Understanding the Adoption, Perception, and Learning Impact of ChatGPT in Higher Education

A qualitative exploratory case study analyzing students’ perspectives and experiences with the AI-based large language model

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AUTHORS: Ondřej Filipec & Johannes Valentin Woithe

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Authors: Ondřej Filipec & Johannes Valentin Woithe

Tutor: Brian McCauley

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Abstract

Background: The incorporation of artificial intelligence (AI), particularly OpenAI's ChatGPT, in higher education, has sparked substantial discourse since its introduction. AI's transformative role in higher education is largely recognized. Despite its potential to revolutionize the pedagogical field, its application raises several concerns. This research seeks to shed light on the dynamics of ChatGPT use in higher education, contributing to the dialogue surrounding AI's educational implications.

Purpose: The analysis of the factors influencing ChatGPTs’ adoption, perception, and its effect on learning experience to help the higher education sector deal with challenges and opportunities presented by the chatbot.

Method: The study is conducted on a constructivist-interpretivist ground, employing a qualitative, observation-based, exploratory cross-sectional case study. Semi-structured interviews, based on the UTAUT 2 model, are used as the primary data collection method. Thematic analysis was used to analyze the data and create themes, which combined with an abductive approach helped derive broader meaning and implications.

Conclusion: Through a trichotomous model, the researchers have identified the primary factors contributing to ChatGPT adoption, its´ role in the post-adoption period, students’ perspectives on the tool and its future integration, as well as what they perceive the role of the educators is in this evolved landscape, and identifying main psychosocial effects the AI tool has on its users. The results highlight the importance of informed decision making, taking a balanced approach to
assimilating ChatGPT into education, paying attention not only to technical benefits but also to impacts on the learner. Suggestions to extend the UTAUT2 model are made. Avenues for further research are opened by the limitations of this study, and by the interplay of the segments in the tri-part model.
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__________________________                                                    __________________________
Ondřej Filipec                                                              Johannes Valentin Woithe
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1. Introduction

This chapter serves as an introduction to the research topic, providing essential background information and contextualizing the study within its broader academic landscape. The research problem is identified, highlighting the necessity to address the existing gap in the literature. This consequently paves the way for establishing the purpose and objectives of this thesis. As a result, the main research question is formulated, which will guide the subsequent investigation and analysis throughout the study.

1.1. Background

The rapid development and integration of artificial intelligence (AI) and machine learning technologies have led to transformative changes across various industries, including higher education (Chen et al., 2020). It has already made considerable impacts in the education sector (AIEd), particularly in administration, instruction, and learning (Chen et al., 2020). Universities are now exploring ways to harness AI's power to enhance the student experience and support faculty in their teaching and research efforts (Zawacki-Richter et al., 2019).

Spearheading the technological frontier is ChatGPT, AI powered chatbot developed by OpenAI, which employs advanced natural language processing (NLP) techniques to comprehend, interpret, and generate human-like content (Adiguzel et al., 2023). It has attracted significant attention for its potential to revolutionize teaching, learning, and research experiences, as noted in the International Journal of Information Management (Dwivedi et al., 2023). Since its launch in November 2022, ChatGPT has garnered millions of active users worldwide, becoming the fastest growing platform ever (Hu, 2023).
Figure 1: Example of interaction with ChatGPT-4

However, the integration of AI tools like ChatGPT in higher education has sparked heated debates (Rudolph et al., 2023). While some critics argue that it encourages plagiarism, others contend that it can significantly improve the interaction between students and faculty, facilitating access to information essential for academic success (Baidoo-Anu & Owusu Ansah, 2023; Zhang, 2023). The ongoing discourse on the potential advantages and drawbacks of AI in higher education is fueled by a continuous stream of new research and findings.

In this context, ChatGPT, as an AI-driven technology, has the potential to revolutionize how students and educators interact, access information, and collaborate. Drawing parallels with previous technological advancements, the adoption of ChatGPT has already fueled discussions about its implications and the importance of responsible use in academia. Our research aims to contribute to this ongoing discussion by examining the role of ChatGPT in higher education.
1.2. Problem

The growing influence of ChatGPT in various domains, including higher education, presents both opportunities and challenges that require comprehensive investigation for informed decision making in the future. This study involves exploring the implications of ChatGPT in higher education stemming from its adoption and perception among students. This topic is of crucial importance, as it holds the potential to significantly impact teaching, learning, and academic integrity in the higher education sector (Susnajk, 2022; Ventayen, 2023).

As the capabilities of language models continue to expand (Kasneci et al., 2023), it is essential for educators, students, and institutions to gain a deeper understanding of the role of AI, specifically ChatGPT, in the context of higher education. For example, the possible applications of ChatGPT by teachers and students, the potential to improve learning experiences as well as the current state of large language models in education create the need for further exploration of the topic at hand (Kasneci et al., 2023).

Several studies have identified a noticeable gap in the literature on the actual usage, perception, and implications of ChatGPT in higher education (Kasneci et al., 2023; Qadir, 2022; Rudolph et al., 2023; Susnjak, 2022; Zhai, 2022). Arguably the most significant gap for our paper is the one identified in the “teaching, learning and scholarly research” section by the aforementioned paper by Dwivedi et al. (2023). The identified area for future research was posed by the question whether ChatGPT can provide an enhanced student learning experience and if so, what is the view and experience of the students. It is essential to understand how ChatGPT is perceived and why it is used by students in order to ensure its effective and smooth accommodation into the higher education sector (Qadir, 2022) and determine its pitfalls and benefits.

1.3. Purpose

The purpose of this study is to contribute to the growing body of research in this area by addressing this gap in the literature on ChatGPT's adoption and perception (and consequently, the resulting effects on students learning experience) among students at JIBS (business faculty) and JTH (engineering faculty) within Jönköping University. Building on the current literature and addressing the identified research gap, this investigation seeks to provide a deeper understanding of the potential benefits, pitfalls, and implications of ChatGPT in higher education.
To fulfill this goal, the study aims to achieve the following objectives:

1. Examine the students' adoption manners with ChatGPT at JIBS and JTH in their academic activities and the factors influencing their engagement.
2. Investigate students' perceptions of ChatGPT's impact on their learning experiences, focusing on aspects such as academic performance, learning efficiency, and motivation.
3. Identify potential issues and concerns related to the adoption of ChatGPT in higher education, particularly regarding academic integrity and the need for alternative assessment methods.
4. Discuss recommendations for educators, students, and institutions on how to effectively deal with ChatGPT in teaching, learning, and assessment practices, considering the identified benefits and challenges.

1.4. Research Question

Taking the above into consideration, the main research question guiding this study is:

I. "How do students in higher education perceive and adopt ChatGPT, and what is its impact on their learning experience?"
2. Literature Review

This chapter establishes the theoretical background for artificial intelligence in education, specifically ChatGPT. Essential literature is synthesized through a topical approach, uncovering the current knowledge landscape and identifying knowledge gaps, followed by a background on our theoretical framework of UTAUT in the area of education. This lays the foundation for the thesis, setting the stage for an in-depth exploration and empirical investigation of ChatGPT's role and potential in higher education.

2.1. Introduction to the Literature Review

The focal point of interest for this thesis is recent innovations in artificial intelligence technology and their application in real world context, which are simultaneously tangible and applicable in the near future. Initially, AI was explored at large, utilizing various 2022 and 2023 publications, including academic research and articles from prominent media outlets. These resources highlighted AI's implications for STEM fields, law, research, and everyday life, with a strong focus on advanced AI forms like machine learning, deep learning, and natural language processing. The significant interest and investment in these areas, especially seen in the Microsoft-Google AI rivalry, revealed the importance of emerging tools like ChatGPT. Concurrently, substantial investments are being directed towards the advancement of Artificial Intelligence in Education (AIEd) and data analysis initiatives (Moore et al., 2019).
Figure 2: Google searches of “ChatGPT” (Data source: Google Trends)

The above graph shows the relative search volume over time, with 100 representing peak popularity for the term.

Upon conducting a preliminary review of the AI domain, an escalating interest in the deployment and utilization of innovative AI technologies within the educational context was observed (Blikstein, 2018; Pham & Sampson, 2022). Several systematic literature reviews on the future usage and prospects of AI were found, either exploring AI across fields or focusing on field specific-AI, such as healthcare, ethics, business, and education (Borges et al., 2021; Enholm et al., 2021; Morley et al., 2020; Shah & Chircu 2018; Zhai et al., 2021; Zhang & Lu, 2021). Consequently, academic papers combining these two fields have been searched for. Exploring AI and innovative technology in education in general, such as digital transformation, has led to the discovery of research which explored a type of AI- specifically chatbots and virtual assistants within the educational environment (Hwang & Chang 2021; Pérez et al., 2020; Winkler & Söllner 2018; Wollny et al., 2021), and its engagement with students (Abbas et al., 2022; Almahri et al., 2020; Frangoudes et al., 2021), where a recommendation for further research was also identified (Almahri et al., 2020; Frangoudes et al., 2021; Hobert & Berens, 2020; Winkler & Söllner 2018). Therefore, the search criteria to find articles researching the role of chatbots in higher education were adjusted. Currently, the most popular and advanced chatbot is ChatGPT, developed by
OpenAI (McFarland, 2023). Subsequently narrowing down our scope, a number of articles and one systematic literature review about ChatGPT in the aforementioned context was found. A knowledge gap was once more identified, as stated in the Problem section - the relevant papers stated more research has to be done to understand the multifaceted complexity of ChatGPT’s impact in university education (Dwivedi et al. 2023; Kasneci et al., 2023; Rudolph et al., 2023; Talan & Kalinkara 2023, Van Dis et al., 2023).

2.2. Method of the Literature Review

Due to the novelty of ChatGPT it was decided to review the relevant literature using a topical approach. This approach helps create a coherent structure for the review by focusing on different aspects of the subject matter and synthesizing the existing literature around these topics. Adopting a topical approach in the literature review enables drawing insights from various disciplines, such as AI (Russell & Norvig, 2016), education (Mishra & Koehler, 2006), and human-computer interaction (Sharp et al., 2019). This cross-disciplinary perspective offers a comprehensive understanding of ChatGPT’s potential impact on higher education and the factors influencing its adoption and integration (Bughin et al., 2017). Furthermore, this approach aids in identifying potential gaps in the existing literature (Tranfield et al., 2003), which can assist in refining research objectives and contribute to the body of knowledge in the field (Alvesson & Sandberg, 2013). Five topics were identified, starting with broad themes related to artificial intelligence, innovation and technology in education, followed by more specific themes related to AI and chatbots in education. The final topic provides a background for the theoretical framework of the study, focusing on the theory of acceptance and adoption of technology and the UTAUT model in education.

Topics:

1. Innovation and technology in education
2. AI in education
3. Chatbots in education
4. ChatGPT in education
5. UTAUT in education
The relative extensiveness of topics required us to search literature relevant to each individual one in order to prevent missing important sources. This resulted in a larger number of used keywords specific to each theme. In terms of databases, Primo and Google Scholar were used. Primo was used as it allowed us to get access to complete articles which sometimes was not possible using Google Scholar. On the other hand, Google Scholar often provided more search results especially when it came to research on ChatGPT as it is a rather new phenomenon. Some articles were also found by studying the reference list of literature reviews on topics relevant to our research.

In order to judge the relevance of articles their title was assessed, abstract and conclusion sections and used the Scimago ranking and the ABS list to ensure the key papers were of high quality. Recent articles were prioritized, while still including older articles to give a solid theoretical background for related areas of interest.

Below, the various segments and targets of our literature search are described, and their findings are discussed. As the segments are getting increasingly narrower in scope, the process of selecting our research problem should become apparent.

**2.3. Innovation and Technology in Education**

Due to the nature of technology being always intertwined with change, the way teachers integrate technology is not rigid (Ruggiero & Mong, 2015). The COVID-19 pandemic has been a driving force in recent years for digital transformation in education, resulting in the adoption of online learning as a permanent feature (García-Morales et al., 2021). This has led to the use of multiple digital tools and platforms to support online learning, AI not being an exception.

Several capabilities have been identified provided by educational technology, such as datafication, human-to-human technology-enabled interactions, human-to-machine technology-enabled interactions, immersive experience, and scalability (Castro, 2019). The importance is emphasized in analyzing the contexts of use of these capabilities, which is thereby an area taken into consideration in this research.

Learning management systems are perceived as the most useful tool by students and teachers (Bond et al. 2018). Moreover, most students already have access to a wide variety of tools and are willing to use digital media for their studies. Even so, there is a need for increased teacher
professional development to address academic digital literacy, as noted by Ng (2012) and Redecker (2017).

There is a great potential of educational technology to improve student engagement, which has been recognized for some time (Bond et al. 2020; Norris & Coutas, 2014). Nonetheless, it is not as simple as forcing technology on students and hoping for a better result. Caution is recommended—without careful strategy and sound pedagogical basis, technology can in fact promote disengagement and hinder learning (Howard et al., 2016; Popenici, 2013). There is generally a positive relationship between the use of technology and student engagement, particularly in university studies (Chen et al. 2010), but research in this area has been predominantly STEM and medicine focused (Li et al., 2017; Nikou & Economides, 2018).

