

Czech University of Life Sciences Prague

Faculty of Economics and Management

Department of Information Technologies (FEM)



Bachelor Thesis

**A survey of the use of AI-assisted tools in higher
education in the Czech Republic**

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CZECH UNIVERSITY OF LIFE SCIENCES PRAGUE

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BACHELOR THESIS ASSIGNMENT

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Informatics

Thesis title

A survey of the use of AI-assisted tools in higher education in the Czech Republic

Objectives of thesis

The main objective of this thesis is to analyze the use of AI-assisted tools by students at universities in the Czech Republic.

The partial objectives are:

- to conduct a search of policies and rules about using AI-assisted tools among Czech universities.
- to design and conduct a survey among a targeted group of university students in the Czech Republic to collect data about their use of AI-assisted tools and the attitudes of their teachers toward these tools.
- to analyze the data, interpret results, and contrast them with the findings of other studies.
- to formulate recommendations and conclusion.

Methodology

The chosen methodology for this study will focus on a questionnaire survey among the university student population in the Czech Republic. A document analysis will target the university policies available publicly on websites. Descriptive statistics and regression analysis will be used to analyze the survey data.

The proposed extent of the thesis

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Keywords

Artificial Intelligence; Higher Education; Research Tools; Technology Adoption

Recommended information sources

- Atlas, S. (2023). ChatGPT for higher education and professional development: A guide to conversational AI.
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Declaration

I declare that I have worked on my bachelor thesis titled "A survey of the use of AI-assisted tools in higher education in the Czech Republic" by myself and I have used only the sources mentioned at the end of the thesis. As the author of the bachelor thesis, I declare that the thesis does not break any copyrights.

In Prague on 13.03.2024



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A survey of the use of AI-assisted tools in higher education in the Czech Republic

Abstract

The use of AI-assisted tools by university students have dramatically increased. It has raised concerns for the university's administrative departments. Students tend to use AI-based technologies for personalised assistance, time management, and receiving instant feedback and can sometimes unethically use these AI technologies such as plagiarism and cheating during coursework. The main objective of this thesis is to analyse the use of AI-assisted tools by university students in Czech higher education. The partial objectives used to attain the main objective were the conduction of survey questionnaire that was completed by 125 randomly targeted university students in the Czech Republic to collect data and analyse their attitudes and behaviour towards the use of these AI tools, the conduction of search policies and rules about using AI-assisted tools among Czech universities, and the result's analysis and contrasting with the findings of other studies.

The use of AI-assisted tools has grown internationally after the Covid-19 pandemic. The impact of these technologies has reached institutional and administrative levels. Significant attention has been brought up to this expansion in terms of technology trust and integration in higher education. This research paper sets out to address and analyse the potential for major chatbots like ChatGPT to increase student engagement and success during their academic journey, including the assessment of the benefits and challenges of AI-assisted tools used by students in higher education in the Czech Republic to answer one research question, How can AI technology assist students during their academic profession?

Future researchers can conduct comparative studies across different countries or regions to understand the differences in the adoption, patterns, and effectiveness of AI-assisted tools in higher education. Researchers can analyse faculty members' attitudes, expectations, and concerns regarding the integration of AI tools in teaching and administrative processes.

Keywords: Artificial Intelligence; Higher Education; Research Tools; Technology Adoption

Průzkum využití nástrojů podporovaných umělou inteligencí ve vysokoškolském vzdělávání v České Republice

Abstrakt

Využívání nástrojů podporovaných umělou inteligencí vysokoškolskými studenty se dramaticky zvýšilo. To vyvolalo obavy správních oddělení univerzity. Studenti mají tendenci používat technologie založené na AI pro personalizovanou pomoc, řízení času a získávání okamžité zpětné vazby a někdy mohou tyto technologie AI používat neeticky, jako je plagiátorství a podvádění během výuky. Hlavním cílem této práce je analyzovat využití nástrojů s podporou umělé inteligence studenty vysokých škol v českém vysokém školství. Dílčími cíli k dosažení hlavního cíle bylo provedení dotazníkového šetření, které vyplnilo 125 náhodně cílených vysokoškoláků v ČR za účelem sběru dat a analýzy jejich postojů a chování k používání těchto nástrojů AI, provádění vyhledávacích politik a pravidla pro používání nástrojů asistovaných umělou inteligencí na českých univerzitách a analýza výsledků a porovnávání se zjištěními jiných studií.

Používání nástrojů podporovaných umělou inteligencí po pandemii Covid-19 mezinárodně vzrostlo. Dopad těchto technologií dosáhl institucionální a administrativní úrovně. Tomuto rozšíření byla věnována značná pozornost z hlediska technologické důvěry a integrace ve vysokoškolském vzdělávání. Tento výzkumný dokument si klade za cíl zabývat se a analyzovat potenciál velkých chatbotů, jako je ChatGPT, zvýšit zapojení studentů a úspěch během jejich akademické cesty, včetně posouzení přínosů a problémů nástrojů podporovaných umělou inteligencí, které používají studenti vysokých škol v České republice. odpovědět na jednu výzkumnou otázku: Jak může technologie umělé inteligence pomoci studentům během jejich akademické profese?

Budoucí výzkumníci mohou provádět srovnávací studie napříč různými zeměmi nebo regiony, aby pochopili rozdíly v přijímání, vzorcích a účinnosti nástrojů podporovaných umělou inteligencí ve vysokoškolském vzdělávání. Výzkumníci mohou analyzovat postoje, očekávání a obavy členů fakulty ohledně integrace nástrojů umělé inteligence do výuky a administrativních procesů.

Klíčová slova: Umělá inteligence; Vysokoškolské vzdělání; Výzkumné nástroje; Přijetí technologie

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1 Introduction

The use of AI-assisted tools by university students has dramatically increased. A new trend that changed AI technologies into student support services. The research on AI-assisted tools can have the potential to revolutionize education by providing personalised, enhanced, and engaging learning experiences that can allow students to reach their potential during their academic journey. The research on AI tools opens new aspects to students and teachers to understand new policies and concepts on the use of these tools.

Moreover, Large AI generative tools such as ChatGPT and Google Bard can help students articulate their thoughts, manage their time, improve their productivity, and have better learning outcomes. The integration of AI-assisted tools can raise ethical challenges to administrative departments because of the misuse of AI-assisted tools academically. However, new policies and guidelines can minimize potential risks and challenges towards the use of AI learning technologies.

The main objective of this thesis is to analyse the use of AI-assisted tools by targeted university students in the Czech Republic. The partial objectives and methodology will be used to attain the main objective. The partial objectives consist of three parts: Design and conduction of survey, analysis of research policies about the use of AI-assisted tools among the Czech universities, and the analysis and evaluation of the results. The thesis contains sections that talk about trends of AI policies, benefits and challenges, and potential risks associated with the integration of AI-assisted tools in higher education.

Furthermore, the thesis contains sections of the practical part and results and discussions which talk about data collection methodology, data cleaning, data evaluation, descriptive statistics, and regression analysis. The conclusion part recapitulates the objectives and methodology used for this thesis and provides recommendation for future researchers who can benefit from this research study.

