The Impact of ChatGPT on Higher Education:

Exploring the AI Revolution

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Foreword by Ted Mitchell

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We dedicate this book to the memory of Dr İbrahim Arıkan, the founder of MEF Schools and MEF University, who dedicated his life to revolutionising education. Dr Arıkan's ultimate dream was to establish MEF University as a fully flipped university, but sadly, he passed away before witnessing its realisation. He was a pioneer across all stages of education, from kindergarten to university, and believed in a democratic approach to education that prioritised the individuality of each student.

Dr Arıkan implemented full academic independence for teachers at his institutions, and his commitment to creating a learning environment that nurtures the potential of every student has left a lasting impact on the field of education. His spirit lives on in the hearts and minds of every student and teacher who had the privilege to know him. As we continue to honour his legacy, we are proud to say that MEF University has become the realisation of his dream, an innovative and fully flipped university that empowers students to take control of their education and become lifelong learners.

We believe that Dr Arıkan would have been proud of the innovative direction MEF University is taking by incorporating cutting-edge technologies like ChatGPT to further enhance the teaching and learning experience. As a pioneer in education, he always believed in implementing new and effective teaching methods to provide his students with the best possible education. His spirit continues to inspire us to strive for excellence in education, and we dedicate this book to his memory.

About the Authors

Caroline Fell Kurban is an academic, educator and consultant with a diverse educational background, including a PhD in Applied Linguistics, MA in Technology and Learning Design, MSc in Teaching English to Speakers of Other Languages and BSc (Hons) in Geology. Her expertise in flipped learning and contributions to publications on digital teaching and learning have been instrumental in advancing initiatives at MEF University in Istanbul. As the principal investigator, Caroline's extensive background and prior studies have influenced the selection of theoretical frameworks for this investigation of ChatGPT integration in education. Her expertise in Clayton Christensen's Theory of Jobs to be Done, critical examination of power dynamics through theorists like Bourdieu and Marx and understanding of phenomenology through Heidegger's philosophy bring a comprehensive perspective to her research. With her credentials and passion for enhancing educational practices, she is well-suited to lead this project.

Muhammed Şahin, an esteemed academic leader, holds a geomatics engineering degree from Istanbul Technical University (ITU) and earned his master's degree from University College London in 1991 and a PhD from the University of Newcastle in 1994. He joined ITU as an Assistant Professor in 1994 and climbed the ranks to become a tenured Professor in 2002. Şahin's remarkable career includes serving as the Rector of ITU from 2008 to 2012 and later as the founding rector at MEF University, the pioneering institution fully based on the flipped learning methodology in which this research is located. With esteemed leadership roles in various organisations, substantial contributions to research and strategic management and influential work in engineering education, his expertise spans diverse domains. However, his current passion and dedication revolve around educational transformation, especially with regard to the impact that technologies are having on reshaping learning experiences and empowering students for the future. He strongly believes that the experiences derived

from this transformation should be shared with others, which is what prompted the development of this book.

Foreword

In the dynamic and ever-evolving landscape of education, one of the most profound shifts is the integration of emerging technologies. As an advocate for access to high-quality education for all, I find this era of technological advancement an intriguing period of transformation. This book dives deep into the exploration of artificial intelligence (AI) in education, specifically focusing on AI chatbots like ChatGPT, and the implications they bring to our learning environments.

My pleasure in presenting the foreword for this book is twofold. Firstly, because the authors have undertaken a rigorous exploration of a critical topic. Secondly, because this subject resonates with my professional journey, spent in pursuit of improving student outcomes and democratising access to quality education.

MEF University in Istanbul, the book's focal research site, stands as a beacon of innovation for its integration of AI, offering a unique context for this study. The authors critically examine ChatGPT, discussing its development, the ethical considerations surrounding its use, and the need for a globally inclusive discourse on the ethical guidelines for AI technologies.

From my tenure as US Under Secretary of Education to leading the American Council on Education, I have seen the impact that a conscientious integration of technology can have on access to high-quality education. In this book, by delving into the history and ascent of chatbots, formulating a theoretical framework for evaluating AI's influence, conducting a contemporary literature review and embarking on an exploratory case study, the authors shed light on how AI chatbots have the potential to reshape the very foundations of teaching and learning.

What the authors present is not just a well-researched treatise on ChatGPT, but a tool for future exploration. The book's concluding chapters provide a blueprint for how to effectively and ethically integrate these AI

technologies in our classrooms and institutions, a guide I wish I had when piloting early edtech initiatives in my own career.

The insights gleaned from this book go beyond ChatGPT. They will shape how we, as educators, policymakers, and students, navigate the rapidly changing technological landscape of education. The authors have not only provided a comprehensive exploration of AI chatbots in education but also prompted us to consider how we can harness this technology to create an equitable and inclusive future for all learners.

In the grand scheme of things, the integration of AI in education is a new frontier. This book stands as an essential guide for all those venturing into this new territory. We stand on the precipice of a new era in education – an era where AI can help us achieve our shared goals of equity, excellence and accessibility in education.

Let us not just read this book but act on its insights to ensure a future where all learners have access to quality education.

Ted Mitchell
President of the American Council on Education

Preface

It is my pleasure to introduce our new book, *The Impact of ChatGPT on Higher Education: Exploring the AI Revolution*. As the founding rector of MEF University in Istanbul, Turkey, I am proud to say that our institution has always been at the forefront of innovative and cutting-edge approaches to education.

Since our establishment in 2014 as the world's first fully flipped university, we have been dedicated to providing our students with the skills they need to succeed in their future careers. However, we also recognise that the landscape of education is constantly evolving, and we must adapt our methods accordingly. That is why, in this book, we are excited to share our exploration of how ChatGPT may affect the roles of students, instructors and institutions of higher education.