The most frequently researched tools for enhancing student engagement are discussion forums, general websites, learning management systems (LMS), general campus software, and videos (Henrie et al. 2015). Furthermore, digital games, web-conferencing software, and Facebook were the most effective tools for its enhancement (Schindler et al., 2017). There are multiple conclusions on this matter, as other studies found that it was rather text-based tools, knowledge organization and sharing, and multimodal production tools that had the greatest impact on engagement (Bond et al. 2020).

The more students are engaged and empowered within their learning community, the more likely it is that engagement will lead to a range of positive outcomes, and the more likely it is that this energy and effort will then feed back into the activities and learning environment (Bond et al. 2020). While the body of literature exploring the interplay between student engagement and technology continues to grow, a gap remains in its theoretical understanding and grounding (Henrie et al., 2015).

Providing continuous support to enable students' actual use of technology, as well as ensuring instructor presence throughout the course, has been seen as a crucial element. The integration of educational technology facilitates engagement if students find it meaningful, related to real life, and can act without anxiety. In this context, providing opportunities for students to have increased levels of agency in their learning, through activity and technology choice, as well as through collaborative activities, can also enhance it. Through thoughtful engagement with and application
of technology, and by providing students with opportunities for active participation, students' learning can be nurtured (Bond et al., 2020).

2.4. AI in Education - AIEd

Educational AI tools can be classified into three categories: learner-facing, teacher-facing, and system-facing AIEd (Baker et al., 2019). These categories help to distinguish the various roles AI can play in the education sector. Learner-facing AIEd tools, like intelligent tutoring systems and educational chatbots, interact directly with students, providing guidance based on individual needs. Teacher-facing AIEd assists educators with instructional and administrative tasks, such as lesson planning, grading, and student monitoring, offering insights to improve teaching strategies and optimize the learning environment. System-facing AIEd operates at an organizational level, aiding in decision-making, resource allocation, and policy implementation. For example, analyzing large datasets helps administrators make informed decisions benefiting the institution as a whole.

All three categories are currently being used in higher education in a variety of ways, such as in the form of mobile app-enhanced learning (Crompton & Burke, 2018). One of the other prevalent usages of AI in education are learning analytics. They are used to provide insight into students' cognitive processes, which can be used to train them to use cognitive strategies and monitor their own learning (Crompton et al., 2020). Additionally, AIEd has been used for predicting student success, diagnosing knowledge gaps, curating learning materials, facilitating collaboration, automating grading, evaluating student understanding and engagement, and providing personalized feedback and teaching course content (Zawacki-Richter et al., 2019).

An important aspect to consider is that AI can be used to provide students with personalized feedback and guidance on their learning pathways (Maier & Klotz, 2022). The enablement of customization of learning materials to the needs and capabilities of individual students often results in improved learning experiences, engagement and achievements (Chen et al., 2020; Owoc et al., 2021). Since human factors and user experience play a fundamental role in the design of educational technologies (Earnshaw et al. 2018), stakeholders should be aware of the broader picture and consider the goals and standards of instructors, technology integration frameworks, and educational conditions when designing and implementing technology for learning (Foulger et al., 2017).
Attention has also been paid to AIs use in administration and faculty instruction (Chen et al., 2020). Their review found that AI has been extensively adopted by educational institutions in various administrative forms, however the effects it has had are yet to be assessed and generalized. A key impact area which AI has enabled and/or improved was teacher effectiveness and efficiency, resulting in richer or improved instructional quality (Chen et al. 2020). By automating administrative tasks and providing personalized support, AI has the potential to free up teachers' time and allow them to focus on more meaningful interactions with students. In general, AI-based tools and services offer enormous pedagogical opportunities for designing intelligent student support systems and scaffolding student learning in adaptive environments (Zawacki-Richter et al., 2019). With the availability of big data and learning analytics, there is a possibility for quite literally a renaissance in assessment, with providing just-in-time feedback and ongoing analysis of student achievement being much more plausible (Luckin et al., 2016).

Another important research area is focused on utilizing machine learning in education. Exploring the potential of using machine learning (and crowdsourcing) to enhance the education sector, various learning activities were identified that could be improved by ML, including but not limited to generating exam questions and class materials, improving reviews and explanations, and assessing exams (Alenezi & Faisal 2020).

Along with these opportunities come ethical implications and potential risks. Experts are aware of this and are emphasizing time and time again the importance of developing ethical frameworks for AI applications in education (Baker et al., 2019; Russel & Norvig, 2016). In one instance, administrators of said AI systems may be tempted to replace teaching with profitable automated AI solutions in times of budget cuts, leading to issues such as job displacement (Zawacki-Richter et al., 2019). In response, several institutions have been established to develop ethical governance frameworks for AI in education, such as the Institute for Ethical AI in Education in the UK and the Analysis & Policy Observatory in Australia. Another problem is the inherent biases, corrupted data or (in)deliberate actions of programmers of the AI that can lead to deviations of AI behavior, which in turn can result in “maliciousness” (Zanetti et al., 2019). It is pivotal to ensure that AI is used ethically and transparently and addressing concerns about the potential for AI to exacerbate existing inequalities in education (Owoc et al., 2021).
It is essential to note that AI applications in education should not be based on what is technically possible, but rather what makes sense pedagogically. This requires critical reflection on the ethical, pedagogical, social, cultural, and economic dimensions of AIEd, which have been largely overlooked in current literature (Zawacki-Richter et al., 2019). There remains a need for innovative research and practices to increase the learning impact of AIEd, such as adopting design-based approaches (Easterday et al., 2017). In order to make the most of these technologies, it is important to understand the psychological processes involved in learning, as well as the goals and standards of instructors and the educational conditions that support the use of technology. In the lens of epistemic cognition in learning, educational technologies should be primarily designed to support students' development of this critical thinking skill (Sandoval et al. 2016). Furthermore, the lack of theoretical frameworks within the field of educational technology as a whole presents a contemporary challenge for additional research (Hew et al., 2019).

Overall, AI proved to enhance online instructions, student engagement, streamline educational administration, increase learning and instructive quality by offering accurate prediction, assessment and engaging students with online materials and environments (Luckin et al., 2016; Ouyang et al. 2022; Yang et al., 2020; Zawacki-Richter et al. 2019). The literature demonstrates the growing interest in the use of AI in education and highlights the potential benefits and challenges associated with its implementation. Future research in this area is sought after to further explore the impact of AI on education and to develop effective strategies for its implementation (Boyd & Holton, 2018; Karsenti, 2019; Woolf et al., 2013).

### 2.5. Chatbots in Education

As the latest culmination of AIEd, chatbots in education have emerged as a significant development in the field of AI technologies for supporting teaching and learning activities (Okonkwo & Ade-Ibijola, 2021). The growing number of studies focused on the use of chatbots in education (Wollny et al., 2021) implies a heightened interest in incorporating this technology within the educational sector. Presently, chatbot technology in education may be situated in the "Innovation Trigger" phase (Linden & Fenn, 2003). This phase is characterized by high expectations for the technology, yet practical and in-depth experiences with it remain limited. Indeed, that is the case, as the main uses of chatbots in education have so far been “only” supporting student well-being, engaging students and marginally assisting teaching (Durall &
Kapros, 2020). As a result, there is an increasing drive to explore and understand the potential applications and benefits of chatbots.

Chatbots have the potential to significantly improve learning outcomes and student happiness (Winkler & Soellner, 2018), alongside other advantages listed in the previous segment of the literature review. They can provide benefits such as content integration, quick access, motivation and engagement, student assistance, and immediate assessment (Durall & Kapros, 2020; Mikic-Fonte et al., 2018; Okonkwo & Ade-Ibijola, 2021; Ranoliya et al., 2017; Ureta & Rivera, 2018). Moreover, chatbots have the ability to be equally effective at creating emotional, relational, and psychological benefits as a human conversation partner (Ho et al., 2018), which can be leveraged in student supporting systems.

However, chatbot implementation also comes with challenges such as ethical issues, insufficient evaluation, user attitude, their inherent programming, data integration issues, and the potential for misuse of the tool for academic dishonesty (Chatterjee & Bhattacharjee, 2020; Cunningham-Nelson et al., 2019; Paschoal et al., 2018; Rahman et al., 2017; Ruan et al., 2019).

Various recommendations for future research have been made, including the development of chatbot models or implementation frameworks, practical integration, open educational resources, establishing ethical principles for the use of chatbots in education, and usability evaluation (Hwang et al., 2020; Lin & Tsai, 2019; Medeiros et al., 2018; Paschoal et al., 2018; Pham et al., 2018; Smutny & Schreiberova, 2020; Sreelakshmi et al., 2019).

Overall, many of the benefits and drawbacks permeate from the reviewed AIEd in education segment of the thesis. It is evident from the increasing volume of research done on chatbots in education that this is a sought-after avenue with a need to advance further (Wollny et al., 2021), signifying the wide spread of chatbot technology within the educational landscape and the awareness of its importance. Numerous studies mostly examining a wide range of university-specific chatbots have been conducted. However, given the predominance of ChatGPT, it was the authors’ decision to center research efforts on this tool specifically. This focus can enhance the relevance of our findings and clarify its wider implications in education.
2.6. ChatGPT in Education

It is duly noted there is limited academic literature on the use of various versions of ChatGPT in higher education (Rudolph et al. 2023). Despite the examination of ChatGPTs functionality, strengths, and limitations, as well as its implications, applications, opportunities, and threats, the novelty of the topic has resulted in a limited volume of research. Consequently, there is a lack of reliability and replicability within existing studies. Several authors mentioned below have acknowledged this gap and emphasized the need for further research to strengthen our understanding of ChatGPT and its impact on various domains.

One of the potential applications of ChatGPT in higher education is as a self-studying instrument. ChatGPT has also been shown to be helpful in writing coherent and informative papers and can even pass multiple university-grade exams (Zhai, 2022). To improve students' critical thinking and creativity, educators are encouraged to design AI-involved learning tasks that engage students in solving real-world problems.

ChatGPT has been found to be useful in finance research for idea generation, literature synthesis, and data identification (Rudolph et al., 2023). It is less competent in content that requires higher-order thinking. Additionally, there are concerns that ChatGPT is being exploited for academic misconduct, as touched upon earlier (Susnjak, 2022; Ventayen, 2023).

Several papers have identified a need for furthering the knowledge on ChatGPT in the higher education setting, both directly and indirectly (Alenezi & Faisal, 2020; Kasneci et al., 2023; Qadir, 2022; Rudolph et al., 2023; Susnjak, 2022; Zhai, 2022).

2.7. UTAUT in Education

The unified theory of acceptance and use of technology is a tested model which determines the intention to use and active use of technology (Khechine et al., 2020). Due to the progressive development of educational technology this model can be easily applied to the setting of education. It has even been claimed that the UTAUT model has emerged as the theoretical groundwork for future research on technology adoption in the domain of e-learning (Wedlock & Trahan, 2019).

In a review of studies which use UTAUT as a conceptual framework (Attuquayefio & Addo, 2014) 12 out of 20 studies assessed were applying the UTAUT model in the context of education. A
similar review with a focus on the UTAUT 2 framework found that 2 out of 17 studies were conducted within the educational field (Alazzam et al., 2015).

Evidently, this framework is being used in the educational context. However, its extension, has been applied less frequently. The original version of the model is the preferred version in education research (Yee & Abdullah, 2021). This is because most technologies, such as learning management systems (e.g., Canvas), in the educational context are provided by the institutions. Therefore, they are studied using UTAUT which was created for the organizational environment, while UTAUT2 is focused on assessing consumers' acceptance and use of information technology.

Even though the model was originally developed and tested using quantitative analysis, researchers have also followed a qualitative approach, also in higher education (Williams et al., 2021). The framework can be applied to different groups of people to analyze their specific acceptance of technology. In education research various versions of UTAUT have been used to explain the academicians, university students, secondary students and primary school children acceptance or adoption of technology (Yee & Abdullah, 2021).

Another key point to consider is in which educational setting (primary, secondary, tertiary education) studies are carried out. A systematic literature review on UTAUT in mobile learning adoption established that most research was being done in higher education settings (Aytekin et al., 2022).

One study even assessed student’s acceptance and use of chatbots in universities using UTAUT2. Its authors suggested that future research should be done in different departments, universities, and countries (Almahri et al., 2020).

Hence, UTAUT2 has been found to be the most suitable theoretical lens, given its relatively recent development and intended purpose. A justification for selecting this specific model can be found below.
3. Theoretical Framework

This chapter provides the theoretical base for understanding the perception and the possible adoption of ChatGPT in the context of higher education, grounding the discussion with the UTAUT2 model. The chapter also acknowledges the original UTAUT model's roots in organizational contexts, while arguing for the relevance of UTAUT2 in consumer contexts, such as students’ acceptance of ChatGPT. The potential to extend the UTAUT2 model is identified.