2 Objectives and Methodology

2.1.1 Objectives

The main objective of this thesis is to analyze the use of AI-assisted tools by students at universities in the Czech Republic. The partial objectives are:

- to conduct a search of policies and rules about using AI-assisted tools among Czech universities.
- to design and conduct a survey among a targeted group of university students in the Czech Republic to collect data about their use of AI-assisted tools and the attitudes of their teachers toward these tools.
- to analyze the data, interpret results, and contrast them with the findings of other studies.
- to formulate recommendations and conclusion.

2.1.2 Methodology

The chosen methodology for this study will focus on a questionnaire survey among the university student population in the Czech Republic. A document analysis will target the university policies available publicly on websites. Descriptive statistics and regression analysis will be used to analyze the survey data. The survey questionnaire will include 18 questions (16 are required to answer and two of them are response optional) to assess the attitudes of teachers and students on the use of AI-based technologies. The survey questions were carefully chosen based on the discussion with the thesis supervisor to meet the thesis' objectives and requirements in order to manage data collection from the sampled audience. The questions were written on Google Forms because it provides built-in statistical data that can be transferred to excel sheets for further analysis.

Furthermore, the surveys will be composed of a set of questions to test the knowledge and understanding of students at the Czech universities when it comes to Artificial intelligence and its benefits while using these tools for personalized learning like scientifically writing, gaining instant feedback, time management, or even formulating emails to their professors. The randomly selected participants will complete the survey questionnaire, and the collected results will be analyzed to formulate the conclusion regarding the use of AI-assisted tools throughout their academic journey.

The survey questionnaire will include 18 questions (16 are required to answer and two of them are response optional) to assess the attitudes of teachers and students on the use of AI-based technologies. The survey questions were carefully chosen based on the discussion with the thesis supervisor to meet the thesis' objectives and requirements in order to manage data collection from the sampled audience. The questions were written on Google Forms because it provides built-in statistical data that can be transferred to excel sheets for further analysis. The survey also contains a list of well-known AI generative tools, and university students will be assessed on their familiarity with these AI tools including but not limited to ChatGPT, Google Bard, ZeroGPT, and Jasper Chat.

3 Literature Review

3.1.1 Artificial Intelligence in Higher Education.

The emergence of artificial intelligence has revolutionized various industries in modern society, including higher education (Kengam, 2020; Zawacki-Richter, 2019; Fahimirad & Kotamjani, 2018). It has gained significant awareness in the last couple of years, and its impact has reached the institutional and administrative levels (Hacker et al., 2023). Artificial Intelligence (AI) is a machine that performs tasks, with the help of machine learning, associated with human intelligence (Cotton et al., 2023; Chan, 2023; Nazari et al., 2021; Zeide, E. 2019; Ma, et al., 2018; Fahimirad & Kotamjani, 2018). It involves types of algorithms or automated systems that imitate human cognitive abilities (Wang, 2021). Artificial intelligence technology provides real-time feedback, automates administrative and operational tasks, and reduces user workload (Cotton et al., 2023; Chan, 2023; Chaudhry & Kazim, 2022). Based on Lucena et al., (2019), people have perceived this technology where they can interact, connect, read, write, and become informed.

Educational departments such as university professors deal with an endless amount of papers that should be assessed and evaluated (Kengam, 2020, Page 2, para. III). Professors check the authenticity and accuracy of these papers, such as, but not limited to, students' essays or research using AI-assisted tools like Turnitin or ZeroGPT to detect plagiarism. Professors can use artificial intelligence, with the support of machine learning, for writing reports, creating presentations, and effectively sorting their data retrieved from their research to provide them with precise results and decisions that can be beneficial to society (Atlas, 2023; Zeide, 2019).

The workload of university professors has been multiplied by a high demand for learning (Kengam, 2020, Page 2, para. III; Chatterjee & Bhattacharjee, 2020). The adoption of artificial intelligence and research tools in higher education assists university professors and students in attaining their objectives by reducing their workload and providing personalized learning to students (Chan, 2023). Acquiring AI in universities is important, as the amount of data from students, researchers, and other administrations is enormous and can lead to ineffectiveness, inaccuracy, and miscalculation when manually dealt with

(Sharma et al., 2021). Artificial intelligence is a machine that can perform things that have been done previously through human cognition (Chan, 2023; Chaudhry & Kazim, 2022; Zeide, 2019).

In this study, we aim to gain a better understanding of how students among universities of the Czech Republic utilize large generative AI models (LGAIMs) during their studies and their behavior towards these tools. In Addition, we will explore the challenges they encounter while using AI tools in their research. To achieve this, we will conduct surveys with targeted university students in the Czech Republic to gather valuable insights into their experiences and practices related to handling their tasks through the implementation of AI tools.

3.1.2 Application of Research Tools in Higher Education - Strong and Weak AI

Artificial intelligence can be categorized into two types: Strong AI and Weak AI. Weak AI is known as artificial narrow intelligence (ANI) that is limited to a specific task (Chan, 2023; Ma, et al., 2018). It is a specialized tool designed for a specific task, such as Google Maps, email spam filters, face recognition and self-driving cars. As Flowers (2019) explains, Searle's thesis states that weak AI provides us with a powerful tool that allows us to formulate and test hypotheses in a more rigorous and precise fashion. Furthermore, from Deweyan's perspective, detailed in Flower's work, weak AI does not possess a mind, however, it can have a mind if the right data is set to it where it can symbolize feelings in response to the environment it interacts with.

On the other hand, Strong AI is known as artificial general intelligence (AGI) that possesses a mind and has human-like cognitive capabilities and is able to solve more than one problem (Chan, 2023; Cotton et al., 2023; Ma, et al., 2018). AGI can generalize knowledge across various fields and such models are GPT, GPT-3.5, and GPT-4 which are Generative Pre-trained Transformers (GPT) which use deep learning techniques to generate natural language text. These AI models are capable of producing contents with high levels of coherence, complexity, and diversity (Chan, 2023). The integration of these technologies help provide personalized learning experience and instant feedback for students (Cotton et

al., 2023) as some professors are overwhelmed with papers making it difficult for them to provide instructional timely feedback to students.

Sandu and Gide (2019) explore the distinctions between weak AI and strong AI. Weak AI uses techniques like data mining and machine learning, while strong AI (AGI) is characterized as adaptable machines capable of solving problems and providing solutions similarly to humans. Their research also highlights that current AI inventions mostly dwell on weak AI (ANI) and few inventions on AGI.

Furthermore, Sandu and Gide (2019) highlighted the classification of chatbots using a variety of specifications such as the knowledge domain, provided services, goals, and generated responses. According to their findings, Sandu and Gide outlined two different types of domains. The first one is open domain where chatbots deal with general problems and generally respond to questions. The second is closed domain, which addresses specific knowledge and may fail to provide a response.

3.1.3 AI-based Technologies (Chatbots)

New innovations related to AI applications and integration in higher education are rapidly evolving. Students tend to receive less one on one support due to the high demand on learning (Schmohl et al., 2020). Interaction methods exist, such as personal interaction and online communication via email, however, students do not tend to receive instant feedback and personalized assistance at their convenient timings (Cunningham et al., 2019). Countries such as the USA, Japan, China, and Australia are developing new innovations on the use of AI in universities, colleges, and schools (Schmohl et al., 2020).