Our university has always been a pioneer in the use of technology in education. We were early adopters of the flipped learning approach, which has now become widely recognized as an effective pedagogical method. We were also at the forefront of using digital platforms with adaptive learning capabilities to provide our students with personalised and individualised learning experiences.

As we embrace new technologies and innovative approaches to education, the potential of AI in education using ChatGPT is both exciting and promising. However, it is crucial to thoroughly explore and understand how this technology will impact students, instructors and universities themselves. Moreover, universities will have a vital role to play in the global discourse of AI as it rapidly transforms various aspects of our lives.

This book presents an in-depth analysis of our institution's exploratory case study, investigating the potential effects of ChatGPT on various stakeholders. Through the sharing of experiences, anecdotes and perspectives from various practitioners' viewpoints, our goal is to offer a glimpse into the transformations occurring within our organisation. This

endeavour can serve as a useful reference for other institutions seeking to undertake similar inquiries. We are excited to be at the forefront of this discourse and to contribute to the progress of knowledge in this field.

Muhammed Şahin
Rector of MEF University

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In creating this book, we have been fortunate to receive significant support, assistance and inspiration. We are profoundly grateful to all who contributed. Our students, especially Levent Olcay, Utkan Enis Demirelgil, Nida Uygun and Mehmet Oğuzhan Unlu, brought invaluable enthusiasm and insights to the project. We would also like to acknowledge the diligent assistance of our student volunteer, Muhammet Dursun Şahin. We are deeply thankful to the İbrahim Arıkan Education and Scientific Research Foundation, a guiding light in our pursuit of educational excellence, and the MEF University faculty, whose creative ideas and persistent motivation were indispensable. We express our gratitude to Professor Muhittin Gökmen, Director of the Graduate School of Science and Engineering and the Chairman of the Department of Computer Engineering at MEF. His valuable insights concerning AI theorists like Tegmark, Marcus, Davis and Russell greatly enriched our understanding. Additionally, we extend our appreciation to Professor Mustafa Özcan, Dean of the Faculty of Education at MEF, for his continuous feedback and unwavering support throughout the duration of this project. We owe a debt of gratitude to Paker Doğu Özdemir and his team at the MEF CELT, along with the MEF Library staff, especially Ertuğrul Çimen and Ertuğrul Akyol, for their tireless support and valuable contributions. Our heartfelt thanks also go to our colleagues, including Ted Mitchell, whose thoughtful foreword frames our work; Leonid Chechurin, for his astute critique; and Juliet Girdher, whose expertise on Heidegger enriched our understanding of AI through a Heideggarian lens. We also extend our appreciation to the members of our AI think tank, Errol St Clair Smith, Thomas Menella, Dan Jones and Juli Ross-Kleinmann whose thoughtful discussions helped shape our ideas. Finally, we express our sincere gratitude to Emerald Publishing for making this book possible. In essence, this book is a testament to the strength of collaborative effort and the pursuit of knowledge. Each of you has enriched

our work, leaving an indelible mark that we will forever appreciate. Thank you.

Chapter 1

Exploring ChatGPT's Impact on Higher Education – A Case Study

The Revolutionary Impact of AI

Throughout the ages, technological advancements have disrupted traditional practices, necessitating individuals to adjust and weigh the potential advantages and disadvantages of emerging technologies. From the printing press to the blackboard, from the computer to the internet, each new innovation has shaped the way we teach and learn. And artificial intelligence (AI) is set to be the next catalytic jump forwards. Although AI has been around since the mid-1950s, it is only in recent times that data mining, advanced algorithms and powerful computers with vast memory have been developed, thus making AI increasingly relevant. From problem-solving in the 1950s to the simulation of human reasoning in the 1960s, from early mapping projects in the 1970s to the development of intelligent assistants in the 2000s, AI has made impressive strides. Today, AI manifests in household personal assistants like Siri and Alexa, self-driving cars and automated legal assistants. It has also spawned AI-assisted stores, AI-enabled hospitals and the ubiquitous Internet of Things. In the realm of higher education, the integration of AI technologies holds transformative potential for traditional teaching and learning practices. However, a new era has now arrived with the emergence of ChatGPT, the game-changing AI chatbot. So what is ChatGPT?

The Arrival of Chat Generative Pre-trained Transformer (ChatGPT)

ChatGPT, an influential AI chatbot developed by OpenAI, has emerged as a game-changer in education, offering students dynamic and human-like conversations through natural language processing (NLP). Since its launch on 30 November 2022, ChatGPT has revolutionised the educational landscape, providing students with immediate access to information, personalised recommendations and continuous support throughout their academic journey. However, its implementation has also raised concerns about academic integrity, leading some institutions to ban its usage or adopt stricter assessment methods to combat AI-based cheating. This has sparked global discussions among educators, debating whether ChatGPT represents an opportunity or a threat.

At its core, ChatGPT operates by harnessing the power of NLP to comprehend and respond to human queries in a conversational manner. Through advanced algorithms and machine learning techniques, ChatGPT has been trained on vast datasets to generate human-like responses, making it an indispensable tool for engaging with students. The interactive and personalised nature of ChatGPT's conversations makes it highly valuable in the educational landscape. Students can instantly access answers to their questions, relevant resources and tailored recommendations based on their learning needs. Whether seeking clarifications, additional information or guidance, ChatGPT serves as a reliable and readily available support system throughout their academic journey. Furthermore, instructors can leverage ChatGPT to streamline administrative tasks and enhance the learning experience. By automating routine administrative processes, such as addressing frequently asked questions and providing course-related information, instructors have more time to focus on meaningful interactions with students. Additionally, ChatGPT can offer timely and personalised feedback, providing students with real-time guidance and support. Integrating ChatGPT into the educational environment can lead to a more engaging and interactive learning experience. Students benefit from immediate assistance, personalised guidance and a supportive learning environment, while instructors can optimise their teaching practices and facilitate more meaningful interactions.