3.1. Background on Technology Acceptance Theories in Education

The infusion of new technologies into education, including an array of ICTs for learning, teaching, and assessment, has garnered considerable interest (Granić, 2023). Key research areas include e-learning, mobile learning, learning management systems, personal learning environments, MOOCs, and supportive technologies like social media platforms, assistant robots, simulators, and VR/AR technologies.

Prominent research in this direction has mostly focused on usage of new technologies by students' (Abdullah & Ward, 2016; Granić & Marangunić, 2019), with some studies involving university teaching staff. The Technology Acceptance Model (TAM) is the most commonly used model in acceptance studies (Al-Emran & Granić, 2021; Granić & Marangunić, 2019), while the UTAUT model is also well accepted and used in this context.

3.2. UTAUT

UTAUT stands for unified theory of acceptance and use of technology and is a technology adoption model developed by Venkatesh et al. (2003). The model itself is the culmination of efforts to create a framework of a unified approach which takes into consideration the variables reflecting different perspectives and disciplines and increases the applications of the existing theories dealing with technological acceptance to variable contexts (Venkatesh et al., 2003). The authors of UTAUT conducted an extensive review on user acceptance, inspecting eight pre-existing prominent models, subsequently developing a comprehensive unified model, incorporating elements from the eight models they had analyzed. The result is “one of the most comprehensive technology acceptance models” (Nordhoff et al., 2020). Therefore, it is well suited to explain why
a new technology like ChatGPT is being used by such a large number of people in the field of higher education.

The UTAUT model states that actual usage of a technology is a result of behavioral intention. The model intends to explain both people's intention of using a technology as well as actual usage behavior. It does this by looking at four key predictors: performance expectancy, effort expectancy, social influence and facilitating conditions. The impact of these predictors is also moderated by gender, age, experience and voluntariness of use.

![UTAUT Model Diagram](Image)

*Figure 3: UTAUT2 (Venkatesh et al., 2012)*

The original UTAUT model was developed to assess technology acceptance and adoption by employees in the organizational context. In 2012 the model was extended to better explain consumers' acceptance and use of information technology. This iteration is known as the UTAUT 2 model and has 3 additional predictors, which are hedonic motivation, price value and habit (Venkatesh et al., 2012). Despite the less frequent application of UTAUT 2 in educational contexts,
its choice for exploring the adoption and perception of ChatGPT in higher education in this thesis is justified due to the models focus on the consumers' (students). Consequently, UTAUT 2 offers a more suitable framework than UTAUT for understanding the factors influencing students' adoption and utilization of ChatGPT in their learning experiences.

Our research has the possibility to enhance the UTAUT2 model by identifying potential new key predictors that are specific to the use of AI tools in higher education. To achieve this and due to the qualitative nature of our study, the moderating effects of age, gender, and experience will not be considered, as this would not add value while overly complicating the scope of our research.

Despite UTAUT being originally a quantitative model, several studies have used a qualitative version of the UTAUT model to study new technologies, which have provided valuable insights (Bixter et al., 2019; Hasija & Esper, 2022; Rempel & Mellinger, 2015). Researchers who have employed the qualitative variant of the UTAUT model have effectively utilized it as a foundation for devising or, at the very least, informing their interview questions (Williams et al., 2021). In addition, prior studies have expanded upon the UTAUT model by incorporating supplementary categories when the existing ones proved insufficient in adequately addressing the data (Bixter et al., 2019). Our study was inspired by this previous research to use the UTAUT model to design interview questions and potentially expand the model itself.
4. Methodology

In this section, the methodology used to carry out the research study is presented and justified. The relationship between the research purpose and the selected research methodology is clarified. The choice and the reasoning for a qualitative-based research approach is described. Abductive approach is explained and finally, the research design is addressed, where it is explained why a case study was deemed most fitting for this research.

4.1. Research Philosophy

The research philosophy of this paper will branch out from the basis of ontology, i.e., the “nature of reality” (Wilson, 2010). In research, it asks us to consider what the social construct of the world is and our perception of it, or in other words, how we understand the behavior of society as a whole (Wilson, 2010).

Constructivism, the ontological paradigm for this study, emphasizes the importance of individuals constructing their own perceptions and understanding of the world through experiences and interactions, while acknowledging the influence of social and cultural factors (Applefield et al., 2000). The choice of our method (thematic analysis), which will be explored more in-depth later on, and use of the UTAUT 2 model align with the constructivist ontology. Thematic analysis identifies and explores patterns, themes, and meanings within qualitative data, based on the belief that responses carry meaningful, multifaceted insights shaped by individuals' social contexts, experiences, and beliefs. The UTAUT2 model, used in our interview design, similarly posits that individuals' behaviors and intentions are molded by their perceptions and social environment, reinforcing our constructivist path.

The ontological paradigm of constructivism is closely linked to the epistemology of interpretivism. Epistemology explores the nature and scope of knowledge, with interpretivism, positivism, and pragmatism being the primary paradigms (Feast & Melles, 2010). Adopting an interpretivist perspective, this study understands the social world through individuals' culturally and socially shaped interpretations of experiences, acknowledging multiple realities (Grix, 2019; Guba & Lincoln, 1994). It focuses on the in-depth exploration of a specific phenomenon and values the role of social interactions in shaping attitudes and behaviors (Alharahsheh & Pius, 2020; Myers, 2008). Emphasizing the exploration of diverse participant experiences (Orlikowski, 1992), this
approach also recognizes the researcher's influence, advocating for reflexivity and transparency in the research process, making it a rational choice for this paper.

By utilizing a constructivist-interpretivist approach, this research aims to contribute to existing and future research in this area and supporting the education sector in adapting and integrating large language models (Gilson et al., 2023; Kung et al., 2023).

However, focusing on subjective experiences and perceptions may limit the generalizability of findings to other contexts or populations, and reaching consensus can be challenging (Rolfe, 2006; Scotland, 2012). Reproducing results may be difficult, but transparency of the process allows for partial replication (Aguinis & Solarino, 2019). In-depth analysis of a small sample provides rich insights but may not fully comprehend a phenomenon or establish cause-and-effect relationships (Queirós et al., 2017). Additionally, the constructivist ontology's emphasis on multiple subjective realities poses challenges in data collection and analysis, potentially leading to misinterpretation or inaccurate conclusions (Kaptchuk, 2003).

4.2. Research Approach

The abductive research approach was selected for this study, as it is particularly well-suited for addressing gaps in existing knowledge (Tavory & Timmermans, 2014). Given the established scarcity of empirical data on the specific topic, an abductive approach excels at allowing for generating new theoretical insights by identifying patterns and relationships in the data (Dubois & Gadde, 2002; Kolko, 2010). Abduction requires a theoretical lens, which in our case is the UTAUT 2 model, encouraging the identification and investigation of new ideas that fall outside of the initial theoretical framework (Hurley et al., 2021; Meyer & Lunnay, 2013). In previous studies, by using the abductive approach, insights from interview data were deepened by analyzing and linking data to preexisting knowledge and literature (Davey & Grönroos, 2019) and offered a framework for theory building through a cross-fertilization process, where new combinations were developed through a mixture of existing theory and new data (Dubois & Gadde, 2014).

Abductive reasoning facilitates a continuous dialogue between data and theory, allowing researchers to refine their understanding with emerging information (Kovács & Spens, 2005). Abductive reasoning offers flexibility, a holistic perspective, creative thinking, practical implications, and integration of disciplines, making it ideal for applied research in real-world
settings (Alvesson & Sköldberg, 2017; Dubois & Gadde, 2002). Abduction emphasizes theory development, refining existing knowledge, and creating new combinations through established models and empirical findings, rather than confirming existing theories (Dubois & Gadde, 2002). While helpful in this research context, it has limitations. It often leads to tentative conclusions or hypotheses rather than definitive answers (Hurley et al., 2021). In this study, findings may suggest potential relationships between characteristics of ChatGPT and students' adoption and perception, but do not provide definitive causal factors. Researchers must also avoid confirmation bias, as abduction might lead to favoring specific explanations, resulting in an incomplete understanding of the phenomenon (Garbuio & Lin, 2021). Lastly, since abductive research is exploratory and relies on the researcher's creativity and intuition, replicating findings and establishing generalizability may be challenging (Hurley et al., 2021).

Among others, this paper draws inspiration from a study done on case studies using the abductive approach by Dubois and Gadde (2002). The authors emphasize that theory and empirical observation are interconnected and that a researcher cannot fully understand theory without observing the empirical world and vice versa. The following figure demonstrates that a framework, a case, the empirical world and a theory are to be the determinants of arriving at a research conclusion.

![Figure 4: Systematic Combining adapted from Dubois & Gadde (2002)](image-url)
The inductive nature of the thematic analysis process complements the abductive approach, as it facilitates the discovery of novel insights and patterns in the data. By allowing themes and codes to emerge directly from the qualitative data collected through semi-structured interviews, the research can capture “more than meets the eye”.

Inductive and abductive approaches share a similarity in not yielding the guaranteed truths associated with deductive reasoning (Hurley et al., 2021). Nevertheless, each approach is distinct. Inductive reasoning relies on evidence to support conclusions that lack the certainty of deductive conclusions, while abductive reasoning proposes speculative yet plausible explanations to account for unexpected or new phenomena (Folger & Stein, 2017). Some scholars characterize abductive reasoning as “induction plus an explanation” (Harman, 1965; Lipton, 2004), suggesting that abduction seeks to provide meaningful explanations or "informed guesses" to clarify specific occurrences, thus presenting more robust evidence than conclusions derived through inductive reasoning (Green et al., 2007). Due to these reasons, abduction is the selected approach.

4.3. Research Strategy

Qualitative research is chosen for this study due to its focus on understanding students' experiences and perceptions in higher education. This approach allows us to engage deeply with participants' narratives and subjective experiences, providing richer, more comprehensive insights than quantitative methods might yield. Furthermore, as the study focuses on new phenomena in a rapidly evolving digital landscape, it requires the flexibility inherent in qualitative research to capture emerging themes. The selected qualitative methods also align well with the constructivist ontology of our study, emphasizing the co-construction of knowledge through interactive processes. In the context of the whole selected methodology, freedom is allowed to refine the existing theory while simultaneously being grounded in it (Dubois & Gadde, 2002; Kovács & Spens, 2005; Timmermans & Tavory, 2012)

4.4. Research Design

The proposed research design for this thesis will utilize a cross-sectional, exploratory and observation-based case study approach, which involves a detailed examination of a particular
instance, event, or phenomenon, typically within its real-world context (Baxter & Jack, 2008). A case study provides an opportunity for a comprehensive understanding of the complexities and dynamics (Lindvall, 2007) of how and why ChatGPT is being used in the given environment.

A case study is appropriate for this research due to several reasons. It allows for thorough examination of the phenomenon within the university context (Baxter & Jack, 2008), exploration of external factors influencing the phenomenon (Jacobsen et al., 2002), examination from multiple perspectives (Krusenvik, 2016), discovery of unanticipated information (Krusenvik, 2016; Merriam, 2009), increased humanistic experience (Stake, 1978; Yin, 2009), and more natural data capture (Gomm et al., 2000). As ChatGPT is in its early stages, real-life cases help raise awareness and understand its potential and shortcomings in education. Using a case study can inform policy development, guidelines for ChatGPT integration, and develop theories or hypotheses for further research (Krusenvik, 2016).

The limitations of using a case study include limited generalizability due to the specific context in which the research is conducted, making it potentially unrepresentative of the broader population (Flyvbjerg, 2006). Additionally, subjectivity of researchers and interviewees may influence data interpretation and quality (Flyvbjerg, 2006; Guba & Lincoln, 1994). It's essential to consider these limitations and ensure transparent research conduction to minimize potential bias in the findings.
5. Method

In this chapter, the process of data collection is outlined, which serves as the basis for the results and subsequent discussion. The initial steps of the data collection process are explained. Next, the data analysis process is described, including the methods and procedures used for interpreting the collected data. Finally, the chapter concludes with a discussion of the measures taken to ensure that the research process was conducted in an ethical and GDPR-compliant manner.

5.1. Data Collection

This study employed a semi-structured interview approach to encourage dialogue with the interviewees regarding the research topics and allow them to express their independent thoughts (Adams, 2015). However, due to the scope of the research, this particular approach can lead to a reduced sample size due to a relatively short time span of the conduction. The authors have conducted a total of 18 interviews, collectively adding up to 6 hours of interview time. They lasted between 10 to 35 minutes each. In additional time, topics such as potential interview cases were discussed, and informal conversations were held. Any non-relevant data that may have been deemed sensitive or irrelevant to the analysis was excluded from the transcription and coding processes.