Chatbots are computational entities that depend on human interaction to generate outputs, such as mimicking conversations by responding to keywords that can be integrated in variety of platforms (Salvagno et al., 2023; Haleem et al., 2022; Sandu & Gide, 2019). Such platforms are websites, mobile apps, and messaging platforms. As mentioned in Haleem et al., (2022), chatbots can provide relevant and compelling responses. Machine

learning and natural language processing are reinforcing techniques that contribute to ChatGPT's development.

Chatbots employing AI can engage in conversations with humans and automate responses. ChatGPT, a modified version of GPT-3, is an AI language model developed in 2021 by OpenAI that appears to be useful in scientific writing, aiding researchers and scientists in organizing contents, proofreading their work, and in generating writing drafts that are similar to humans (Cotton et al., 2023; Salvagno et al., 2023; Atlas, 2023). ChatGPT is freely accessible on the internet, and users can start by creating a free OpenAI account. It can perform a wide range of tasks especially in higher education such as completing a sentence initiated by users or answering questions (Atlas, 2023).

GPT-3 can be utilized for a variety of applications, such as language translation, content generation, and language modeling (Cotton et al., 2023). These mentioned AI learning companions work through algorithms programmed to recognize and produce human language known as computer linguistics (Salvagno et al., 2023; Haleem et al., 2022). Some examples of natural language processing as stated in Haleem et al., (2022) are translation, summarization, and sentiment analysis.

AI tools like ChatGPT, GPT-2, and Grammarly assist users in verifying their grammar and spelling, as well as articulating their ideas while composing essays (Cotton et al., 2023). These tools allow students to create meaningful texts on diverse subjects (Schmohl et al., 2020). The pilot study carried out by Schmohl et al. (2020), demonstrates that AI-supported text generators can aid students not only in their academic essay writing but also in tasks like drafting thesis, creating study exercises, designing posters, composing articles, and even formulating research proposals.

Moreover, the utilization of AI-supported text generators restores the confidence to students who had negative writing experience in the past, thereby increasing their motivation and interest in scientific work (Cotton et al., 2023; Schmohl, 2020). AI tools could be employed to provide instant personalized feedback to students, aiding in identifying areas of weaknesses that students can effectively build on.

However, the application of these AI-supported text generators in higher education can raise major concerns for the professors as some students might use these AI supported tools to cheat or to plagiarize while scientifically writing (Cotton et al., 2023). This means that some of the professors will remain focused on checking the integrity of the paper rather than the comprehension.

3.1.4 Policies and Rules on the use of AI-assisted tools among Czech Universities

Ethics and code of conduct are crucial when engaging in academic work. Both academic staff and students are obligated to follow the principles of educational activities while conducting research studies or writing thesis. The use of AI-tools tends to expand and broadcast among university members and in order to minimize unethical activities such as plagiarism and cheating, there are some restrictions that should be made in order to allow the proper use of these tools among universities. The code of ethics in the Czech public and private universities (ČZU, CUNI, ČVUT, Masaryk, & UNYP) shares common guidelines regarding the academic use of AI-assisted tools. These instructions can help both teachers and students to explore and ethically use AI tools without breaching the code of conduct. These AI tools can be used by academic staff and students (leaners) to help them articulate their thoughts or to sketch their way during scientific research.

The policies and regulations that are publicly available on Czech Universities' websites enforce their regulations against the use of AI-assisted tools as these models can be manipulated by their users. Moreover, there are no clear guidelines on how students can benefit from these AI-assisted tools in terms of personalized learning or instant feedback. The rules strictly mentioned that students are not allowed to cheat or plagiarize during their academic work, but did not present any tips or techniques on possible ways to use these technologies. In order to minimize the potential of cheating and plagiarism, there should be clear instructions on how students can familiarize themselves with the use of AI tools during their academic journey.

Czech public and private universities should provide comprehensive protocols and courses to guide students on how to ethically use AI-based technologies as these tools can

help them improve their studying techniques. Forbidding the use of AI may not effectively prevent its use; therefore, universities can advise their students to use specific AI-assisted tools, reducing the potential of cheating and plagiarism and allowing students to progress throughout their studies.

Students can somehow need further explanations after the lectures but they do not receive instant feedback to their questions and that is why the use of AI-assisted tools can be clearly regulated so students can benefit from such technologies taking into consideration the supervision of educators and to be used ethically.

However, The statement on the application of AI-assisted tools that is publicly found on Masaryk University's website, encourages both teachers and students to acquaint themselves with the use of AI tools as they apply them to their teaching and learning journeys. It promotes the use of AI-tools to both teachers and students under certain conditions and guidelines. According to the key points presented, educators and learners can use machine learning tools only if they will be transparent, responsible, honest, and cautious.

Professors and students at Masaryk University in Brno are recommended to use the AI-based technologies under the commitment of personalized assistance, development, and the adaptation to innovative teaching methods.

Policymakers can set guidelines stating that students can only benefit from AI-assisted tools if they will use them for personalized learning, assistance, time management, language support, and if they will use it to gain instant and detailed feedback. Just like the rules are strict on cheating and plagiarism, university administration can implement flexible rules in terms of ethical and proper use of AI for knowledge attainment.

3.1.5 Opportunities of AI on Teaching, Learning, and Administrative Processes in Higher Education

The impact of AI on higher education presents novel opportunities and challenges for teaching and learning (Chatterjee & Bhattacharjee, 2020). The implementation of AI in institutional and administrative levels provides enhanced teaching efficiency and adaptive learning and improves student engagement, as AI can automate administrative tasks such as grading and data analysis, reducing the workload on instructors and allowing them to focus more on teaching and interacting with students (Cotton et al., 2023; Chan, 2023; Wang et al., 2023; Kengam, 2020, Page 2, para. IV).

AI not only shapes students' learning experiences through recommendations but also affects how they learn, identifies learning gaps, determines effective pedagogies, and enhances methods for retaining learners' attention (Chaudhry & Kazim, 2022). According to Owoc et al., (2019), Knewton company uses Alta software to identify students' drawbacks in their studies and provides relevant coursework to match their educational levels. This method ensures that students align with appropriate academic levels, setting them on the right track.

Students' academic performance depends on their instructors' feedback. However, instructors are overloaded with papers and students, thus not having sufficient time to provide constructive feedback to them. Therefore, AI-powered chatbots, such as ChatGPT and Google Bard provide instant answers to students' questions, aiding them in understanding concepts, solving problems, and even acting as research assistants to assist students in writing and communicating with others (Chan, 2023; Atlas, 2023).

AI-powered tools come with features such as automated grading and instant answers which increases students' efficiency (Cotton et al., 2023). GPT-3, for example, can create quizzes for students where they can enhance their personalized learning and prepare them for academic examination (Cotton et al., 2023). These functionalities allow students to be actively engaged with their academic tasks in a timely manner without the need to rely on their professors' immediate responses.