As we can see, the potential of ChatGPT in higher education is promising. However, it is essential to recognise the caveats that accompany it. To begin with, addressing the ethical considerations and limitations surrounding ChatGPT is crucial. These encompass concerns about its

reliance on heuristics, lack of transparency in internal workings, issues with capability versus alignment, limitations in helpfulness, interpretability challenges, issues of bias and fairness, factual accuracy and truthfulness, as well as ethical concerns regarding data privacy and cybersecurity. Moreover, the impact of ChatGPT on industries, including higher education, necessitates thorough investigation. The integration of AI technologies like ChatGPT brings transformative effects on job markets, resulting in the elimination and transformation of positions, requiring a re-evaluation of traditional work models. Within education, institutions and companies face disruptive challenges as ChatGPT alters job roles, posing questions about the value of human expertise and critical thinking skills. Additionally, financial implications and the costs associated with implementation and ongoing support require careful consideration. Furthermore, the concentration of AI power and the potential for corporate dominance are critical factors to explore. The risk of a few dominant companies controlling and influencing AI raises concerns about limited diversity, choice and fair competition, emphasising the need to address data ownership, privacy and the possibility of monopolistic practices. Establishing comprehensive policies and regulations becomes essential to ensure ethical use, responsible deployment and accountability in the integration of ChatGPT and similar technologies. Lastly, the scarcity of research on the specific impact of ChatGPT in teaching, learning and higher education institutions underlines the significance of investigation. The limited availability of case studies, insufficient student perspectives and inadequate understanding of necessary adaptations in educational objectives and practices create a substantial knowledge gap. It is therefore crucial that investigations of ChatGPT in higher education are undertaken, due to its potential as well as its associated caveats.

In the wake of the COVID-19 pandemic, educational approaches underwent a significant shift. However, compared to the emergence of ChatGPT, the impact of the pandemic may appear relatively small. While instructors and institutions had the option to revert to traditional educational methods as the pandemic receded, the same cannot be said for ChatGPT and AI chatbots. In fact, one could argue that ChatGPT represents a new kind of ‘pandemic’ in the educational landscape. So, how should this be addressed?

MEF University's Response to ChatGPT

MEF University, a pioneering non-profit private institution located in Istanbul, Turkey, has been at the forefront of embracing innovative educational methodologies since its inception. Founded by Dr İbrahim Arıkan, the university envisions revolutionising higher education by equipping students with the skills necessary for future careers and addressing the dynamic demands of contemporary industries and society. By strategically investing in infrastructure and cutting-edge technology, MEF has solidified its reputation as a forward-thinking institution. Since its establishment in 2014, MEF became a trailblazer by fully embracing the flipped learning approach across its entire campus. This pedagogical model emphasises student-centred learning and the cultivation of critical thinking skills. Under this framework, students engage with course content outside of class, while in-class time is dedicated to the practical application of these principles. Instructors adopt roles as facilitators or coaches, delivering personalised support and feedback. However, MEF University's commitment to enhancing the learning experience and embracing innovation did not stop there. In 2019, the institution phased out traditional final exams in favour of project-based and product-focused assessments, fostering active learning and tangible application of acquired knowledge. Additionally, digital platforms and adaptive learning technologies were seamlessly integrated into programmes, providing interactive resources and tailoring the learning journey to each student's unique needs. The integration of Massive Open Online Courses (MOOCs) further expanded self-directed learning opportunities, culminating in the development of the Flipped, Adaptive, Digital and Active Learning (FADAL) model (Şahin & Fell Kurban, 2019). This model proved its worth when the COVID-19 pandemic struck in 2020. While conventional institutions grappled with the transition to online learning, MEF University's FADAL approach facilitated a seamless shift. The institution's emphasis on technology, active learning and personalised education ensured a smooth transition to remote learning. Accolades, including being recognised as Turkey's top university for effectively navigating the pandemic through national student satisfaction surveys and receiving the 2020 Blackboard Catalyst Award for Teaching and Learning, underscored MEF's successful adaptation to the new educational landscape. Building on this foundation, the institution

introduced an AI minor programme, Data Science and AI, in 2021. This programme equips students across all departments with comprehensive skills in data management, analytics, machine learning and deep learning, preparing them for real-world applications. Through these strategic initiatives, MEF University's commitment to disruptive innovation and investment in new technologies have positioned it as a leader in preparing students to meet the evolving demands of industries and society.

The public launch of ChatGPT on 30 November 2022 sparked robust discussions at MEF University about the potential opportunities and challenges it introduces to higher education. In response, three individuals at the university volunteered to undertake an initial experiment spanning from December 2022 to January 2023. This experiment involved integrating ChatGPT into course design, classroom activities and evaluating its impact on assessments and exams. The findings from this experiment catalysed a faculty meeting in January 2023. During this meeting, the origins and potential implications of ChatGPT were presented, and the volunteers shared concrete examples of its incorporation in various educational contexts. The diverse array of perspectives expressed during the meeting underscored the necessity for an in-depth institutional case study to comprehensively explore ChatGPT's impact on education within MEF University. Specifically, the university aimed to understand how ChatGPT could potentially reshape the roles of students, instructors and higher education institutions. Recognising the gravity of the situation and the imperative for further exploration, the concept for the research project outlined in this book was conceived.