Interviews were chosen as the primary data source for several reasons. Firstly, they provide a rich data source for analysis (Monday, 2020), with the semi-structured variant offering flexibility, adaptability, and increased comfort for participants (Adams, 2015; Kallio et al., 2016; McIntosh & Morse, 2015). They provide direct communication with first-hand ChatGPT users, offering unique insights and perspectives (Blaxter et al., 2006). They allow in-depth exploration of complex phenomena and deeper understanding of interviewees' experiences, attitudes, and beliefs (Alshenqeeti, 2014), in addition to real-time question adjustments and promoting mutual understanding (Dörnyei, 2007). They can build rapport and promote transparency (Cotton et al., 2023; Grierson, 2022; Mhlanga, 2023). The process was facilitated by technology that simplifies transcription and data review (Berg, 2007). Despite advantages, interviews have limitations, including time consumption, smaller scale, anonymity concerns, potential biases, conflicts of interest, and inconsistencies (Alshenqeeti, 2014).
Convenience and snowball sampling methods were combined to recruit interview participants (Biernacki & Waldorf, 1981; Etikan et al., 2016). Initially, convenience sampling was employed, reaching out to individuals from our social circles, who use ChatGPT and are students either in the business or engineering faculty (Etikan et al., 2016). This was followed by snowball sampling, asking interviewees to recommend other ChatGPT users (Goodman, 1961). This method expanded our sample and provided access to relevant individuals (Noy, 2008). Combining both methods allowed us to gather diverse interviewees and collect rich data while maintaining practicality and efficiency (Teddlie & Yu, 2007).

Table 1: An overview of primary data

<table>
<thead>
<tr>
<th>Interview ID</th>
<th>Interview Length &amp; Location</th>
<th>Interviewee’s Faculty</th>
</tr>
</thead>
<tbody>
<tr>
<td>JIB51</td>
<td>15:58 min; face-to-face</td>
<td>business</td>
</tr>
<tr>
<td>JIB52</td>
<td>25:35 min; face-to-face</td>
<td>business</td>
</tr>
<tr>
<td>JIB53</td>
<td>17:31 min; face-to-face</td>
<td>business</td>
</tr>
<tr>
<td>JIB54</td>
<td>19:44 min; Zoom</td>
<td>business</td>
</tr>
<tr>
<td>JIB55</td>
<td>13:24 min; face-to-face</td>
<td>business</td>
</tr>
<tr>
<td>JIB56</td>
<td>25:16 min; Zoom</td>
<td>business</td>
</tr>
<tr>
<td>JIB57</td>
<td>24:29 min; Zoom</td>
<td>business</td>
</tr>
<tr>
<td>JIB58</td>
<td>22:45 min; face-to-face</td>
<td>business</td>
</tr>
<tr>
<td>JIB59</td>
<td>16:28 min; face-to-face</td>
<td>business</td>
</tr>
<tr>
<td>JIB510</td>
<td>10:11 min; face-to-face</td>
<td>business</td>
</tr>
<tr>
<td>JTH1</td>
<td>32:17 min; Zoom</td>
<td>engineering</td>
</tr>
<tr>
<td>JTH2</td>
<td>22:37 min; Zoom</td>
<td>engineering</td>
</tr>
<tr>
<td>JTH3</td>
<td>28:23 min; Zoom</td>
<td>engineering</td>
</tr>
<tr>
<td>JTH4</td>
<td>22:20 min; Zoom</td>
<td>engineering</td>
</tr>
<tr>
<td>JTH5</td>
<td>18:20 min; face-to-face</td>
<td>engineering</td>
</tr>
<tr>
<td>JTH6</td>
<td>13:56 min; face-to-face</td>
<td>engineering</td>
</tr>
<tr>
<td>JTH7</td>
<td>18:15 min; Zoom</td>
<td>engineering</td>
</tr>
<tr>
<td>JTH8</td>
<td>15:24 min; face-to-face</td>
<td>engineering</td>
</tr>
</tbody>
</table>

5.2. Data Analysis

The method chosen for data analysis is thematic analysis by Braun & Clarke (2006). By applying this time-tested approach, it was ensured that our analysis captures the depth and complexity of the data, providing a thorough understanding of the relevant factors (Nowell et al., 2017).
Thematic analysis is a method for identifying, analyzing and interpreting themes in qualitative data (Caulfield, 2022; Terry et al., 2017). It is a fitting way to gain an understanding of individuals' beliefs, thoughts and awareness about a certain topic and offers a structured and systematic way to do so (Braun & Clarke., 2019).

The way of conducting thematic analysis in this research follows the process illustrated in figure 5 (Caulfield, 2022).

![Thematic Analysis Process](image)

**Figure 5: Thematic Analysis Process adapted from Caulfield (2022)**

In the context of applying thematic analysis to data from interviews the audio recordings of the interviews were transcribed using Otter.ai to create textual representations of the conversations to facilitate the next steps of the data analysis (McLellan et al., 2003). The transcripts were manually checked for accuracy retrospectively. The transcription process allowed for an in-depth examination of the data and facilitated the initial identification of themes and patterns (Bailey, 2008). Following the transcription, the data was cleaned to ensure that any irrelevant information was removed, and any errors were corrected. This step was crucial in maintaining the quality and reliability of the data, ensuring that the subsequent analysis would be based on accurate and coherent information (Bryman, 2016).

In the analysis process, familiarity with the data was achieved through reading transcripts, followed by marking text segments with codes based on their meaning. These codes facilitated the generation of subthemes and overarching themes that conceptually linked the data. A subsequent review and theme redefinition ensured accurate representation of the collected information. The end-product of this thematic analysis aided in formulating research findings and their implications.
5.3. Ethical Considerations

Acknowledging and addressing ethical considerations is crucial in research, especially in qualitative analysis (Farquhar, 2012). Informed consent was obtained from all participants who were informed about the study's nature, purpose, and potential risks (Regulation 2016/679). Anonymity and confidentiality were maintained through measures like encrypting and password-protecting interview details.

Power imbalances in the researcher-participant relationship were minimized by creating a comfortable interview environment (Ganga & Scott, 2006). The study considered the potential impact on participants, giving them time to contemplate responses and providing support if necessary. Adherence to ethical guidelines and regulations, such as GDPR, was ensured.

Intercoder reliability was paid attention to in an effort to ensure the consistency and credibility of the qualitative data interpretation. Coding was done independently, followed by a comparison of the results. Discrepancies were resolved through discussions until consensus on the codes was achieved.

The study aimed to ensure trustworthiness and quality by focusing on four critical categories: credibility, transferability, dependability, and confirmability. Credibility was aimed at delivering accuracy and trust in the investigation, with the researchers representing the multiple realities provided by interviewees, ensuring the study's credibility through cross-checking. Transferability concerned the capacity to apply the study's findings to various settings beyond higher education and the specific chatbot, focusing on potential extrapolation and requiring comprehensive presentation of the research process and assumptions. Dependability emphasized transparency in the research process, seeking to strengthen reliability and to provide a way the results could be replicated in similar studies. Confirmability, the final category, focused on the authors' objectivity and neutrality, including acknowledging the researchers’ predispositions, assumptions, and beliefs, and was also achieved by providing raw data and unbiased information.
6. Results & Empirical Findings

The key findings from our thematic analysis of the interview data are presented. This section aims to summarize gained insights in the main identified themes and their related subthemes, providing a structured and comprehensive overview of the results. Each of the thematic sections includes the most relevant data interpretations and is explained through its sub-themes and quotes.

From the primary data a total of 103 distinct codes was extracted. The iterative process of coding ultimately leads to the formation of sub themes that consolidated the findings from the main 5 themes:

T1: Embracing ChatGPT: accessibility, UX, social influence, and net benefits as primary drivers of adoption (Pre-Adoption)

T2: ChatGPT as a personalized learning enabler (Post-Adoption)

T3: Students perspectives on the shift in higher education and its implication

T4: Educators and institution´s role in balancing ChatGPT adoption

T5: Emotional and cognitive effects on learning experience

This hierarchical structure demonstrates the approach taken to synthesize the data and extract meaningful insights. The process is visually represented in the figures below, providing a clearer illustration of the thematic relationships within our findings.
6.1. Structure of the Data Analysis

C7: Perceived utility of ChatGPT
C48: Shallow learning curve
C49: Ease of use
C78: User interface/user experience
C96: Responsiveness and speed of generating answers

C26: Peer recommendation of ChatGPT
C28: Self-recommendation of ChatGPT to others
C50: Influence of social media on ChatGPT adoption
C51: Perceived disadvantage from non-use due to ChatGPT’s capability
C57: Offline social influence on ChatGPT adoption

C6: Limited reliability of ChatGPT
C12/45: Limitations in reference provision and outdated information
C46/94: Variability in responses and challenges in effective prompting
C58: Repetitiveness and redundancy in ChatGPT-generated content
C65/77: Operational limitations: traffic-induced unavailability and quick inactivity-triggered logouts
C66/68: Limited context awareness and transparency of ChatGPT
C72: Need for user editing
C92: Restrictions on text input length

S1: Valuing ChatGPT’s practical benefits, user friendliness and interface
S2: Adapting to peer influence and addressing the fear/disadvantages of missing out
S3: Tolerating technical and functional barriers to adoption thanks to advantages provided by ChatGPT usage

T1: Embracing ChatGPT: accessibility, UX, social influence, and net benefits as primary drivers of adoption (Pre-Adoption)

S4: Enhancing learning experience as a personalized complementary tool
S5: Empowering students by simplifying complex tasks
S6: Fostering creativity through structuring, feedback, idea generation and support

T2: ChatGPT as a personalized learning enabler (Post-Adoption)
Figure 6: Structure of the data analysis

C32: Enjoyment of usage of ChatGPT
C75: Increased motivation as result of usage
C103: Increased creativity as result of usage

C8: User’s limited capability to evaluate the validity and quality of ChatGPT outputs
C30: Concerns about ChatGPT’s impact on users’ moral judgment
C54: Perceived lack of human touch in ChatGPT-generated content
C55: Excessive Dependence on ChatGPT-Generated Content and its implications
C81: Negative social perception of ChatGPT
C101: Caution against blind belief in ChatGPT output
C102: User dissatisfaction with ChatGPT usage

S11: Stimulation of motivation and creativity with AI assistance leading to enhanced engagement

S12: Personal and psychological barriers to ChatGPT usage

T5: Emotional and cognitive effects on learning experience
6.2. T1: Embracing ChatGPT: Accessibility, UX, Social Influence, and Net Benefits as Primary Drivers of Adoption (Pre-Adoption)

The first theme that emerged from the data revolves around the factors that contribute most heavily to the adoption of ChatGPT as a learning tool. This theme encompasses how students appreciate ChatGPT's practical benefits and user-friendly nature, adapt the AI technology due to peer influence and fear of missing out, and tolerate potential challenges due to the perceived advantages of using ChatGPT.

This subtheme reflects students' appreciation of ChatGPT's utility, its accessible and user-friendly interface, along with its fast and responsive nature. It also captures the perceived practical benefits of using ChatGPT, such as the ease of use and shallow learning curve.

Addressing the utility of ChatGPT, one participant portrayed its use in facilitating a quick and easy exploration of relevant academic topics: "I think the main benefit is that as a convenience factor, it allows for a very quick and easy outlook on potential topics in studies"-JIBS8. This viewpoint puts ChatGPT in the role of a convenient tool for students, aiding in the swift exploration and understanding of study areas, and thereby illustrating one of the benefits.
Students particularly appreciated the user interface and overall user experience offered by ChatGPT. As one student reported, “I think the user interface is very clean. They definitely let the whole user experience, that is just hit a few buttons. And then you're there. Also, you can see your previous prompts and answers as well. Yeah, I think it's just super simple to use. That's the main thing”-JIBS 7. This positive feedback underscores the value of a clean, intuitive interface and a seamless user experience in enhancing the utility, accessibility and contributing to the adoption of ChatGPT.

The speed and responsiveness of ChatGPT also stood out to the students: "Yeah, nothing I encountered so far had this responsiveness. And it's almost like you're talking to a human."-JTH8. This observation underpins the interactive and engaging nature of ChatGPT, which contributes to its perceived appeal as a learning tool.

A student mentioned the simplicity of using ChatGPT, saying, "I think it's pretty easy. Like anybody can use it. It's like talking to a person."-JIBS6. This comment emphasizes the easy-to-use nature of the tool, making it a go-to resource for many. It is important to note the last sentences of this and the previous quote, which bring to attention the human-like qualities of the AI, which evidently contribute to adoption of the tool.

Adding to the theme of user-friendliness, the same student recognized the progressive mastery over the tool, remarking, "you can (...) learn ways to use it more effectively, and ask more effective questions, (...) and that comes with experience. But yeah, definitely, it's a learning curve."-JIBS6. This perspective illustrates the underlying notion of a shallow learning curve, where users can quickly grow comfortable with ChatGPT, yet still continuously refine their interactions over time.

6.2.2. S2: Adapting to Peer Influence and Addressing the Fear/Disadvantages of Missing Out

The second subtheme discusses the role of social influences on students' decision to use ChatGPT. It includes codes that encapsulate peer recommendations of ChatGPT, self-recommendation to others, influence of social media on ChatGPT adoption, and the fear of disadvantage due to non-use of ChatGPT. It underlines the importance of social factors in shaping students' adoption of the technology and their attitudes towards ChatGPT.
The power of peer recommendation in the adoption of ChatGPT is demonstrated by the following student's account: "Someone in my class told me about it, and how it can pretty much write code for you. (...) And it's good. So yeah, I used it to explain my codes that I wrote."-JTH3. This quote emphasizes the recurring significance of peer influence, particularly in an academic setting, in initiating curiosity and encouraging practical application of new tools like ChatGPT.