Artificial intelligence provides students who have language-barrier with finding resources and translations to assist them during their studies (Kengam, 2020, Page 2, para. IV). For example, as in (Owoc et al., 2019 Page 5, 2.2), there are applications used at Burlington, Massachusetts, such as Nuance that can transcribe up to 160 words per minute and it is particularly useful for students who have limited ability in writing. Additionally, the application has features such as word recognition and spelling which helps students read and hear in their native language.

Moreover, artificial intelligence can process big data to identify trends and patterns, enabling higher institutions to make effective data-driven decisions on curriculum development, student support, and research allocation (Memarian & Doleck, 2023; Zeide, 2019). However, AI can be costly because it requires investment in hardware, software, and training for faculty staff (Cheng et al., 2021). As stated in Ma, et al., (2018), Artificial intelligence is known for its speed, accuracy, and consistency. In addition, AI requires multiple graphical processors to speed up the training in which it can become expensive (Cheng et al., 2021).

3.1.6 Challenges on AI Integration in Higher Education

The challenges faced when embedding AI in higher education as an ultimate is the faculty instructors' view on AI adoption in higher education as they fear being replaced by an AI or they might be uncomfortable with new teaching methods (Ma et al., 2018). As per Ma et al. (2018), routine and structured jobs can be easily automated and replaced by AI, whereas tasks that are unstructured and involve human interaction are difficult to be replaced by AI. The article also outlines that artificial intelligence will impact two key domains in higher education: curricula and enrollment.

Some professors might not trust this technology because they consider it as a threat to their workforce, thus alighting away from it (Wang et al., 2023). The roles of teachers and students are important when it comes to the use of AI, and some individuals might abuse the AI techniques in their work. Abusing AI technologies can result in plagiarism or other

unethical behaviors while writing due to AI generative tools which can generate contents that resembles what humans can create (Cotton et al., 2023; Chan, 2023).

Composing essays can be overwhelming and problematic for both native speakers and English as a second language (ESL) students (Schmohl et al., 2020; Nazari et al., 2021). Large generative AI models (LGAIMs) provide instant feedback and facilitate thought articulation and brainstorming during writing (Chan, 2023; Nazari et al., 2021). Student growth demands informative input from instructors; yet, educators grapple with limited time due to paper overload. AI's implementation aids in furnishing students with grammatical accuracy and ideas, assisting them in crafting captivating and vivid essays (Schmohl et al., 2020).

Paperpal & Thesis Writer are examples of ANI and are task-specific when compared to ChatGPT, as they can only provide grammar and spelling checks (Schmohl et al., 2020). In contrast, AGIs like ChatGPT and GPT-3 are capable of solving multiple problems, such as but not limited to language translation, text summarization, and sentiment analysis (Haleem et al., 2022). They not only perform preliminary grammar and syntactic checks on texts but also offer instant feedback, questions and answers, movies, and can generate cohesive and diverse contents similar to what humans can create (Haleem et al., 2022). These previously mentioned capabilities can assist users throughout their academic journey (Cotton et al., 2023).

However, if AI knowledge and data were integrated into these mentioned ANI tools (Paperpal & Thesis Writer), they would transform into AGIs and possess a mind. This transformation would enable these technologies to produce content that resembles human capabilities (Flowers, 2019).

In conclusion, the advantages of these AI technologies such as generating human-like cognitive skills that yield cohesive, complex, and varied contents, as well as providing instant feedback to students, have led to a surge in students' reliance on AI-text generative tools. These AI models have assisted these learners to articulate their thoughts, review their essays, and helped them identify areas of weakness, thus enabling students to enhance their skills (Cotton et al., 2023).

3.1.7 Potential Risks Associated with AI Adoption in Higher Education.

Despite the opportunities that AI can provide during teaching and learning, there might be some ethical and technical considerations when developing AI in higher education (Hacker et al., 2023, p. 1117; Kengam, 2020; Zawacki-Richter, 2019, p. 2). Deeper ethical considerations are required as AI-based technologies have changed the nature of the symbiosis between humans and AI (Heyder et al., 2023; Chaudhry & Kazim, 2022). According to Heyder et al., (2023), Aligning AI with human values requires a systematic understanding of the ethical management of human-AI interaction. In order to integrate AI technologies in higher education, they need to be regulated as it has become a real concern for AI researchers and practitioners (Chan, 2023; Heyder et al., 2023).

The successful integration of AI-enhanced learning relies on faculty instructors' willingness to adopt and acquire a comprehensive understanding of AI, thus ensuring continuous improvement in teaching practices (Wang et al., 2023). However, the risks that concern some faculty professors are job displacement, as AI can replace certain administrative and teaching tasks, leading to potential job losses for some faculty members, and the inability of some instructors to interact with such technology (Kengam, 2020, Part VI; Zawacki-Richter, 2019, p. 2).

Excessive reliance on AI tools may lead students to heavily depend on technology, potentially hindering their ability to think creatively and overcome challenges (Chan, 2023; Kengam, 2020, Part VI). The utilization of AI during academic studies could potentially violate the code of conduct, as students might unethically implement large generative AI models for their tasks (Chan, 2023).

AI models rely on deep learning, which means that AI technologies must be taught and grow through data (Oca et al., 2023; Haleem et al., 2022; Kengam, 2020). These technologies encompass algorithms that are instructed with the aid of machine learning using extensive datasets, enabling them to generate predictions based on the data and recognize features of AI-generated content (Cotton et al., 2023; Haleem et al., 2022). Consequently, this process could potentially compromise data privacy and security (Kengam, 2020).

Artificial intelligence necessitates student data, which could compromise data privacy and policy regulations (Kengam, 2020). To incorporate large generative AI models (e.g ChatGPT, Luminous, Bard) into higher education, compliance with EU regulations and the General Data Protection Regulation (GDPR) is important (Hacker et al., 2023, p. 1117). There are terms and conditions that these LGAIMs must adhere to and such examples are data privacy and protection and anti-discrimination (Hacker et al., 2023, p. 1117).

Another ethical challenge arises from the capability of content-generating AI technologies which can produce essays that closely mimic human writing (Cotton et al., 2023). Consequently, instructors are compelled to shift their focus from evaluating the content of the essays to identifying potential breaches of the code of conduct. Text generative AI, such as ChatGPT, Bing, Co-Pilot raise major concerns for instructors as students might unethically use these AI tools in their written assignments or exams (Cotton et al., 2023; Chan, 2023).

Chan (2023) talks about a recent survey of university students and the results showed that one in three students had used essay-generating software to complete their coursework. According to Chan's research in 2023, a conducted survey involving 1000 students showed that about one-third of college students in the US have utilized AI-text generative tools like ChatGPT to accomplish their assigned homework, with 60% of these students using the chatbot on more than half of their assignments. Due to these concerns, some universities have prohibited the use of AI-text generative tools in their academic programs (Chan, 2023). Therefore, AI policies should be incorporated to establish comprehensive guidelines for the utilization of AI technologies in higher education to minimize chances of cheating and plagiarism (Kengham, 2020).