The core objectives of our research project encompass a thorough exploration of ChatGPT's potential impact on students and instructors within the realm of higher education. By immersing ourselves in the implementation of this transformative technology, our study aims to unearth potential challenges and barriers that may emerge. This endeavour offers invaluable insights into the transformative role AI chatbots like ChatGPT can play in reshaping the teaching and learning landscape. Our overarching mission is to delve into how the integration of ChatGPT might redefine the roles of students, instructors and higher education institutions. Through this inquiry, we aspire to gain a profound understanding of how AI chatbots might reshape dynamics and responsibilities within the educational sphere. By scrutinising these shifts, we seek insights into the implications for

educators, learners and universities as a whole. Furthermore, our research aims to contribute to the broader discourse surrounding the integration of AI technologies in higher education. Guided by three pivotal research questions that structure our investigation, namely, ‘How may ChatGPT affect the role of the student?’; ‘How may ChatGPT affect the role of the instructor?’; and ‘'How may ChatGPT affect the role of institutions of higher education?’, our study aims to offer valuable insights that will inform educational practices, guide policy formulation and shape the future integration of AI technologies in higher education institutions. Ultimately, our research endeavours aim to contribute to a deeper understanding of the potential benefits and considerations associated with ChatGPT, ensuring its effective and responsible integration within the realm of higher education.

Purpose and Scope of the Book

This book aims to provide a comprehensive analysis of MEF University's exploratory case study, delving into the potential impacts of ChatGPT on various stakeholders. Drawing from diverse perspectives, experiences and anecdotes, our objective is to offer a profound understanding of the transformative shifts occurring within our institution. By delving into these findings, we intend to contribute meaningfully to the broader discourse on ChatGPT's implications in higher education and offer valuable insights to institutions facing similar inquiries.

In this opening chapter, we introduced ChatGPT and highlighted the significance of investigating its role in higher education. We established our research context, reasons for conducting this study, research objectives and research questions. Chapter 2 delves into the emergence of chatbots, shedding light on their limitations and ethical considerations. Additionally, we explore ChatGPT's profound impact on employment and education, as well as scrutinising evolving educational policies in response to these changes. We conclude this chapter by discussing the need for robust policies to address potential risks associated with AI. Chapter 3 constructs a theoretical framework by incorporating critical theory and phenomenology. This framework enables us to comprehensively examine ChatGPT's impact, encompassing power dynamics, social structures, subjective experiences and consciousness, thereby providing deeper insights into its relevance and

broader implications. In Chapter 4, we present a literature review of ChatGPT in higher education, identifying valuable insights and specific gaps, while explaining how our study addresses these gaps and advances understanding. Chapter 5 introduces the research methodology, employing a qualitative exploratory case study approach at MEF. We utilise interviews, observations, research diaries and surveys for data collection. Thematic analysis aids in interpreting the data, leading to the identification of themes, including: Input Quality and Output Effectiveness of ChatGPT, Limitations and Challenges of ChatGPT, Human-like Interactions with ChatGPT; the Personal Aide/Tutor Role of ChatGPT; Impact of ChatGPT on User Learning and Limitations of Generalised Bots for Educational Context. Chapter 6 offers an interpretation of these themes, linking them to the research questions, data, literature review and theoretical framework. The book then transitions to discussing the practical implications derived from the findings and interpretation. In Chapter 7, we delve into the ethical implications, including critiquing AI detection tools, scrutinising current AI referencing systems, the need to rethink plagiarism in the AI age, the need to cultivate proficiency in AI ethics and the importance of enhancing university ethics committees' roles. Chapter 8 delves into product implications, emphasising the necessity of fair access to AI bots for all students, the importance of fostering industry collaboration to understand AI developments, how we should approach decision-making regarding specialised bots and the importance of integrating prompt engineering courses into programmes. Chapter 9 explores educational implications, discussing the impact of AI on foundational learning, how we can navigate AI challenges through flipped learning, how we can design AI-resilient assessment and instruction strategies, and the importance of fostering AI literacy in students and instructors. In Chapter 10, we highlight our study's contributions to knowledge and research. Beginning with an overview of our research structure, the chapter delves into key insights and findings, revisiting essential themes. Our theoretical framework is discussed for advancing AI discourse by blending philosophy and technology in educational research. We explore practical implications for higher education institutions. Moreover, we advocate that universities bear a moral duty to actively engage in the global AI conversation. Addressing research limitations, we outline how we plan to overcome them in future studies. Recommendations for additional relevant research areas are also presented

to further explore AI in higher education. The chapter concludes by underscoring our role as authors of the AI narrative, with the power to shape AI technologies in alignment with our shared values and aspirations.

In conclusion, this book provides a comprehensive exploration of the implications of ChatGPT within both our institution and higher education at large. Our in-depth case study yields profound insights into the transformative power of AI tools like ChatGPT. By sharing these insights and their broader implications, our goal is to foster meaningful discussions, critical engagement and purposeful initiatives in the field. Our endeavour offers valuable guidance to other institutions, allows us to reflect on our experiences and envisions a future where education thrives in an AI-enhanced environment. We extend a warm invitation to educators, university leaders and institutions to join us in responsibly harnessing AI's potential, thereby shaping a more promising horizon for education.