Showcasing the ripple effect of social influence and technology adoption, one student shared, "I might have influenced some other people. (...) I saw it on the internet. And I was eager to try it. But I think I have like made some friends at least try it and see it around."-JTH8. This illustrates both the impact of online exposure and the role of self-recommendation, suggesting that the cycle of discovery and recommendation can prompt and sustain ChatGPT's use among students.

A sense of urgency and fear of missing out is captured in the following statement: "I had this urge to use it as well, because then I will be left behind in the race."-JIBS7. The perceived disadvantage of not using ChatGPT is apparent here, reflecting a concern that non-users might lag behind in their academic pursuits. This competitive pressure further stresses the influential role of social dynamics in ChatGPT adoption.

### 6.2.3. S3: Tolerating Technical and Functional Barriers to Adoption Thanks to Advantages Provided by ChatGPT Usage

The third subtheme focuses on the technical and functional barriers students face when using ChatGPT but are willing to overlook due to the benefits it provides. This includes limitations such as variable reliability, incorrect reference provision, repetitiveness and redundancy in the tool's output, and operational limitations such as traffic-induced unavailability. Despite these challenges, students seem to perceive that the benefits of using ChatGPT, such as instant access to information and the convenience of learning, outweigh the potential drawbacks, as evidenced by their continued usage of the tool in spite of their awareness of its limitations.
Reflecting on the reliability of ChatGPT, one student cautioned: "(...) Not all the time reliable. So you have to take it with a grain of salt."--JTH2. This statement underlines the need for a critical approach when interacting with ChatGPT, acknowledging the occasional inconsistency in its responses, yet also revealing the user's willingness to navigate these potential hurdles.

Speaking about limitations, the same student remarked on the reference provision of ChatGPT, stating, "(...) sometimes they just give bulls*** references. That doesn't even exist. But that's just to make you happy."--JTH2. This quote reflects the need for users to critically evaluate the references provided by ChatGPT, suggesting a keen awareness of the tool's occasional shortcomings, while also implying the user's continued engagement.

The repetitiveness and redundancy of ChatGPT's content was another area of concern raised by students. A student encapsulated this issue, stating, "But obviously, it's very repetitive"--JIBS2. This feedback suggests that while ChatGPT can be a helpful tool, its propensity for repetitive responses can lead to dissatisfaction among users, detracting from the overall user experience.

While discussing operational limitations, another participant mentioned the occasional issue of high traffic leading to access problems. "So I've definitely been locked out a couple times. But that's because of heavy traffic."--JIBS8. Even with these setbacks, students' continued usage implies that they still see value in ChatGPT's functionalities, further demonstrating their tolerance of these technical barriers due to the overall benefits provided by the tool.

6.3. T2: ChatGPT as a Personalized Learning Enabler (Post-Adoption)

The second theme that emerged from the data is the role of ChatGPT as a personalized learning enabler. This theme captures the ways in which students perceive and engage with ChatGPT in order to enhance their learning experiences, empower themselves by simplifying complex tasks, and foster creativity through structuring, feedback, idea generation and support.
6.3.1. S4: Enhancing Learning Experience as a Personalized Complementary Tool

This subtheme encapsulates the notion that students perceive ChatGPT as an effective tool in assisting with course content, simplifying their overall learning experiences, functioning as a supplementary educational resource, and serving as an educational guide or mentor.

Building on the idea, many students reported that the model provides detailed and relevant information that aligns with their course materials. For instance, one participant shared, “Yeah, it was pretty detailed. And most often, it is matching the course content.” - JIBS1. This comment underscores the perceived utility of ChatGPT in complementing course-related learning.

While students appreciated the detailed responses from ChatGPT, some also highlighted its function in enhancing the learning process, albeit not necessarily providing a unique value. “It does simplify it (learning experience). Okay, but I wouldn't say it adds value that I can find elsewhere.” - JIBS10. This quote suggests that while ChatGPT is recognized for its ability to simplify learning, the perceived value-added can be context-dependent and varied among students.

Students recognized the importance of traditional educational resources, but they also prize the value of ChatGPT as a complementary tool. One interviewee stated, “I think traditional sources are much better, but using ChatGPT is a very good complement.” - JIBS2. This
illustrates that ChatGPT is seen by some as an additional resource that can enhance, rather than replace, conventional learning methods.

The role of ChatGPT as an assistant or tutor was a recurring theme in students' experiences. One student described their use of ChatGPT, stating, “Usually, it's not so much for writing as like generating texts that I would complete for the assignments, but more as a sort of assistant, or sort of like a tutor, teacher slash Google.” - JIBS9. This perspective sees ChatGPT as a supportive figure, providing guidance much like a human tutor would. Further reinforcing this perspective, another student emphasized the personalized mentorship aspect of ChatGPT, noting, “it's more in person experience with a teacher, but you can't expect a teacher to be with every student. But with ChatGPT, you can ask, you can make that work. And every student can have their own mentors.” - JTH4. This finding underscores the potential of ChatGPT to democratize access to personalized learning and mentorship in a feasible and scalable way.

6.3.2. S5: Empowering Students by Simplifying Complex Tasks

The fifth subtheme concerns the perceived ability of ChatGPT to empower students by simplifying complex tasks. Students noted ChatGPT's capacity for content summarization, the advantage of editable prompts, and its ability to break down difficult concepts.

Students particularly acknowledge its ability to distill extensive information into summaries: "So I just took the article and told ChatGPT to summarize (...) and give me a condensed version of it, emphasizing the most important parts." - JIBS6. This quote shows the utility of ChatGPT in efficiently managing extensive academic content. Similarly, ChatGPT's ability to explain complex topics in a simplified manner was another standout feature for many students. As one participant put it, "Well, I mentioned before they (ChatGPT) explain it to me, like I'm a 10-year-old, that little trick has helped me immensely." - JIBS7. This quote points to how the AI's capacity to explain complex academic content simply can significantly aid in students' comprehension and learning.

The flexibility of ChatGPT, particularly the ability to rephrase or edit prompts, was another feature that students found empowering. "If I put in a question, and it doesn't give me the answer that I was expecting, I can just rephrase the question. (...) That's a good quality or like
a good feature (...) you can edit the things you tell it."-JIBS1. This brief account underlines the adaptability of ChatGPT, allowing students to refine their queries for better responses.

6.3.3. S6: Fostering Creativity through Structuring, Feedback, Idea Generation and Support

The sixth and final sub theme relates to the use of ChatGPT for promoting creativity. Students reported using ChatGPT as a conversational partner, for structuring and outlining written text, as a feedback provider, and for structuring and outlining technical tasks.

The interactive nature of ChatGPT, especially its usage as a dialog partner, was seen as a beneficial factor: "But just to have like a partner to speak with, almost gives advice, the responses are really good."-JTH7. This quote emphasizes the perceived value of ChatGPT through interactive dialogue.

The recurring benefit of structuring, not only in written work but also in technical tasks like programming is apparent: "Also, it gives a pretty good estimate of like programming code, like for, like, initial structure, and then I will build on it (...) Instead of me writing in manually from the beginning, it gets pretty accurate, like, the initial backbone of it. The structure of it."-JTH8. This quote draws how ChatGPT can provide a useful starting point, offering a structural "backbone" that can save students time and effort.

ChatGPT's utility also extends beyond structuring text to the brainstorming phase: "Yeah, I mostly use it for brainstorming and getting some sort of structure for writing whatever I want."-JIBS4. This illustrates how ChatGPT can stimulate creative thought, acting as a catalyst during the ideation stage of the writing process.

ChatGPT's ability to provide feedback was another feature that students found notably beneficial, as evidenced in this quotation: "Let's say you wrote a text, like, had an assignment to write a 500-word text (...), then you can just paste it into ChatGPT. And have it reviewed. (...) it will give examples that you couldn't have come up with yourself or think of, so I think it's a great tool to improve and to give feedback on the work that you have done."-JTH3. This presents the value of ChatGPT in ultimately helping students to improve their work.
6.4. T3: Students Perspectives on the Shift in Higher Education and its Implications

The third theme focuses on the shifting dynamics within the higher education landscape due to the integration of AI tools like ChatGPT. This theme encompasses students' perspectives on this shift as well as their recognition of the need for conscious ChatGPT integration.

S7: Envisioning an evolved academic landscape with ChatGPT

S8: Students recognizing the need for conscious ChatGPT integration

T3: Students perspectives on the shift in higher education and its implications

Figure 9: Overview of the third theme

6.4.1. S7: Envisioning an Evolved Academic Landscape with ChatGPT

This subtheme focuses on the transformative potential of ChatGPT in higher education, advocacy for its integration, and restructuring education to accommodate AI tools. Students expressed optimism towards ChatGPT's future role in education, acknowledging its potential to significantly reshape the academic environment.

The idea of transformative potential is a perspective shared among many students, explicitly summarized in this quote: "it has the potential to transform the whole education system"-JTH1. This sentiment demonstrates a recognition of the considerable influence that AI tools like ChatGPT could have in reshaping how education is delivered and experienced.

Not only do students recognize the potential, but they also advocate for its integration into the educational framework. "I believe, instead they need to educate the students how to use this tool in a better way to help them to improve their... studying and educating themselves"-JIBS4. This implies the students' preference of educators to guide students in leveraging the capabilities of AI tools like ChatGPT to enhance their learning experiences.
In connection, optimism is expressed towards its future role in education. One participant observed the rapid development of ChatGPT: "I think one thing to mention about ChatGPT... it's in its baby phase, like, maybe now it's already like, having all these tools and doing as good as them. But in one year, two years probably will beat them"—JIBS2. This statement reflects the expectation that as ChatGPT evolves, it will surpass existing educational tools, further underlining its potential to revolutionize the academic landscape.

This brings to light the need for a restructuring of educational systems to better incorporate AI tools. One student expressed this sentiment, stating: "However, maybe some courses might have to be restructured in order to be incorporated"—JIBS5. This suggests that for ChatGPT to be optimally effective, adjustments may need to be made to the traditional teaching and learning models.

6.4.2. S8: Students Recognizing the Need for Conscious ChatGPT Integration

This subtheme reveals students' understanding of ChatGPT's complex role in higher education, emphasizing the tool's limitations in critical thinking and problem-solving. It acknowledges that ChatGPT's impact is user-dependent and raises concerns about uncritical content acceptance, academic integrity risks, sensitive data handling, and stakeholder influence on output. It supports addressing these issues, not by banning ChatGPT, but by implementing regulatory measures and ethical guidelines for its use.

The awareness of those challenges and certain limitations of ChatGPT is empirically observed: "However, if we're talking about what I said earlier, if you're writing argumentative papers, or have to add a certain critical reflection, I think ChatGPT lacks that on the student side"—JIBS8. This statement provides an example of where the technology may fall short, specifically in tasks that require critical thinking and reflection.

In terms of ethical neutrality, one student noted, "So it can actually be used for better. But that's all based on the intentions of the students"—JIBS6. This perspective accentuates the user-dependent nature of ChatGPT's impact. The tool itself is neutral, but the outcomes of its use can vary widely, depending on the motivations and intentions of the individual student. This reflects the need of ensuring responsible use of the tool, signifying that blending of ChatGPT into higher education needs to be carried out with a clear understanding of its implications.
A compelling point of discussion within this subtheme was the potential for uncritical acceptance of the content provided by ChatGPT, as touched upon earlier in sub-theme 6: "I also think (...) people who don't really know how to vet the information you get, might go okay, it said this must be true. And without doing further research, you can't really tell if that's true or not"-JIBS10. This comment points to a dangerous pitfall in ChatGPT's use, where users may be led to uncritically accept the information given by the AI, without further investigation or verification. This intensifies the significance of integrating critical thinking skills and information literacy into the ChatGPT utilization process, ensuring students use it as a starting point for research rather than as an unquestionable source of facts.

Another prominent concern is the potential for the language models misuse leading to breaches of academic integrity: "But yeah, I do see ethical challenges in the sense of like it does. It is a form of plagiarism...But it's a form of plagiarism that is so well done. That it's kind of crazy gray area, whether or not that's plagiarism. So that is definitely a gray area that should be considered regarding ethics in the educational system"-JIBS8. This interviewee’s perspective recognizes the blurred boundaries that AI technologies like ChatGPT present in academic domains, particularly around authorship and original work. It is crucial to discuss and clarify the concept of plagiarism in an era of AI-driven writing and research tools.

In exploring this further, it's interesting to note the diverse perspectives students have on this issue. For instance, when asked if they believe it's plagiarism to prompt ChatGPT to write something for them, one student simply responded with a "No"-JIBS1. This is a point of contention, exacerbating the difficulty of discussing this issue.