After ChatGPT's release, some teachers have noticed up to one-fifth of students using AI tools in their assignments (Cassidy, 2023). Cassidy (2023) highlights that universities in Australia had to modify their approaches to designing exams and other assessments due to students' growing dependence on AI-supported text generators. Additionally, the same article by Cassidy (2023) reports that New York's public schools have imposed a ban on ChatGPT across all devices, as a consequence of its effects on student learning and issues with plagiarism. Consequently, major institutions have introduced new

laws and regulations regarding AI utilization, categorizing it as a form of cheating and a violation of the academic code of conduct (Cassidy, 2023; Chan, 2023).

To conduct assessments with minimal or no reliance on AI-generated technologies, universities must establish comprehensive guidelines. Cotton et al. (2023) draws attention to key strategies that can effectively reduce the use of AI-generated technologies in assessments. One approach highlighted in Cotton et al.'s (2023) research is the design of assessments that assess students' cognitive abilities, such as critical thinking, problem-solving, and communication skills. For instance, instead of assigning essays on specific topics, educators can create an engaging environment that allows students to collaborate and interact through group discussions, presentations, or other interactive activities that requires the implementation of their knowledge and skills.

In conclusion, for AI technologies and LGAIMs to advance and overcome ethical concerns in higher education, academic staff can offer detailed guidelines to students on how to structure their assignments (Cotton et al., 2023). Additionally, a well sustained cybersecurity, transparency, and data insurance are fundamental in order to protect users' privacy and aids in the development of AI in higher education (Sharma et al. 2021).

3.1.8 Inaccuracy and Bias of AI-assisted tools on Decision-making

The use of AI-assisted tools to enhance student learning and productivity has increased (Cunningham et al., 2019). The researches done by (Wang, 2021 & Cunningham et al., 2019) correlate together by talking about how chatbots play a role in lectures' paperwork reduction and time saving, allowing them to focus and improve their course curriculum.

However, The output results generated by chatbots such as ChatGPT and some other AI-assisted tools can provide inaccurate responses and can show biases towards students (Wang, 2021). This issue can generate further mistakes as these technologies rely on data and if the data is inaccurate, missing, or not properly presented, then mistakes will

accumulate (Oca et al., 2023). AI tools can learn from the past and provide us with instant answers, yet they can commit mistakes (Wang, 2021).

These AI tools are also utilized by some university professors which can help them during their decision-making process. However, some professors use AI plagiarism checkers to check the integrity and originality of their students' work. Sometimes, in a few cases, some students could get accused of using AI tools but in reality they were only using language translation machines such as Google Translate and they paste their translated version to their work yet the AI detectors mention it to be AI content generated.

3.1.9 Inaccuracy and Bias of AI-based Technologies in Other Related Search Areas

The expansion of artificial intelligence in healthcare has been surging and demonstrated the possibility to aid in patient diagnoses and education (Oca et al.; 2023; Bohr & Memarzadeh, 2020). Patients have been increasingly relying on the use of the internet for personal education and to obtain responses related to their health issues. According to Oca et al. (2023), who conducted research on the inaccuracy and bias in AI chatbots' ophthalmologist recommendations, the study showed the differences among three major chatbots (ChatGPT, Google Bard, & Bing Chat) and results indicated significant bias and inaccuracy towards male and female ophthalmologists.

The study was about three chatbots who were provided with the same prompt which was to find four good ophthalmologists in 20 most populous US cities. Each of the three AI bots provided 80 recommendations that contained demographic characteristics, socially constructed, and socioeconomic status. However, these AI-based technologies are only accurate based on the information they are trained on (Oca et al., 2023). If the data is not properly provided and inaccurate, then these programs can build on errors (Oca et al., 2023). Therefore, these technology-supported tools showed more male ophthalmologists than female ophthalmologists. Although this study focused on healthcare, it still shows how the outcomes of AI tools can be biased and inaccurate, leading to further mistakes on decision-making.

3.1.10 AI plagiarism Detection Tools.

AI plagiarism detection tools are important when it comes to scientific writing. AI Plagiarism detection tools allow both instructors and students to check the authenticity and integrity of their papers to avoid falling into copyright issues. Therefore, these tools must come in handy for professors and students which will enable them to check the originality of their research or essay to avoid breaching the code of conduct.

Researchers generate results when they complete a study or conduct an experiment. To provide legitimate conclusions that will provide insightful information for educators, researchers use AI tools that can assist in building statistical analysis and check their authenticity before publishing their discoveries. Some experts suggest that the implementation of AI in higher education has the potential to assist instructors and students in gaining a progressive understanding of assessments and evaluations, enabling them to provide feedback to students (Cotton et al., 2023; Chan, 2023). Using predictive analysis, scientists can identify past patterns to formulate predictions that assist them in decision-making (Zeide, 2019). By utilizing AI-assisted tools, professors can effectively scale their work. These AI technologies will enable the professors to allocate more time on providing engaging courses rather than having to deal with overwhelming paperwork.

3.1.11 Research Question

The use of AI-assisted tools has grown internationally after the Covid-19 pandemic. The impact of these technologies has reached institutional and administrative levels (Hacker et al., 2023). Significant attention has been brought up to this expansion in terms of technology trust and integration in higher education. This research paper sets out to address and analyse the potential for major chatbots like ChatGPT to increase student engagement and success during their academic journey. It will also assess the benefits and challenges of AI-assisted tools used by students in higher education in the Czech Republic to answer one research question, How can AI technology assist students during their academic profession?

4 Practical Part

The practical part of this thesis aims to analyze the use of AI-assisted tools by targeted university students in the Czech Republic. This chapter is divided into three subparts: Data Collection, Data Cleaning, and Data Evaluation. The first subchapter focuses on data collection methodology which is needed for the data evaluation. The data collection methodology is a survey questionnaire that includes 18 questions (16 are required to answer and two of them are response optional) to assess the attitudes of teachers and students on the use of AI-based technologies. The survey questions were carefully chosen based on the discussion with the thesis supervisor to meet the thesis' objectives and requirements in order to manage data collection from the sampled audience. The questions were written on Google Forms because it provides built-in statistical data that can be transferred to excel sheets for further analysis. In order for the questionnaire to be fully launched, a pilot study was conducted, based on my supervisor's advice on 4 university students, and once the revisions were made, the survey was set to effect. The second subchapter is data cleaning which includes sorting, replacing, defining values, and modifying the collected data from the survey questionnaire. The third subchapter is data evaluation which includes the results, which will be interpreted and treated anonymously and in an aggregated manner using statistical analysis for comparison with other findings and studies that will help us to formulate recommendations and conclusions to this study.

4.1.1 Data Collection Method

The data collection method requires the design and conduction of, in our case, a survey questionnaire that aligns with the thesis' aims and objectives. The research study talks about the use of AI-assisted tools by students in higher education in the Czech Republic, which gave the author a chance to customize and to connect with students from different study areas. Therefore, while conducting the survey, the author personally approached the randomly targeted audience from the Czech University of Life Sciences (FEM Department) and from the Czech National Library of Technology (NTK) where students from various study majors, universities, and different backgrounds study. This one-to-one option was selected to ensure that surveyors fully understand the questions so they can provide as accurate answers as possible that can help in formulating better recommendations and

conclusions, which then can help with the accreditation of this research study. This approach also allowed the author to see if the surveyors understood the questions properly and to provide explanations whenever it was necessary to them. It took around 8 minutes per surveyor to complete the survey as the author was explaining the topic, their data rights, and the questions to them when they needed to, but some of the audience had/wanted to answer the open ended questions presented in the survey questionnaire which took quite longer than the average time.