Chapter 2

Navigating the Landscape of AI Chatbots

Emergence and Growth of Chatbots

Artificial intelligence (AI) has transformed human existence by processing vast data and performing tasks resembling human capabilities (Anyoha, 2017). Early AI faced challenges, but the breakthrough Logic Theorist showcased its potential (Anyoha, 2017). Thriving in the 1990s and 2000s, AI achieved landmark goals despite funding hurdles (Anyoha, 2017). The development of conversational AI systems progressed significantly, with milestones like ELIZA, ALICE and SmarterChild (Adamopoulou & Moussiades, 2020; Shum et al., 2018). In November 2022, OpenAI unleashed Chat Generative Pre-trained Transformer (ChatGPT), a powerful natural language processing (NLP) model with 175 billion parameters, rapidly gaining one million users. GPT-3.5, developed in 2020, marked a significant advancement in language models, capable of learning from any text and performing various tasks (Rudolph et al., 2023).

In 2022, OpenAI unveiled ChatGPT-3.5, followed by GPT-4 in 2023. Notably, companies like Microsoft seamlessly integrated ChatGPT into their products (Milmo, 2023a; Waugh, 2023). The rising popularity of ChatGPT has ignited discussions about the future of search engines, particularly concerning Google (Paleja, 2023b). In response, Google introduced its own chatbot technologies, including LaMDA and Apprentice Bard (Milmo, 2023a). Sundar Pichai, CEO of Alphabet, voiced strong confidence in Google's AI capabilities (Milmo, 2023a) and revealed plans to seamlessly integrate chatbots into their product offerings. Furthermore, other companies have also entered the AI chatbot arena. In April 2023, Elon Musk, CEO of Twitter (now renamed as X), playfully proposed the idea of ‘TruthGPT’ in response to ChatGPT's reluctance to address controversial topics. Musk highlighted the need for an AI system free from such

constraints, leading to the inception of a cryptocurrency-based project to tackle this challenge (Sabarwal, 2023). Later, in July 2023, Meta introduced its advanced AI system, ‘Llama 2’. Mark Zuckerberg proudly announced its collaboration with Microsoft and the availability of this AI for research and commercial purposes (Sankaran, 2023). Thus, industry has now taken the lead in machine learning model development, surpassing academia. This is the current situation. However, what lies ahead?

OpenAI states that its long-term goal is to create ‘artificial general intelligence’ (AGI) (Brockman & Sutskever, 2015). AGI refers to AI systems that possess the ability to understand, learn and apply knowledge in a way that's comparable to human intelligence. AGI would be capable of performing a wide range of tasks and adapting to new situations without being explicitly programmed for each specific task, making it a higher level of AI than the specialised, narrow AI systems currently available. Tech entrepreneur, Siqi Chen, claims that GPT-5 will achieve AGI by the end of 2023, generating excitement in the AI community (Tamim, 2023). Chen's claim, while not widely held at OpenAI, suggests that generative AI is making significant strides (Tamim, 2023). Sam Altman, the CEO of OpenAI, goes one step further, hinting at the potential for AI systems to far surpass even AGI (Sharma, 2023). He believes that AI's current trajectory indicates remarkable potential for unprecedented levels of capability and impact in the near future (Sharma, 2023). In summary, AI's transformative impact on human existence, coupled with the rapid advancement of chatbots like ChatGPT, highlights the potential for significant changes in various industries and the field of AI as a whole. However, this does come with caveats.

Challenges and Ethical Considerations in AI

As AI chatbots like ChatGPT continue to evolve and become more prevalent in our daily lives, we are starting to understand more about their limitations. One of the biggest questions surrounding ChatGPT is how it works, and even the creators themselves do not fully understand it. They attempted to use AI to explain the model, but encountered challenges due to the ‘black box’ phenomenon present in large language models like GPT (Griffin, 2023). This lack of transparency raises concerns about biases and

the dissemination of inaccurate information to users. Researchers are exploring ‘interpretability research’ to understand the inner workings of AI models (Griffin, 2023). One approach involves studying individual ‘neurons’ within the system, but the complexity of billions of parameters makes manual inspection impractical. To address this, OpenAI researchers employed GPT-4 to automate the examination of system behaviour (Griffin, 2023). Despite limitations in providing human-like explanations, the researchers remain optimistic about AI technology's potential for self-explanation with continued research (Griffin, 2023). However, further work is needed to overcome the challenges in this field, including describing the system's functioning using everyday language and considering the overall impact of individual neuron functionality (Griffin, 2023).

At the core of ChatGPT lies language processing, encompassing various aspects like grammar, vocabulary and cultural context. While it can perform numerous language-related tasks, its understanding is limited to learnt patterns from training data. Unlike humans, ChatGPT lacks actual consciousness or self-awareness, relying on heuristics, which are rules of thumb used to make efficient decisions in complex situations (Kahneman, 2011). In language processing, heuristics help parse sentences, recognise patterns and infer meanings based on context. ChatGPT uses deep learning algorithms trained on extensive text data to generate relevant and coherent responses (Sánchez-Adame et al., 2021). However, language's constant evolution and complexity still present limitations for AI chatbots.

ChatGPT also has some limitations that lead to gaps in its knowledge base and issues with generating accurate responses (Johnson, 2022; Rudolph et al., 2023). It can frequently repeat phrases, reject questions or provide answers to slightly modified versions of questions (Johnson, 2022). Additionally, some chatbots, including ChatGPT, have been observed using language that is misogynistic, racist and spreading false information (Johnson, 2022). These issues stem from the challenge of aligning the model's behaviour with human values and expectations (Ramponi, 2022). Large language models like ChatGPT are trained to optimise their objective function, which may not always align with human values when generating text (Ramponi, 2022). This misalignment can hinder the practical applications of chatbots in systems that require reliability and trust, impacting human experience (Ramponi, 2022). This is often seen in the following ways (Ramponi, 2022):

- *Lack of Helpfulness*
  Where a language model fails to accurately understand and execute the specific instructions provided by the user.
- *Hallucinations*
  When the model generates fictitious or incorrect information.
- *Lack of Interpretability*
  When it is hard for humans to comprehend the process by which the model arrived at a particular decision or prediction.
- *Generating Biased or Toxic Output*
  When a model generates output that reproduces such biases or toxicity (due to being trained on biased or toxic data) even if it was not intentionally programmed to do so.