Expanding on this, students also claim detectability of content generated by ChatGPT and voiced reservations about its use: "You cannot do the typical thing of just writing things out from ChatGPT because that is pretty much detectable at this point,"-JTH1 further advising, "Actually, I recommend not to use it"-JTH1. These statements from the same student acknowledge that while ChatGPT may be a powerful tool, its outputs may not be immune to detection, and it carries potential risks and ethical implications in educational settings.
In addition to these issues, the handling of sensitive information is also a key concern: "Well, I guess there are some (ethical issues)... So I don’t know how it deals with the sensitive issues"-JIBS1. This comment reflects a certain level of ambiguity regarding how ChatGPT processes and manages sensitive information. The lack of transparency in this aspect raises ethical and privacy concerns that need to be addressed.

The distribution and control of AI tools leads to important considerations. One student expressed this concern, noting, "that leads to another point about the fact that these super powerful tools are going to be in the hands of just a few people, because only big companies have the ability to train these kinds of tools and to host them"-JTH1. This expresses the view that concentrated power and influence may prove troublesome in the future, as only a limited number of entities have the resources to develop and manage such sophisticated AI tools. If this problem remains unaddressed, the situation may result in privatization of knowledge, which could consequently have significant negative effects on society as a whole.

Students also voiced their stance against outright banning ChatGPT at universities: "I don't think it should be banned entirely. Because if it's a good tool to use when you're learning about a field, but I think the way it's being used needs to be changed"-JTH4. This statement suggests a nuanced approach towards regulating ChatGPT usage in academia, emphasizing the need for changes in usage practices rather than complete prohibition. It showcases the belief that with the right guidelines and usage norms, ChatGPT can continue to be a valuable resource.

6.5. T4: Educators and Institution’s Role in Balancing ChatGPT Adoption

The fourth theme delves into the role of educators and institutions in navigating the adoption of ChatGPT while maintaining academic integrity. It explores the potential advantages of ChatGPT for educators and the need for a balanced approach towards ChatGPT usage among students.
Figure 10: Overview of the fourth theme

6.5.1. **S9: Tapping into the Potential of ChatGPT to Support Educators**

The ninth subtheme focuses on how educators can harness the power of ChatGPT as a pedagogical tool, enhancing their efficiency in the teaching process. It further introduces the perception that educators can use AI-detectors to check for ChatGPT generated content, however as of date, no tools to reliably do so, not even the detector introduced by the same company that made ChatGPT (Kirchner et al., 2023).

Students recognized the potential benefits of ChatGPT from a pedagogical perspective. One quote encapsulates both the potential of ChatGPT as a pedagogical tool and its ability to enhance educator efficiency: "so I think that one benefit from the pedagogical side is that teachers could be like, hey, based on learning objective, 1, 2, 3 and 4, how would you assess this paper, removing the bias in a way, and it will also be more convenient and saving time." - JIBS8. This quote, coming from a student who also worked as a teacher assistant, brings the potential of AI tools in streamlining the grading process to light, potentially freeing up educators to focus on other aspects of teaching.

The claim that ChatGPT generated content can be detected was already mentioned under the previous subtheme, S8. Educators could use this to their advantage to check for AI generated content, when suspecting its use in assignments in which it is not permitted.

6.5.2. **S10: Encouraging a Balanced Approach to ChatGPT Use Among Students**

The final subtheme under this theme focuses on the need for a balanced approach to ChatGPT usage among students. It covers the impact of ChatGPT on the learning process, mitigating excessive reliance on ChatGPT for assignment completion, and the establishing of regular
patterns of ChatGPT usage in comparison to the absence of a consistent ChatGPT usage pattern.

In contemplating the impact of ChatGPT on the learning process and potential learning deficits due to over-reliance on the tool, one student captured the balance that must be struck: "It simplifies the learning experience. It's a tool that's very useful when learning (...) However, yeah, I'm still a bit scared, but I'll become incompetent, competent to think on my own"—JIBS5. This quote underscores the need for students to navigate the benefits of this AI tool while consciously avoiding over-dependency that could lead to a loss of independent critical thinking skills.

The following quote further emphasizes the necessity of a balanced approach to ChatGPT use: "ChatGPT is my go-to, let's say. So sometimes, maybe if (...) it went offline, for example. So then I would be like, Okay, I have to go back and actually search for it manually"—JTH8. This statement suggests that excessive dependence on ChatGPT could disrupt the learning process when the tool is unavailable, further displaying the need for students to maintain traditional research skills alongside their use of AI tools.

A notable aspect of ChatGPT usage among students is the individual approach to its adoption. One student elaborated, "My text editor already has an extension. So I don't even have to go to the website. So while I'm coding, I get answers from ChatGPT without even going to the website"—JTH4. This reflects a pattern of regular and integrated usage, showing how AI tools can be embedded into students' workflows.

On the other hand, some students reported a less regular pattern: "Routine no, I mean, I don't use it as my first tool to solve something. But I use it when I need to, like assistance with something that I can't figure out on my own or in the course literature"—JTH3. Here, the student uses ChatGPT as a supplementary tool, providing a contrasting view to the continuous reliance observed in the previous quote. These quotes underscore the importance of striving for a balanced approach in using AI tools in academic practices.
6.6. T5: Emotional and Cognitive Effects on Learning Experience

The fifth theme delves into the emotional and cognitive aspects of students’ experiences when using ChatGPT. It explores how the tool stimulates the learning process and acknowledges personal and psychological barriers to ChatGPT usage.

![Figure 11: Overview of the fifth theme]

6.6.1. S11: Stimulation of Motivation and Creativity with AI Assistance Leading to Enhanced Engagement

The first subtheme emphasizes the psychological stimulation that ChatGPT provides. Students reported enjoyment in using the tool and increased motivation and creativity as a result. It outlines the positive impacts that AI tools like ChatGPT in this context can have in an educational setting, thereby enhancing the learning process.

Expanding on this subtheme, students' enjoyment of using ChatGPT came to light through their accounts: "I think it's, it's odd. It automates a lot of processes that I do. If I want to make a table, I can just give it to ChatGPT instead of writing it by myself. Yeah, that's so much time-saving that. That's why it's fun"-JTH4. This quote exhibits how the tool's ability to automate tasks not only enhances efficiency but also contributes to the enjoyment of the learning process.

Further exploring the positive impact of ChatGPT on motivation; "I am far more motivated, with any academic stuff, even studying for exams. (...) When I got stuck with a critical concept, I just gave up for a day.(...) So I'm more motivated on that front. (…) The painstaking, time-consuming part is going to be solved pretty easily. (…) And otherwise, I enjoy the creative part of the assignment”-JIBS7. Hence, ChatGPT's support in overcoming obstacles and simplifying complex tasks has a motivational effect as evidenced by this quote.
6.6.2. S12: Personal and Psychological Barriers to ChatGPT Usage

The final subtheme outlines the personal and psychological barriers associated with using ChatGPT. Students discussed a variety of issues, including concerns about the tool's impact on users' moral judgment, the perceived lack of a human touch in content generated by ChatGPT, negative social perceptions of the tool, and user dissatisfaction with its usage.

Diving deeper into the emotional and cognitive trade-offs of ChatGPT usage, some students expressed concern over the tool's influence on their own thought processes: "So yeah, I use ChatGPT to basically make layout for my potential or possible opinion on the specific topic"-JIBS3. This quote suggests a degree of reliance on the AI tool not just for fact-checking or information gathering, but also for forming opinions, revealing a potential impact on users' moral judgment.

Some interviewees pointed out the perceived lack of a human touch in ChatGPT's responses: "You know, like it's just generated, and there is no afterthought and like no human input"-JIBS9. This comment indicates the potential cognitive dissonance users may feel when interacting with AI-generated content, which while often accurate, lacks the detailed understanding and contextual awareness inherent to human communication.

Another aspect of the perceived barriers lies in its social perception. One student pointed out, "So I think one major limitation is more of the social perception of it at the moment... that may hinder people from distinguishing it as just like a very important technology that can help a lot... can basically enhance the entire educational system"-JIBS8. It is apparent from this quote that the perceived societal attitudes towards AI can influence the reception and utilization of tools like ChatGPT in educational settings, which could be an obstacle to their broader acceptance and integration.

Lastly, the subtheme also exhibits the factor of user dissatisfaction with ChatGPT usage. One participant shared an opinion that stood out from the rest of the students: "No, no, I don't like using it... Because probably because it's sort of still in its early phases, even though it's advanced. It's something that you need to learn the kind of phrases or what information you should give it to get the outcome you want"-JIBS10. Despite its potential benefits, the learning curve associated with effectively using ChatGPT may result in varying degrees of user satisfaction, which could impact ChatGPT's adoption, perception, engagement and usage.
7. Discussion

In this chapter, the findings from our identified themes are combined with theoretical insights drawn from relevant literature and academic sources. The themes and key concepts are then integrated into a trichotomous model, which aims to explain the effects of adoption, perception and learning experience on the ChatGPT phenomenon in higher education. This section serves as a means to systematically relate our empirical observations to established theory, as well as to visualize and contextualize them in a model to allow for needed additions to the growing body of knowledge on the subject.

The following section introduces a diagram for understanding not only how students and educators adopt and engage with ChatGPT, but also how this new technology impacts the learning experience. Additionally, the model considers the diverse perceptions surrounding ChatGPT, both present and future oriented, ranging from its perceived utility to its drawbacks. The diagram captures a part of the complex reality of ChatGPT in higher education, where the three dimensions mutually influence and shape one another, illustrating how they are not isolated but rather intimately connected. It will be used as a basis to explore the given topic, supported by the themes obtained from the thematic analysis. From each dimension, several different implications arise. Findings connected to other major theories not previously discussed will also be briefly explored, demonstrating consistency with additional literature and contributing to the robustness of our study.
The selected model was designed with a holistic lens in mind, constructed on the basis of the thematic analysis. This ensures that it genuinely reflects the experiences of the participants. It also reflects the research problem and research question initially proposed, and is found to be connected to relevant literature, forging a solid theoretical link. Lastly, it incorporates the author's unique insights.

### 7.1. The Adoption Dimension

The Adoption section represents the extent and manner of ChatGPT involvement, tracing the student's progression from initial use and exploration of the tool (pre-adoption) through the decisive stage of adoption (or rejection), and potentially onward to consistent and sustained engagement (post-adoption). This is reflected in the two related themes, one exploring the reasons for adoption, while the other shows what the adoption results in. The themes related to this journey draw attention to overcoming the technical and functional factors and to the benefits and challenges that influence continued use of the tool. It also includes factors influencing adoption that fall under UTAUT's 2 constructs such as performance and effort.
expectancy. Taking these elements into account is crucial as it provides a clearer picture of the role and impact of ChatGPT in higher education.

7.1.1. Usage, Engagement, and Adoption Differentiation

Usage, engagement, and adoption each denote different facets of ChatGPT's role in higher education, marking unique stages in the user-AI relationship.

Usage is the basic application of ChatGPT, such as for assignments, but it doesn't guarantee long-term adoption or imply engagement implications. Engagement signifies the user's investment and enthusiasm, reflecting the value derived from the AI through exploration, advocacy, and extra-academic use. Adoption indicates the tool's incorporation into higher education at various levels, encompassing initial usage and preceding decision-making. As evident from the thematic analysis and the UTAUT 2 model, factors influencing ChatGPTs and other technologies adoption are often manyfold, complex and intertwined.

7.1.2. T1 Embracing ChatGPT: Accessibility, UX, Social Influence, and Net Benefits as Primary Drivers of Adoption (Pre-Adoption)

This theme centers on the factors present in the pre-adoption phase, giving meaning to the underlying reasons why students may start their AI-enhanced academic journey.

Students appear to have integrated ChatGPT into their learning processes to varying degrees. This variation in usage patterns and adoption habits may be influenced by factors beyond our study, such as students' prior experiences with technology, individual learning styles, time, or cultural factors. This supports the Diffusion of Innovations theory (Rogers, 2003), suggesting that individuals adopt and integrate innovations at different rates depending on factors such as personal characteristics, different perceived benefits, and social influences. This is reinforced by the interview data, from which the notion that students use ChatGPT most extensively for tasks that would save the most time emerges. Since every user has a different set of abilities or lack thereof, this results in attributing varying importance to factors thanks to which a user may become an adopter. When paired with the generally beneficial features (such as the ease of use), that combined give rise to this theme, it became clear that these advantages even overshadow the technical and functional challenges. This consequently paints a clearer picture of why a student may decide to adopt ChatGPT and/or continue using it.
The analysis indicates that a crucial aspect driving adoption and use of the tool is the perceived competitive advantages and peer influence, which is still in line with Rogers’s theory. These findings can be additionally related to the Social Comparison Theory (Festinger, 1954), which hypothesizes that individuals evaluate themselves and their abilities based on comparisons with others. As AIs role becomes more significant in higher education, students increasingly feel compelled to adopt these tools to keep pace with their peers and maintain a competitive edge.

The authors additionally find that students' adoption of AI is likely influenced by the "hype cycle" (Fenn & Raskino, 2008), as some students mentioned being influenced by social media and a general trendiness or pressure to adopt AI tools. This raises questions about whether the perceived value derived from the tool, which has been identified as one of the primary factors driving ChatGPT's adoption, of AI in education is inflated by external factors, such as public relations and marketing efforts of OpenAI/Microsoft, or peer pressure.