4.1.2 Data Cleaning

Data cleaning is used for detecting, replacing, and correcting errors in order to provide data that can be then evaluated accurately. The data obtained from the Google Form Survey went through a cleaning process of modifying values and correcting grammar and spelling mistakes. The data cleaning process also included sorting and replacing some strings into numbers on Microsoft Excel that can be interpreted by statistical softwares such as Statistical Package for Social Sciences (SPSS). Defining values to the strings assisted in the hypotheses testing procedure.

4.1.3 Data Evaluation

In order to proceed with data evaluation and analysis, the final results from the conducted survey must be fully available. The survey, which gathered a total of 125 responses from various study fields and universities such as ČZU, ČVUT, and CUNI and other universities in the Czech Republic, will undergo analysis using statistical methods (descriptive statistics & regression analysis). To abide by the data privacy rights, responses will be treated anonymously by removing the surveyors student email address. These results will be interpreted and contrasted with other research studies or findings that will help us formulate improved suggestions and conclusions which can be beneficial to future researchers who are looking to develop on this study.

5 Results and Discussion

The survey's aim was to collect data about the use of AI-assisted tools by targeted university students in the Czech Republic. The survey had 125 respondents with different demographics and attitudes towards the use of AI-assisted tools. The collected data was cleaned, analyzed, evaluated, and underwent hypothesis testing using SPSS Statistics Software that generated the following results of the study.

5.1.1 Descriptive Statistics of the Survey

The survey questionnaire had a total number of 125 respondents. The demographic questions were set to descriptive statistics using SPSS Software with the name of the university, major of study, language of study, and years of study. In the (Table 1) below, it is confirmed that the survey targeted universities in the Czech Republic and the three major universities were ČZU (55.2%), ČVUT (16.8%), and CUNI (16.8%) with respective corresponding frequencies of (69), (21), and (21) students.

SPSS Results Table 1 Descriptive Statistics on Demographic Categories - Name of the Current University

1) Which university are you currently attending?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Metropolitan University	1	0,8	0,8	92,8
	Palacky University Olomouc	1	0,8	0,8	93,6
	Pardubice University	1	0,8	0,8	94,4
	Prague University of Chemistry and Technology	1	0,8	0,8	95,2
	Czech Language Institution	2	1,6	1,6	18,4
	English College in Prague	2	1,6	1,6	92,0
	Prague University of Economics and Business	6	4,8	4,8	100,0
	Charles University	21	16,8	16,8	16,8
	Czech Technical University	21	16,8	16,8	35,2

Czech University of Life Sciences in Prague	69	55,2	55,2	90,4
Total	125	100,0	100,0	

The (SPSS Table 2) below shows 11 fields of study and (46.6%) of the surveyors in the Czech universities were studying Informatics. The other three major fields of study were Economics and Management (11.2%) , Medicine (10.4%), and Engineering (10.4%). The engineering field contained students studying mechanical, electrical and road engineering but were categorized under Engineering in order to fit in the descriptive statistics. The Science field contained students studying biology, chemistry and radiology and were grouped up under Science in general. This statistics confirms that a variety of students from different study fields also rely on the use of AI-assisted tools during their studies.

SPSS Results Table 2 Descriptive Statistics on Demographic Categories - Current Major of Study

2) What is your current major or field of study?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Economics and International Relations	1	0,8	0,8	9,6
	Film Studies	1	0,8	0,8	32,0
	Czech Language	2	1,6	1,6	8,8
	Tourism	2	1,6	1,6	100,0
	International Law	3	2,4	2,4	80,8
	Business Administration	9	7,2	7,2	7,2
	Science	9	7,2	7,2	98,4
	Engineering	13	10,4	10,4	31,2
	Medicine	13	10,4	10,4	91,2
	Economics and Management	14	11,2	11,2	20,8
	Informatics	58	46,4	46,4	78,4
	Total	125	100,0	100,0	

In (SPSS Table 3 & SPSS Table 4) below, there were higher values for students studying in the English language (64%) than the students studying in the Czech language (36%). The students were grouped into two categories as shown in the figure below: Juniors (0 to 2 years) and Seniors (3+ years) where regression analysis was used to analyze the data. These demographic categories underwent hypotheses testing comparison of (5) dependent variables towards the demographic categories in order to see which of the demographic categories are affected by the dependent variables.

SPSS Results Table 3 Descriptive Statistics on Demographic Categories - Language of Study

3) Language of Study

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Czech	45	36,0	36,0	36,0
	English	80	64,0	64,0	100,0
	Total	125	100,0	100,0	

SPSS Results Table 4 Descriptive Statistics on Demographic Categories - The Current University's Year of Study

4) How many years have you been enrolled in university in the Czech Republic?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Juniors	65	52,0	52,0	52,0
	Seniors	60	48,0	48,0	100,0
	Total	125	100,0	100,0	

5.1.2 AI-tools in Higher Education in the Czech Republic

The use of AI-assisted tools by university students in the Czech Republic can have positive and negative sides. The survey results showed major positive and negative sides of AI-tools such as ChatGPT, Google Bard, and Bing to university students in the Czech Republic. The excel figure below shows the list of benefits and challenges of AI-assisted

tools to the czech university students. Based on the results form (Excel Table 5), students tend to leverage from AI-technologies with corresponding percentages of personal assistance with (46.6%), improved productivity (45.8%), and time management with (51.7%) in which students can enhance their writing and language skills, and have better learning outcomes. Despite the demand on AI-assisted technologies, students tend to encounter challenges while using AI technologies. Such major challenges faced by university students in the Czech Republic are, based on (Excel Table 6), Inaccuracy and Bias with (51.7%), Understanding the generated output on complex tasks with (42.4%), and technical issues with (39.8%). These benefits and challenges may vary among students depending on their expectations from using AI-assisted tools.

Excel Table 5 Benefits to Students while Using AI-assisted tools for their Academic Work - Results

Benefits of AI tools on Students Academically	Frequency	Percentage %
Personalized Assistance	55	46.6%
Enhanced Writing Assistance	47	39.8%
Improved Productivity	54	45.8%
Better Learning Outcomes	37	31.4%
Time Management	61	51.7%
Instant Feedback	47	39.8%
Language Support	47	39.8%
N = 125		

Encountered Challenges While Using AI tools	Frequency	Percentage %
Ethical Concerns	15	12.7%
Data Privacy	23	19.5%
Inaccuracy and Bias	61	51.7%
Technical Issues	47	39.8%
Understanding the Generated Output	50	42.4%
None of the above	17	14.4%
N = 125		

Excel Table 6 Encountered Challenges by University Students while Using AI-assisted Tools Academically Results

6 Regression Analysis

6.1.1 Hypotheses Test 1 - Frequency of Use of AI-assisted tools between the Junior and Senior Students in the Czech higher education.