But why does this happen? Language models like transformers are trained using next-token-prediction and masked-language-modelling techniques to learn the statistical structure of language (Ramponi, 2022). However, these techniques may cause issues as the model cannot differentiate between significant and insignificant errors, leading to misalignment for more complex tasks (Ramponi, 2022). OpenAI plans to address these limitations through its release of a limited version of ChatGPT, (ChatGPT-3.5) and gradually increasing its capabilities using a combination of supervised learning and reinforcement learning, including reinforcement learning from human feedback, to fine-tune the model and reduce harmful outputs (Ramponi, 2022). This involves three steps, although steps two and three can be iterated continuously.

- *Stage One*
  Fine-tuning a pre-trained language model on labelled data to create a supervised policy.
- *Stage Two*
  Creating a comparison dataset by having labellers vote on the policy model's outputs and training a new reward model on these data.
- *Stage Three*
  Further fine-tuning and improving the supervised policy using the reward model through proximal policy optimisation.

(Ramponi, 2022)

OpenAI employs a moderation application programming interface (API), an AI-based system, to detect violations of their content policy and ensure that harmful language, such as misogyny and false news, is avoided (Johnson, 2022). However, the system is not perfect and has flaws, as seen when a Twitter user bypassed it to share inappropriate content (Johnson, 2022). OpenAI acknowledges the challenges and limitations of their language models, including ChatGPT-4, which may produce harmful or inaccurate content despite its advanced capabilities (Waugh, 2023). While they are actively working to improve the system through supervised and reinforcement learning, as well as collaborating with external researchers, challenges related to interpretability and hallucinations remain unresolved (Waugh, 2023).

AI ethics is a rapidly evolving field, especially with the rise of generative AI systems (GAI), making fairness, bias and ethical considerations crucial (Maslej et al., 2023). The 2023 Artificial Intelligence Index Report highlights the presence of unfairness and bias in AI systems, leading to potential harms such as allocative and representation harm (Maslej et al., 2023). Emily Bender, a University of Washington computational linguist, warns that language models can carry biases due to their training data, leading to problematic outcomes (Grove, 2023). Instances of AI-related ethical issues are on the rise, as demonstrated by the Algorithmic and Automation Incidents and Controversies Repository (Maslej et al., 2023). For instance, the use of AI in US prisons raised concerns about discrimination, while the Gang Violence Matrix in London faced criticism for bias (Maslej et al., 2023). Midjourney's AI-generated images also raised ethical concerns (Maslej et al., 2023). Fair algorithms are essential to prevent such issues, but currently, AI incidents and controversies are on the rise, highlighting the need for continuous ethical vigilance (Maslej et al., 2023). To address issues of bias in AI, various applications are being utilised. The perspective API by Alphabet's Jigsaw assesses toxicity in language, with its use increasing by 106% due to growing AI deployment (Maslej et al., 2023). SuperGLUE's Winogender Task measures gender bias in AI systems related to occupations, evaluating the use of stereotypical pronouns (Maslej et al., 2023). Instruction-tuned models, fine-tuned on instructional datasets, have shown improved performance, but they may rely on stereotypes (Maslej et al., 2023). The BBQ and HELM benchmarks assess bias and fairness in question-

answering systems, highlighting trade-offs between accuracy and bias metrics (Maslej et al., 2023). Additionally, machine translation models struggle with gendered pronouns, leading to mistranslations and potential dehumanisation (Maslej et al., 2023). Despite these challenges, these applications are valuable tools to mitigate bias and promote ethical AI practices.

Conversational AI raises ethical concerns as well. Researchers from Luleå University found that 37% of analysed chatbots were female gendered, and 62.5% of popular commercial chatbots defaulted to female, potentially reinforcing biases (Maslej et al., 2023). Moreover, dialogue systems may be overly anthropomorphised, making users uncomfortable, and many examples in dialogue datasets were rated impossible or uncomfortable for machines to output (Maslej et al., 2023). Clear policy interventions and awareness of limitations are crucial to address these issues and foster better communication with users. Text-to-image models face biases too. Meta researchers found Instagram-trained models to be less biased than previous ImageNet-trained models (Maslej et al., 2023). And the socially, environmentally and ethically responsible (SEER) model showed fairer representations of people (Maslej et al., 2023). However, using public data without user awareness for AI training may be unethical. A study comparing pre-trained vision-language models revealed gender bias in larger models, with contrastive language-image pre-training (CLIP) having more bias but higher relevance (Maslej et al., 2023). Stable Diffusion and DALL-E 2 exhibited biases, as did Midjourney, generating images reinforcing stereotypes (Maslej et al., 2023). For example, ‘CEO’ prompted images of men in suits (Maslej et al., 2023).