It is apparent that ChatGPT has the potential to improve productivity by streamlining workflows and performing tasks that do not require much creativity or critical assessment (like formatting a text), allowing students and educators to focus on more important aspects of their work (Zhai, 2022), or tasks that specifically require the human perspective and touch. This could imply the shift of the nature of assigned workload and its assessment from the current state to a one where the ‘human- specific capabilities’, which the AI tool cannot yet substitute, are at the center of focus while designing assignments and projects.

7.1.3. **T2: ChatGPT as a Personalized Learning Enabler (Post-Adoption)**

Shifting our attention to the post-adoption scenario, this segment will move beyond empirically observed adoption factors to illuminate the transformative role of ChatGPT in personalizing the learning experience. This theme represents a shift in the users' relationship with ChatGPT, from simply using it to integrating it into their academic routines in ways that supplement and enhance them.

Incorporating this theme into the 'Adoption' part of our trichotomous model is pivotal for several reasons. Firstly, it indicates the potential of ChatGPT to reframe the higher education setting, moving beyond the act of usage to fuller utilization of its potential. It demonstrates the
tangible benefits and value derived from ChatGPT in the post-adoption stage, which serves as a catalyst for sustained engagement and further consolidation.

Secondly, it reveals the versatility of ChatGPT as a tool that adapts to individual learning needs. This adaptability, stemming from AI's inherent characteristic of learning from user interactions, creates a feedback loop that can be exploited for further benefits. The more a user interacts with ChatGPT, the more tailored and value-adding the experience becomes, hence the 'personalized learning enabler.'

The classification of ChatGPT in this manner underscores the significance of post-adoption behavior in gauging its impact on higher education. Often, students struggle with issues in the absence of their tutors, which while promoting independence, may also lead to unaddressed needs due to the near impossibility of personalized attention in university settings. ChatGPT offers a solution by providing on-demand, tailored tutoring, enhancing this aspect of educational quality.

The implication of this theme suggests that the success of AI in higher education is not merely about technical adoption but also about how effectively the tool can be personalized to enhance the learning experience. This insight can guide educators and institutions in their strategies to facilitate AI adoption and integration, emphasizing not just the usage, but also the meaningful engagement that leads to improved learning outcomes.

7.1.4. Differences Between Faculties
An interesting observed difference in the adoption of ChatGPT between JTH (engineering faculty) and JIBS (business faculty) arose from the primary data, which provides integral insights into how the technical familiarity and the nature of academic discipline influence the use and perception of AI tools. As evidenced from the interviews, the JTH faculty with their technical knowledge tend to have a more accurate understanding of ChatGPT's capabilities and limitations. A notable example is their increased awareness of occasional ChatGPT's hallucinations and its dangers (cases where the AI generates information that isn't based on its training data or factual knowledge). This informed perspective arguably allows them to anticipate the future of integrating such a tool into their educational practices more accurately, additionally influencing their adoption and perception of ChatGPT.
On the other hand, JIBS faculty, in some cases lacking the technical acumen, sometimes state false information about ChatGPT (such as the belief the tool is able to provide references reliably). The use cases also vary between the faculties, with JTH using ChatGPT for coding purposes unlike JIBS students, which leverage it for text and content improvement. Despite these differences, the theme of ChatGPT as a personalized learning enabler is common to both faculties, albeit manifested in unique ways that align with the specific needs of each discipline.

This dichotomy between JTH and JIBS illustrates the importance of ensuring an adequate level of awareness and information spread about AI tools across all faculties. It emphasizes the need to tailor educational strategies to the distinct needs and contexts of different academic disciplines, while also stressing the value of ensuring that the potential and limitations of ChatGPT are well understood. This can help prevent the spread of misinformation and facilitate more effective and context-specific adoption and use.

7.2. The Perception Dimension

The Perception part captures evolving attitudes towards ChatGPT in academia from students' perspective and their viewpoints on the educational institutions’ role, stressing the importance of conscious adoption of the technology and the pivotal role of an informed and balanced user approach.

It is a vital component to our trichotomy as it can be understood as the bridge between the Adoption and Learning Experience part of the diagram. The student attitudes, beliefs, and perceptions explored in this dimension directly influence interactions with ChatGPT and shape the quality of the learning experience. In essence, while the Adoption triangle represents the effects of the tools’ attributes, this dimension seeks to interpret and give meaning to the 'human' side of AI integration. More specifically, it aims to strengthen the grip on the understanding of psychological responses to the technological shift, and their meaning.
Overall, this dimension illustrates the perceived necessity for transparent communication and effective change management strategies on the institutional level and provides a better starting point to understand AI’s future in this field.

7.2.1. T3 Students Perspectives on the Shift in Higher Education and its Implications

The first explored theme within this dimension provides a window into students' thoughts, fears, and expectations regarding the integration of AI in their educational journey, and its consequences for the educational sector. This theme helps to understand the perceived shifts in academic culture from the learners' viewpoint and the possible impacts of these changes on their learning experience and future career prospects. Moreover, understanding students' perception is pivotal in our trichotomy as it illuminates the human side of technology adoption.

The students' optimism is clearly encapsulated in their visions of an evolved academic landscape. It can be understood as an anticipation for a paradigm shift where ChatGPT is not only an add-on but an integral component of the learning process. This anticipation and desire for innovation is interpreted as a signal of the disruptive potential of AI and reveals the eagerness of some students, leaving an option to potentially leverage it. This portrayal is however not rigid. There is apparent caution that clashes with optimism, evident in the students' recognition of the need for a mindful AI integration. In part, this manifests as an implicit yet noticeable call for balance and caution. This aligns well with the "disruptive innovation" theory (Christensen, 1997), where students express concerns about privacy, data security, and potential biases in AI algorithms, giving rise to important considerations in AI adoption. These concerns are in line with those by Chen et al. (2020) and Quadir (2022) introduced in the literature review.

During the exploration of this theme the authors observed a phenomenon described by Lynch et al. (2020) as the “AI in education paradox”. It states that the benefits of new technologies like ChatGPT may not be fully realized due to poor implementation or the user's misunderstanding of the tool's capabilities, leading to potentially incorrect conclusions about the technology's effectiveness. The study also calls attention to the term *unconscious incompetence*, where in this context the user overestimates his ability to operate the tool and shifts the blame to it for not performing adequately. In the context of this paper, this theory
provides a valuable insight: not being informed of the technologies capabilities and operational qualities will significantly increase the chance of failing in dealing with the implementation, having negative effects on both students and their institutions.

### 7.2.2. Educators and Institution’s Role in Balancing ChatGPT Adoption

The second theme offers a complementary perspective. It synthesizes meaning from the identified responsibilities and challenges that educators and educational institutions might face as they navigate ChatGPT into their curricula (Bostrom & Yudkowsky, 2014). However, it is important to note that this is still only the students’ opinion, and the reality for the educators might be considerably different. It exposes the perceived necessity of striking a balance between leveraging AI's benefits and mitigating potential drawbacks and encouraging a mindful approach.

Here, students convey a vision for educators to harness the power of ChatGPT, where faculty does not punish using ChatGPT, but rather use it themselves to enrich learning environments, diversify teaching methods, and ensure personalized learning experiences. This view posits the role of educators as facilitators of knowledge, rather than the only source of information. This student perspective underpins the core essence of the Perception dimension in our trichotomy. It accentuates the importance of the user's perception and how it can shape the technology's potential (Benham & Raymond, 1996). This views the educator's role in AI adoption as the coordinator of a collaborative and informed approach fusing ChatGPT into the learning environment (Winfield & Jirotka, 2018). Consequently, it puts forth the case for building a more flexible and adaptive higher education ecosystem that can learn, evolve, and grow in step with other advancements, be it technological or other.

### 7.2.3. The Importance of Student-Institution Collaboration

The accommodation of AI tools such as ChatGPT into higher education hinges on a critical factor - the collaboration and shared interest between students and educators. This concept expands beyond simple cooperation, as it necessitates mutual understanding, shared objectives, and collective vision for the future of education (Williams, 1985). It is essential that students and educators are no longer just recipients of change, but active participants shaping the transformation. As such, their joint interest in leveraging the AI's potential could serve as a base for further actions.
Throughout the analysis the authors realized that being informed is not just crucial, it's paramount. Knowledge about the capabilities, limitations, and potentiality of AI tools like ChatGPT aids in dispelling misconceptions, managing expectations, and facilitating informed decision-making (Bostrom & Yudkowsky, 2014; Neelen & Kirschner, 2020; Weller, 2020). Both students and educators can then better cope with the potentially disruptive AI-including academic landscape.

This concept serves as an element of cohesion, tying together the two themes present in the Perception dimension. Thus, the outcome of interactions between perceptions, attitudes, and knowledge should lead to a betterment of our grasp on the future of the educational shift.

### 7.2.4. ChatGPT and the Discussion about Academic Integrity

Addressing the reemerging subject, the question of ChatGPT as a source for citation raises issues around intellectual property, authorship, and academic integrity. Some argue that since ChatGPT generates its responses based on corpus of pre-existing text, using its output without citing it could be seen as a form of plagiarism. The opposing viewpoint is that since ChatGPT doesn't create original content in the conventional sense, but rather assembles its responses from a database of existing text, citing it could potentially misrepresent the nature of its contribution.

Consequently, whether ChatGPT's output can or should be cited raises further questions. If we view authorship as a form of creative, intentional act, then it's difficult to assign authorship to an AI, which doesn't possess creativity or intention in the conventional sense. Conversely, if authorship is viewed as producing text, then AI could arguably be considered an author in some sense.

Additionally, ChatGPT-generated content currently passes through plagiarism and AI generated content detection tools, such as Turnitin and GPT Zero, posing a significant risk to the integrity of writing-intensive assignments in higher education (Ventayen 2023). This potential for cheating necessitates the development of new assessment formats. (Zhang 2023). Looking at the issue through a more holistic lens, it would therefore be in place to suggest new
assessment methods that would focus on creativity and critical thinking, which are skills that AI cannot easily substitute (Ventayen, 2023; Zhang 2023).

This brings the authors to highlight the need for clear guidelines on how to approach these issues, as it is a matter of considerable importance to academia. As AI continues to play an increasingly significant role in higher education, these questions will only become more pressing and complex.

7.3. The Learning Experience Dimension

The final dimension of the trichotomy ventures into the territory of emotional and cognitive effects that AI technologies like ChatGPT exert on learners. This dimension adds a unique layer to the diagram by focusing on the internal experiences of the learners, which are often overlooked in the technical discourse around AI. By doing so, it affirms the importance of considering the mental states of learners.

This dimension is thus essential in adding to the process of painting a holistic picture of ChatGPT's role in higher education. Since it deals with both the cognitive and emotional aspects of learning, it incentivizes a creation of supportive environments. Furthermore, it suggests the urgency for ongoing investigation and dialogue about the effects of AI tools on the user side.

7.3.1. T5: Emotional and Cognitive Effects on Learning Experience

The final theme provides a number of insights, limited however by the scope of this research, into the learner's psyche and their meaning. It sheds light onto the positive and negative experiences affecting the students, from increased motivation and creativity to personal and psychological barriers. It reveals some of the intricacies of learning as it extends beyond the academic and technical domains and brings forth the transformative potential of AI tools like ChatGPT in stimulating learners. It is inferred that creative thinking and the like can in fact be fostered by ChatGPT, thereby enriching the learning process.

It is necessary not to shy away from the less promising side of AI adoption. Perceptions of isolation, anxiety towards new technology, or overdependence on algorithmic instruction are substantial factors that have the potential to negatively interfere with the students' academic experience. These elements not only affect students' learning but can also shape their
perceptions and engagement patterns with the AI tool, thereby feeding back into the other two dimensions of the model.

A further understanding can provide insights into the human factors influencing the outcome of ChatGPT's presence in academia, potentially resulting in a more inclusive and effective learning environment where AI tools supplement rather than supplant human involvement. These findings only reinforce the idea that while AI can be a powerful tool for enhancement, careful consideration must be given to the human element in the learning process. The study highlights the call for ongoing dialogue regarding this issue between all involved stakeholders.

Looking beyond, AI tools such as the one in question also have the potential to worsen societal inequalities, which aligns with the Digital Divide theory (Norris, 2003). As AI becomes more prevalent in higher education, addressing potential inequities is crucial to ensure all students benefit from the technology and improve their digital literacy. The significance is clear: strategies for ChatGPT implementation must be multifaceted in the way they address the drawbacks present in all dimensions of the presented trichotomy.

The potential of AI tools, like ChatGPT, to augment learning and productivity is echoed in both our analysis and literature, despite concerns about academic integrity (Quadir, 2022; Rudolph et al., 2023; Susnjak, 2022; Ventayen, 2023; Zhai, 2022; Zhang 2023). This aligns with the "Constructivist Learning Theory" (Vygotsky, 1978), underlining learning as an interactive process of knowledge construction. Hence, the integration of AI in education must prioritize active learning, critical thinking, and collaboration, rather than mere convenience.