In the results of (SPSS Table 7) below, the junior students were tested to see if they use AI tools for their academic work more frequently than the senior students. Based on the significance value of (0,012) with a significance level (α) of (0.05), the hypotheses testing between the junior and senior students towards the frequent use of AI-tools for their academic work showed statistically significant difference. Since the p-value of (0.012) was less than the p-value of (0.05), we reject the null hypotheses (H_0), confirming that the junior students use AI-assisted tools more frequently than the senior students for their academic work.

		Levene's Test for Equality of Variances		t-test for Equality of Means						95% Confidence Interval of the Difference	
		F	Sig.	t	df	Significance One-Sided p	Two-Sided p	Mean Difference	Std. Error Difference	Lower	Upper
7) How frequently do you use AI-assisted tools for your academic work?	Equal variances assumed	6,540	0,012	-1,946	123	0,027	0,054	-40,769	20,951	-82,240	0,702
	Equal variances not assumed			-1,937	118,234	0,028	0,055	-40,769	21,053	-82,459	0,921

SPSS Table 7 Regression Analysis Hypotheses Testing 1 Results

6.1.2 Hypotheses Test 2 – Comfortability levels between students studying in English and in Czech languages towards the use of AI-assisted tools.

The second hypotheses testing aimed to assess whether there was a significant difference in the comfort levels of using AI-assisted tools between students studying in the English language and students studying in the Czech language. Drawing from (SPSS Table 8), the p-value of (0.410) with significance level (α) of (0.05), the null hypotheses (H_0) cannot be rejected. This concludes, based on the results, that there is no statistically

significant difference in the comfort levels of using AI-assisted tools between students studying in the English language and students studying in the Czech language because the p-value (0.410) is greater than the significance level (0.05).

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means							
		F	Sig.	t	df	Significance One-Sided p	Two-Sided p	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
11) How comfortable are you with the use of AI-assisted tools in your academic work?	Equal variances assumed	0,683	0,410	-0,026	123	0,490	0,979	-0,004	0,161	-0,324	0,315
	Equal variances not assumed			-0,027	103,403	0,489	0,979	-0,004	0,155	-0,311	0,302

SPSS Table 8 Regression Analysis - Hypotheses Testing 2 Results

6.1.3 Hypotheses Test 3 – Preference of Clear Policies on the Ethical use of AI Tools in the Czech Higher Education.

The third hypotheses test focused on determining whether there was a significant impact in the preference of clear and proper guidelines on AI technologies between students studying in English and Czech languages. Given the hypotheses results on (SPSS Table 9), the significance value yielded (0.840) which is greater than the significance level (a) (0.05). Therefore, we cannot reject the null hypotheses (H0), which means we can conclude based on the results that there is no significant impact in the preference of clear AI policies and guidelines between students studying in English and Czech languages.

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means					
		F	Sig.	t	df	Significance One-Sided p	Two-Sided p	Mean Difference	Std. Error Difference

15) Do you believe that universities should have clear policies and guidelines for the ethical use of AI-assisted tools in education?	Equal variances assumed	0,041	0,840	0,101	123	0,460	0,920	0,007	0,069	-0,129	0,143
	Equal variances not assumed			0,101	92,311	0,460	0,920	0,007	0,069	-0,129	0,143

SPSS Table 9 Regression Analysis - Hypotheses Testing 3 Results

6.1.4 Hypotheses Test 4 - Regular use of Digital Technology or Online Resources in Academic Work.

The fourth hypotheses aimed to evaluate the impact between the junior and senior students while using digital technology and online resources. It is confirmed on (SPSS Table 10), based on the p-value of (0.004), that there is a statistically significant difference between the junior and senior students towards the regular use of digital technology and online resources and we can reject the null hypotheses (H0) because the p-value of (0.004) is lower than the alpha significance level (α) of (0.05).

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means
		F	Sig.	t
5) How often do you use digital technology or online resources for your academic work?	Equal variances assumed	8,590	0,004	1,502
	Equal variances not assumed			1,480

SPSS Table 10 Regression Analysis - Hypotheses Testing 4 Results

6.1.5 Hypotheses Test 5 – Comfortability Levels between Junior and Senior students towards the use of AI-assisted Tools.

The fifth hypotheses focused on evaluating the impact on comfortability levels between junior and senior students in the Czech higher education. The hypotheses test results on (SPSS Table 11) confirmed that the p-value of (0.081) is greater than the alpha level (α) (0.05) and the null hypotheses (H_0) cannot be rejected. Based on the results, we conclude that there is no significant impact between the junior and senior students towards the comfortability levels towards the use of AI tools.

Independent Samples Test

			Levene's Test for Equality of Variances		t-test for Equality of Means							
			F	Sig.	t	df	Significance One-Sided p	Two-Sided p	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
										Lower	Upper	
11)	How comfortable are you with the use of AI-assisted tools in your academic work?	Equal variances assumed	3,089	0,081	-0,588	123	0,279	0,558	-0,091	0,155	-0,398	0,216
		Equal variances not assumed			-0,581	107,570	0,281	0,563	-0,091	0,157	-0,402	0,220

SPSS Table 11 Regression Analysis - Hypotheses Testing 5 Results

6.1.6 Hypotheses Test 6 Frequency of Use of AI-assisted tools between the Czech and English students in the Czech Higher Education.

The sixth hypotheses testing examined if there was a significant difference in the extent of use of AI tools by students studying in English and in Czech languages. The results on (SPSS Table 12) showed a significance value of (0.027) which is less than the alpha level (α) of (0.05). This means that the null hypotheses (H_0) can be rejected and conclude that there is a significant difference between the frequency of use between students studying in English and in Czech languages.

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means				95% Confidence Interval of the Difference			
		F	Sig.	t	df	Significance One-Sided p	Significance Two-Sided p	Mean Difference	Std. Error Difference	Lower	Upper
7) How frequently do you use AI-assisted tools for your academic work?	Equal variances assumed	4,990	0,027	-4,393	123	<0,001	<0,001	-90,417	20,584	-131,161	-49,672
	Equal variances not assumed			-4,231	81,631	<0,001	<0,001	-90,417	21,370	-132,931	-47,902

SPSS Table 12 Regression Analysis - Hypotheses Testing 6 Results

6.1.7 Hypotheses Test 7 - Demographic Categories Vs Five Dependent Categories

The last hypotheses testing focused on ANOVA testing between the demographic categories: Name of the university, major, language, and year of study to analyse which of these factors are impacted by the five dependent categories and the five dependent variables: Frequency and comfortability levels of AI usage, concerns level, and policy preference on AI tools. The results on (Excel Table 13) below showed significance levels between the demographic and the five dependent categories. There was a significant difference between the extent of use of digital and online resources and the dependent variable of frequency of use of AI tools because the p-value of (0.004) was less than the alpha level (α) of (0.05). This means that the null hypotheses (H_0) can be rejected. Moreover, there was a significant difference between the extent of use of digital and online resources and the comfortability levels towards the use of AI tools. However, out of the (5) demographic categories, only the language of study showed a significant difference towards the concerns of use of AI-assisted tools because the p-value of 0.004 was less than the alpha level (0.05) which means the null hypotheses (H_0) can be rejected.