AI ethics research is experiencing significant growth and attention in conferences and publications. Fairness, Accountability, and Transparency (FAccT), an interdisciplinary conference, is a prominent platform for research on algorithmic fairness and transparency, witnessing a tenfold increase in submissions since 2018 (Maslej et al., 2023). The interest in AI ethics is shared by industry and government-affiliated actors, indicating its relevance for policymakers, practitioners and researchers (Maslej et al., 2023). European contributions to the field are also on the rise, although the majority of authors are still from North America and Western countries (Maslej et al., 2023). In recent years, workshops on fairness and bias in AI have emerged, with NeurIPS hosting its first workshop on fairness,

accountability and transparency in 2014 (Maslej et al., 2023). Certain topics, like ‘AI for Science’ and ‘AI for Climate’, have gained popularity and transitioned from workshops to the main track, reflecting the surge in AI applications in healthcare and climate research (Maslej et al., 2023). NeurIPS has seen a rise in papers focused on interpretability and explainability, particularly in the main track (Maslej et al., 2023). Additionally, statistical methods such as causal inference are being used to address fairness and bias concerns, leading to a significant increase in papers submitted on causal inference and counterfactual analysis at NeurIPS (Maslej et al., 2023). Privacy in machine learning has also become a mainstream concern, with NeurIPS hosting workshops and privacy discussions moving into the main track (Maslej et al., 2023). The conference now requires authors to submit broader impact statements addressing ethical and societal consequences, indicating a growing emphasis on ethical considerations (Maslej et al., 2023). The surge in the number of papers on fairness and bias, as well as the increase in workshop acceptances, reflects the growing interest and importance of this topic for researchers and practitioners (Maslej et al., 2023).

AI algorithms also face challenges in factuality and truthfulness. This had led to the development of AI for fact-checking and combating misinformation using fact-checking datasets (Maslej et al., 2023). However, research on natural language fact-checking seems to have shifted, with a plateau in citations of widely-used fact-checking benchmarks like FEVER, LIAR and Truth of Varying Shades (Maslej et al., 2023). Automated fact-checking systems have limitations, as they assume availability of contradicting evidence for new false claims and some datasets lack sufficient evidence or use impractical fact-checking articles as evidence (Maslej et al., 2023). To address these challenges, the development of the TruthfulQA benchmark evaluates the truthfulness of language models on question answering, testing misconceptions across various categories (Maslej et al., 2023).

AI interfaces like chatbots have practical benefits but raise privacy concerns due to their potential for intrusive data collection (O'Flaherty, 2023). Unlike search engines, chatbots' conversational nature can catch users off guard, leading them to reveal more personal information (O'Flaherty, 2023). Chatbots can collect various data types, including text, voice, device, location and social media activity, potentially enabling

targeted advertising (O'Flaherty, 2023). Microsoft's consideration of adding advertisements to Bing Chat and Google's privacy policy permitting targeted advertising using user data raise further concerns (O'Flaherty, 2023). However, ChatGPT's privacy policy is believed to prioritise personal data protection and prohibit commercial exploitation (Moscona, as cited in O'Flaherty, 2023).

In response to data privacy, cybersecurity concerns, some countries and companies initially imposed bans on the usage of generative AI technology like ChatGPT. For instance, Italy passed a decree banning the use of such technology for processing personal data, citing potential threats to data privacy (Paleja, 2023c). However, the ban was later lifted after OpenAI addressed regulatory requirements (Robertson, 2023). Others issued warnings to staff. Companies like JP Morgan and Amazon restricted employee use of ChatGPT (O'Flaherty, 2023). Data consultancy firm Covelent advises caution, recommending adherence to security policies and refraining from sharing sensitive information (O'Flaherty, 2023). Even chatbot companies like ChatGPT and Microsoft warn against sharing sensitive data in conversations (O'Flaherty, 2023). These actions highlight the serious data privacy threats associated with AI chatbots.

There are also concerns that AI interfaces, like ChatGPT, have the potential to facilitate fraud, spread misinformation and enable cybersecurity attacks, posing existential risks (O'Flaherty, 2023). Experts warn that advanced phishing emails could be created using chatbots due to their ability to generate content in multiple languages with impeccable language skills (O'Flaherty, 2023). Moreover, chatbots might spread misinformation, assist in creating realistic deepfake videos and contribute to the dissemination of harmful propaganda on social media platforms (Tamim, 2023). These risks are already evident, with chatbots being used for malicious purposes, such as generating fake news (Moran, 2023). Additionally, AI presents security risks, aiding cybercriminals in conducting more convincing and efficient cyberattacks (O'Flaherty, 2023).

There are also ethical concerns that surround the potential exploitation of African workers in content moderation for AI engines like ChatGPT (Schamus, 2023). Earning less than $2 a day, these workers handle distressing online content to train AI engines, raising questions about the sustainability and fairness of their efforts (Schamus, 2023). The utilisation of African labour for data mining and cleansing by a US organisation

underscores the ethical predicament of relying on underpaid individuals from less economically advantaged regions to benefit those in more affluent areas. Consequently, addressing these ethical concerns is crucial for the responsible development of AI tools.

Meredith Whitaker, an AI researcher and ethicist, highlights that generative AI heavily relies on vast amounts of surveillance data scraped from the web (Bhuiyan, 2023). However, the specific sources of these data, obtained from writers, journalists, artists and musicians, remain undisclosed by proprietary companies like OpenAI (Bhuiyan, 2023). This raises concerns about potential copyright violations and lack of fair compensation for content creators. When asked about compensation for creators, OpenAI's CEO, Sam Altman, mentioned ongoing discussions but did not provide a definitive answer (Bhuiyan, 2023). The impact on local news publications, whose content is used for training AI models, is also a concern, and Altman expressed hope for supporting journalists while considering possible actions (Bhuiyan, 2023). Nonetheless, the necessity for external regulation to address these issues is evident (Bhuiyan, 2023).