The differing student responses to ChatGPT result in a spectrum of emotional and cognitive impacts. Enhanced motivation and decreased stress for some, compounded with concerns about negative learning effects for others, reflects the multi-dimensional nature of user experience as outlined by Hassenzahl et al. (2010). This, in turn, has vital implications for the development of strategies for ChatGPT accommodation, going back to the idea of the demand for a balanced approach that considers both the positive and negative impacts on students' learning.
Social Cognitive Theory (Bandura, 1986) offers a valuable lens for unpacking this theme within our trichotomous model. It proposes that learning is a socially mediated process, grounded in reciprocal interactions between individuals and their environment. Observational learning - a cornerstone of SCT - can explain how students' engagement with ChatGPT is shaped by witnessing their peers’ experiences. For example, observing positive outcomes from peers might incentivize their own engagement, and vice versa. Additionally, SCT underscores the role of self-efficacy, a belief in one's capabilities, in influencing behavior. Students with high self-efficacy might be more inclined to adopt ChatGPT, interpreting its potential challenges as opportunities for growth rather than threats.

This gives directions for the design of interventions aiming to promote successful AI adoption. It points out the requirement for creating learning spaces where positive experiences and benefits of AI usage are recognized, and that bolsters individual self-efficacy.

In the broader context, this theme connects the more tangible aspects of AI adoption and perception with the more subjective realm of learning experience. It uncovers the idea that the success of AI in higher education doesn't solely rest on its technical capabilities or how it's perceived. It's equally dependent on how it resonates with the subjective realities of learners.

7.3.2. Anthropomorphizing of ChatGPT and Selective Blindness

Another interesting observation was that people sometimes anthropomorphize ChatGPT, referring to it with human pronouns, unlike with other AI tools like Grammarly or Quill Bot. This may suggest a unique emotional bond and high resemblance of GPT's content to human content, potentially fostering engagement and creativity, but might also encourage overdependence on the tool. This para-social relationship coupled with the 'selective blindness' phenomenon, where users ignore the tool's limitations, can lead users to misconceive it as a human-like companion rather than a programmed assistant.

Media Equation Theory (Reeves & Nass, 2006) provides a theoretical perspective on this phenomenon. It proposes that humans tend to interact with media and technology as if they were real people, thus explaining the observed anthropomorphizing. In the context of this paper, the theory suggests that the more human-like an AI appears, the more likely users are to overlook its limitations – a behavior that can exacerbate the risk of selective blindness.
Given this, it is crucial for educators and institutions to provide clear guidelines on the capabilities and limitations of ChatGPT, resuming the notion of it as a tool rather than a substitute for human interaction. Additionally, integrating digital literacy programs that educate users about the risks of anthropomorphizing and selective blindness could prove beneficial. This understanding can further inform the creation of initiatives that promote responsible AI adoption and mitigate potential cognitive and emotional barriers.

7.4. UTAUT 2

Our trichotomy of Adoption, Perception, and Learning Experience intersects with key predictor variables in the UTAUT 2 model, potentially giving rise to an improved lens to analyze ChatGPT's role in higher education. The first dimension, Adoption, aligns with Effort Expectancy and Performance Expectancy. The two themes under this dimension directly reflect UTAUT 2's concepts of expected ease of use and the anticipated benefits of using the tool.

The second dimension, Perception, resonates with Social Influence and Facilitating Conditions. The included themes encapsulate the social and institutional elements that shape the acceptance and usage of AI tools like ChatGPT. The UTAUT 2 model emphasizes the importance of these influences on users' willingness to adopt new technology.

Lastly, the Learning Experience dimension, containing the theme 'Emotional and cognitive effects on learning experience,' links with Hedonic Motivation, a predictor variable in UTAUT 2 that concerns user satisfaction and enjoyment. This dimension goes beyond the tool's practical benefits and considers the deeper educational impact.

The trichotomy, supported by the themes discovered through our thematic analysis, hence aligns, although not perfectly, with key predictive variables of the UTAUT 2 model. Considering the thesis's context, some potential additional variables to expand the UTAUT 2 model could be:

1. Ethical extension of the Social Influence: In this paper, this would capture students' awareness and concerns about the ethical influences of using AI tools in education (academic integrity, privacy, data sensitivity, etc.). In general, this dimension would
encapsulate the various ethical and extend the psychosocial considerations of whatever technology in question.

2. Cognitive Impact: In our research, it’d focus on students' perceptions of the effects of AI on learning processes, emotions, and cognitive development. This variable would encompass the ways AI tools can facilitate or hinder critical thinking, problem-solving, creativity, and other essential cognitive skills. Overall, this key predictor variable would measure the role of the cognitive impact the technology has on the user and how that impact predicts their behavioral intention and use.

3. Future prospects: Related to our thesis, this variable would explore students' outlook on the future of AI tools in education and associated benefits and challenges. Generally, this is a more future-oriented component that would encompass the opportunities and future problems associated with the use of the given technology and how they influence the user’s intention of use.

Overall, despite the model not playing a role in our process of analyzing the interview data, UTAUT 2 is found to provide a relevant backbone for investigating technological acceptance even in the new context of AI tools in universities.
8. Conclusion

In this final chapter, the theoretical contributions of this study will be discussed. Practical applications of our findings and analysis for involved stakeholders are outlined. Furthermore, a critical examination of the strengths and limitations of our study takes place. Finally, key potential areas for future research are identified, highlighting the need for further exploration and understanding of the rapidly evolving field of AI in higher education.

8.1. Theoretical Contributions

This research suggests extending the UTAUT 2 model to include AI applications, introducing potential extra variables. These should be verified through further research, offering an opportunity to expand the model's applicability to unique AI tool characteristics. This enhanced model could provide a more detailed framework for AI tools beyond higher education. However, validating these additional variables through more data analysis and technology adoption literature comparisons remains crucial.

Our study also contributes to the emerging body of literature on GPT in education by examining how students interact with ChatGPT and how their experiences and perceptions shape its usage and impact on learning. By exploring student-AI tool interactions and views on AI integration in higher education through developing the trichotomous model, insights are provided into the dynamics at play in the now AI-influenced educational landscape.

8.2. Practical Implications

Our study has practical applications for higher education stakeholders like students, educators, and institutions. Students are cautious yet optimistic about the future and perceive a necessity of the educators and institutions balancing the presence of ChatGPT. It highlights the need for continuous professional development, equipping educators with skills to handle the evolving AI landscape in education.

This study helps understand factors influencing AI tool adoption, hopefully enabling more effective accommodating, if not integrating strategies. The authors have identified accessibility, the UX, social influence, and net benefits as the primary reasons for adoption,
which were found to result in ChatGPT filling the role of a personalized tutor, enabler and facilitator if adopted.

Lastly, provides insights into the emotional and cognitive impact of AI tools, establishing a theoretical base to create supportive learning environments. It is found that ChatGPT is mostly enjoyable to interact with, and can improve learning experience, mainly by increasing motivation and creativity. On the other hand, personal and psychological barriers to its use were identified, such as potential impacts on users' judgment and overreliance on the tool.

8.3. Reflection on Study Strengths and Limitations

Our study offers a comprehensive approach to understanding ChatGPT in higher education, providing a holistic view by examining various factors of its perception and adoption. Leaning on the UTAUT 2 model strengthens the theoretical basis and enables comparison with other studies.

Limitations include a potentially unrepresentative sample, reliance on self-reported data, some interviewees' lack of familiarity with ChatGPT's technology, the snapshot nature of our cross-sectional research, and the focus on ChatGPT as a specific AI tool, which may limit applicability to other AI technologies or platforms. These limitations were acknowledged and addressed to the best of ability of the authors, such as by seeking a more diversified interviewee sample (from different faculties), validating the self-reported data where possible, providing explanations on ChatGPT to interviewees, and reinforcing the idea that while the findings are specific to ChatGPT and the two faculties, certain insights could be extrapolated to inform further studies.

8.4. Recommendations for Future Research

Future studies should aim for more diverse participant samples across various academic disciplines and demographics to improve the generalizability of findings. Potential synergies, tensions, and opportunities may lie in the overlap of the trichotomous model's dimensions, as denoted by the double-sided arrows in figure 13, indicating worthwhile areas for further research.
Longitudinal studies could explore the long-term impact of AI tools like ChatGPT on students' learning experiences and performance, investigating the potential of AI tools in fostering collaboration, group learning experiences, and the development of critical thinking and creativity among students. The role of educators and institutions in AI tool adoption and effective use should also be examined, along with best practices for AI integration into curricula and assessment methods. The emphasis on academic integrity discussions suggests a need for ethical use policy development and revised assessment methods.
References


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Appendices

Interview questions:

- How often do you use ChatGPT in your studies?
- What do you use ChatGPT for?
- Can you describe a specific situation where you used ChatGPT? What was the purpose and outcome?
- How do you evaluate the quality of the responses generated by ChatGPT?
- What do you believe the benefits and limitations of using ChatGPT in higher education are?
- How do you perceive the usefulness of ChatGPT in comparison to traditional educational resources?
- How does ChatGPT compare to other tools or resources you use for similar tasks?
- Have you noticed any changes in your learning experience and outcomes since using ChatGPT?
- In your opinion, do you think ChatGPT has the potential to transform higher education, and if so, how?
- Do you think ChatGPT should be allowed/banned at JU? To what degree should it be banned/allowed?

Specific to UTAUT 2:

Performance Expectancy:

- How useful do you find ChatGPT in completing your academic tasks?
- How do you think ChatGPT impacts your academic performance?

Effort Expectancy:

- How easy is it for you to use ChatGPT?
- Are there any challenges you face while using ChatGPT?

Social Influence:

- Do you feel that your peers or instructors influenced your decision to use ChatGPT?
- How so?
- Have you recommended ChatGPT to your classmates or colleagues? If so, why?

Hedonic Motivation:

- Do you find ChatGPT enjoyable to use?
- Does using ChatGPT improve your learning experience?

Price Value:

- Would you be willing to pay for ChatGPT if it was not free?

Habit:

- How often do you use ChatGPT?
- Have you developed a routine around using ChatGPT?

Appendix 1: Interview questions
GDPR Thesis Study Consent Form

Required by European Union General Data Protection Regulation 2016/679

GDPR Consent for “Exploring the Usage and Perception of ChatGPT in Higher Education: An Analysis of Student and Faculty Perspectives in Universities”

Please tick the appropriate boxes

Taking part in the study
I consent to JIBS processing my personal data in accordance with current data protection legislation and the data delivered.

☐ ☐

I consent voluntarily to be a participant in this study and understand that I can refuse to answer questions and I can withdraw from the study at any time, without having to give a reason.

☐ ☐

My signature below indicates that I choose to take part in the thesis study and consent to JIBS treating my personal data in accordance with current data protection legislation and the data delivered.

Name of participant [IN CAPITALS] ____________________ Signature ____________________ Date _____________

Thesis contact details for further information
Ondrej Filipc, +420731175034, filip20mv@student.ji.se
Johannes Valentin Woithe, +4915737829398 woijo20ym@student.ji.se

Appendix 2: GDPR consent form
Appendix 3: Participant information sheet

You are being invited to take part in a thesis study. Before you decide whether or not to take part, it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully.

The purpose of this study is to evaluate student and faculty perception on ChatGPT in a higher educational context in a cross-sectional case study in spring 2023. The interviews are only done with students and faculty currently at Jönköping University. This interview will contribute to the growing body of research about the aforementioned phenomenon in the educational context, will expand the knowledge base and will give grounds for further research in this area. This is a bachelor’s level thesis.

It is entirely up to you to decide whether to take part. If you decide to do so, you will be given this information sheet to keep and will be asked to give your consent. All the information that we collect about you during the course of the research will be kept strictly confidential. You will not be able to be identified in any ensuing reports or publications.

Under GDPR you have the following rights over your personal data:

- **The right to be informed.** You must be informed if your personal data is being used.
- **The right of access.** You can ask for a copy of your data by making a ‘subject access request’.
- **The right to rectification.** You can ask for your data held to be corrected.
- **The right to erasure.** You can ask for your data to be deleted.
- **The right to restrict processing.** You can limit the way an organisation uses your personal data if you are concerned about the accuracy of the data or how it is being used.
- **The right to data portability.** You have the right to get your personal data from an organisation in a way that is accessible and machine-readable. You also have the right to ask an organisation to transfer your data to another organisation.
- **The right to object.** You have the right to object to the use of your personal data in some circumstances. You have an absolute right to object to an organisation using your data for direct marketing.
- **How your data is processed using automated decision making and profiling.** You have the right not to be subject to a decision that is based solely on automated processing if the decision affects your legal rights or other equally important matters; to understand the reasons behind decisions made about you by automated processing and the possible consequences of the decisions, and to object to profiling in certain situations, including for direct marketing purposes.

You should also know that you may contact the data protection officer if you are unhappy about the way your data or your participation in this study are being treated at dpo@ju.se