The five demographic categories had p-values higher than the significance level (α) of (0.05) towards the believe in having clear policies and guidelines towards the ethical use of AI-assisted tools in Education. However, only the extent of use had a significant difference out of all the five demographic categories towards the integration of AI-technologies in the Czech higher education.

ANOVA TEST	P Values	P Values	P Values	P Values	P Values
	University	Major of Study	Language of Study	Year of Study	Extent of Use
7) How frequently do you use AI-assisted tools for your academic work?	0.775	0.187	<0.001	0.054	0.004
11) How comfortable are you with the use of AI-assisted tools in your academic work?	0.332	0.203	0.979	0.558	0.015
14) Are you concerned about issues related to data privacy and security when using AI-assisted tools for academic purposes?	0.029	0.585	0.004	0.556	0.992
15) Do you believe that universities should have clear policies and guidelines for the ethical use of AI-assisted tools in education?	0.859	0.573	0.920	0.498	0.296
17) Do you think that AI-assisted tools will become more integrated in higher education in the Czech Republic, or do you anticipate limitations or challenges in their adoption?	0.813	0.813	0.911	0.454	0.012

Excel Table 13 Regression Analysis (ANOVA Test) - Hypotheses Testing 7 Results

7 Discussion

The conducted research of policies and rules about the use of AI-assisted tools among Czech universities mostly showed the normal pattern which is the total prohibition on the use of these AI tools. In this era of ongoing technological advancements, it is nearly difficult to prohibit the use of such AI technologies used by university students. However, proper policies and guidelines can be established to minimize the extent of use of AI-assisted tools by students in higher education.

The guidelines can be more of student friendly because the results provided in section 5.1.2 showed the advantages of the use of AI-tools by students in the Czech higher education that allowed them to positively benefit from these AI tools. Instead of the general restriction on the use of AI-assisted tools, which can do minimal barriers to their users, detailed and proper laws can be used to teach students on the ethical way to use AI technologies.

AI detection tools can detect essays or course work that was completed by AI-assisted tools. However, these tools cannot always detect if students used AI during in-person or online examinations, even if the instructors focused the e-learning systems to solely open the exam page on the browser. Therefore, the recommended solution to the addressed issue of the unethical use of AI-assisted tools academically can be the design of project-based assessments, open-ended exam questions and oral presentations.

Moreover, based on the survey open-ended results, some of the students suggested that universities should adapt to the use of AI-assisted tools because forbidding the use will not stop the use of these tools. Therefore, many students advised to have helpful educational classes on the ethical use of AI-assisted tools and to have their own university's AI tool by integrating the open-source code to comply with university rules.

The surveyed students proposed to have clear AI guidelines as they have explained their struggle to understand a certain topic, thus the use of AI-assisted tools can help better understand the concepts of certain topics especially that their instructors are overwhelmed with administrative tasks.

The conducted research by Chan, et al (2023), which discusses the comprehensive AI policy in higher education, surveyed 180 and 457 teachers and students respectively in different Hong Kong universities, showing the viewpoints of attitudes and expectations on the use of AI-assisted tools in higher education. Comparing the author survey's results with Chan, et al (2023) survey, both studies showed the positive integration of AI technology in future learning practices and that the use of AI-assisted tools can help save students' time, provide personalized feedback, and improve students' academic performance. The results available on Chan, et al (2023), contrasted with the author's research, elaborated on the successful AI implementation by conducting experiments in variety of sectors to better assess how the use of AI can have impact on students' learning processes. Moreover, Chan, et al (2023) had qualitative data on 10 themes and 25 subthemes collected from teachers, staff, and students that directly focused on the planning of AI policy for teaching and learning in universities.

The conducted research by Cotton et al, (2023), which discusses the academic integrity in the era of ChatGPT, provides key strategies on minimizing cheating and plagiarism. The study recommends the design of assessments that require students to prove their critical thinking, problem-solving, and communication skills instead of asking students to write essays. Comparing these recommendations with the responses from the surveyed students in this research study, this can create clashes as the students of this research have suggested that the academic staff to accept the adoption and use of AI-assisted tools during their studies. However, some students of this research have pointed out how AI can be dangerous and the need to educate students on the proper and productive use of these tools.

In the discussion part with Chan, et al (2023), it was interesting that both teachers and students were unsure if teachers can accurately detect students' use of generative AI technologies to complete their assignments. However, teachers also believe that AI tools can provide insights and personalised feedback, which enforces the concern to establish assessment methods that involve critical and analytical thinking and supports the responses from the surveyed students in this research, suggesting that universities should have their own AI platform that can be used by students.

In conclusion, to minimize the potential risks of cheating and plagiarism since forbidding the use of AI-assisted tools will not stop the use of them, it is recommended by the

some of the surveyed students that university departments should establish clear standards that specify the benefits that students can ethically leverage from such AI technologies during their self-study, promote academic integrity, to design exams that are open-ended and require critical and analytical thinking, group presentations, promote collaboration, and oral assessments, and to familiarise students with ethical issues that can allow them to use these AI tools responsibly.

8 Conclusion

The branch of AI is growing and students' dependency on such tools has increased. With the use of AI-assisted tools, students tend to have improved productivity, efficiency, and better learning outcomes. Despite the heavy demand on AI tools, Czech university students faced challenges such as inaccuracy and bias, technical issues, and difficulty in understanding the generated output when dealing with complex tasks.

The main objective of this thesis was met by analyzing the use of AI-assisted tools by university students in the Czech Republic in which the partial objectives and methodology were used to attain the main aim of this thesis. The partial objectives included the design and conduction of a survey questionnaire which was completed by targeted university students in the Czech Republic to collect data about their use of AI-assisted tools and the methodology was focused on survey questionnaire among targeted university students in the Czech Republic. The leading results were displayed using descriptive statistics and regression analysis of the survey data.

Since this study analyzed students' behaviors, attitudes, and perspectives towards the use of AI-assisted tools, future researchers can benefit from this thesis. The future researchers can use this study to further build on it either to compare or contrast their findings of how university students use AI-technologies. They can also find similarities and differences by heading to the results and discussions section. The sample size of this research study has 125 respondents studying either in the Czech or the English language at a variety of universities in the Czech Republic with different years and majors of study.

Moreover, future researchers can conduct comparative studies across different countries or regions to understand the differences in the adoption, patterns, and effectiveness of AI-assisted tools in higher education. Researchers can analyse faculty members' attitudes, expectations, and concerns regarding the integration of AI tools in teaching and administrative processes.

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10 List of pictures, tables, graphs and abbreviations

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10.1.2 List of abbreviations

- ČZU – Czech University of Life Sciences Prague
- ČVUT – Czech Technical University in Prague
- CUNI – Charles University
- UNYP – University of New York Prague
- AI – Artificial Intelligence
- LGAIMs – Large Generative Artificial Intelligence Models
- GPT – Generative Pre-trained Transformers