The environmental impact of AI technology, particularly large language models, is a growing concern. Data centres, hosting power-hungry servers for AI models like ChatGPT, significantly contribute to carbon emissions (McLean, 2023). The power source, whether coal or renewable energy, further affects emission levels (McLean, 2023). Moreover, the water footprint of AI models is substantial; for example, Microsoft's data centres used around 700,000 litres of freshwater during GPT-3's training, equivalent to the water needed for hundreds of vehicles (McLean, 2023). Hence, it's vital to tackle these environmental concerns and imperative to discover sustainable solutions as these models continue their expansion (McLean, 2023).

AI's Impact on the Job Market

AI is no longer just a futuristic concept that we see in movies; it's now a reality in our everyday lives – from individuals to organisations, and from businesses to governments. Advancements in AI technology have led to its rapid deployment, but with great power comes great responsibility. Historian Yuval Noah Harari (2018) suggests that to comprehend the nature

of these technological challenges, we should start by asking questions about the job market: What will the job market look like in 2050? Will AI impact all industries, and if so, how and when? Could billions of people become economically redundant within the next decade or two? Or will automation continue to create new jobs and greater prosperity for all in the long run? Will this mirror the positives that happened due to the industrial revolution or is this time different? Given the ongoing debate and lack of consensus among experts, this section aims to provide some answers to the aforementioned questions.

We are now starting to hear a lot more mainstream conversation regarding the social and economic impact that AI and AI chatbots will have on society and industry. According to the 2023 Artificial Intelligence Index Report, bar agriculture, forestry, fishing and hunting, the demand for AI-related skills is rapidly increasing in nearly all sectors of the American economy. The report highlights that between 2021 and 2022, the number of AI-related job postings increased on average from 1.7% to 1.9% (Maslej et al., 2023). According to Business Insider, AI technology like ChatGPT could drastically change jobs in various industries, such as finance, customer service, media, software engineering, law and teaching, including potential gains and losses (Mok & Zinkula, 2023). This may happen in the following ways.

In finance, it is thought likely that very soon AI-powered bots will handle complicated financial questions, allowing advisors and CFOs to make real-time decisions by tapping into AI's knowledge. They will also be able to perform information analysis, pattern detection and forecasting. Moreover, ChatGPT will save time for marketers in finance by analysing data and providing insights into customer behaviour as well as organising information and generating marketing materials (*How Will ChatGPT & AI Impact The Financial Industry?*, 2023). In addition, ChatGPT has the potential to disrupt jobs across various industries on Wall Street, including trading and investment banking. This is because ChatGPT can automate some of the tasks that knowledge workers perform today. One advantage of this is that it will enable them to concentrate on higher-value tasks. However, it also means that AI could do certain jobs that recent college graduates are currently doing at investment banks (Mok & Zinkula, 2023). This may lead to the elimination of low-level or entry jobs.

When it comes to customer service and engagement, according to Forbes, conversational AI, such as ChatGPT, has the potential to revolutionise customer service by providing human-like conversations that address each user's concerns. Unlike traditional chatbots, which follow predetermined paths and lack flexibility, conversational AI can automate the upfront work needed for customer service agents to focus on high-value customers and complex cases requiring human interaction (Fowler, 2023).

And what about the creative arts? Forbes predicts that ChatGPT is expected to have a significant impact on jobs in advertising, content creation, copywriting, copy editing and journalism (Fowler, 2023). Furthermore, due to the AI's ability to analyse and understand text, it is likely that ChatGPT will transform jobs related to media, including enabling tasks such as article writing, editing and fact-checking, script-writing for content creators and copywriting for social media posts and advertisements (Fowler, 2023). In fact, we are already seeing chatbots drafting screenplays (Stern, 2023), writing speeches (Karp, 2023), writing novels (Bensinger, 2023) and being used by public relations companies to ‘research, develop, identify customer values or changing trends, and strategize optimal campaigns for… clients in a matter of seconds’ (Martinez, 2023). There is already a visible response from affected employees in response to these developments. In Los Angeles in early May 2023, a strike was initiated involving thousands of film and television writers, later joined by actors and other members of the film community, with the aim not only to address financial matters but also to establish rules preventing studios from using AI to generate scripts, excluding human involvement in the creative process (Hinsliff, 2023). This shift is also being seen in Buzzfeed, which is one of many publishers that have started to use AI-generated content to create articles and social media posts, with the aim of increasing efficiency and output (Tarantola, 2023). However, the quality of the content generated by AI is still a concern for many (Tarantola, 2023). Another area which is being affected is fashion, where AI is being used for everything from analysing data to create designs for upcoming collections to generating a variety of styles from sketches and details from creative directors (Harreis, 2023).

When it comes to engineering, while ChatGPT may be able to aid engineers in their work by generating answers for engineering calculations and providing information on general engineering knowledge, it will not be

able to replace the knowledge, expertise and innovation that engineers bring to the design and product development process (Brown-Siebenaler, 2023). However, regarding software engineering, there may be many changes. Software engineering involves a lot of manual work and attention to detail. However, ChatGPT can generate code much faster than humans which will lead to improved efficiency, bug identification and increased code generation speed, while also cutting resource costs (Mok & Zinkula, 2023).

With regard to healthcare, Harari (2018) gives the following example by comparing what doctors do to what nurses do. Doctors mainly process medical information, whereas nurses require not only cognitive but also motor and emotional skills to carry out their duties. Harari believes this makes it more likely that we will have an AI family doctor on our smartphones before we have a reliable nurse robot. Therefore, he expects the human care industry to remain a field dominated by humans for a long time and, due to an ageing population, this is likely to be a growing industry. And there is now evidence coming out to support Harari's claims. A recent study conducted by the University of California San Diego looking at a comparison between written responses from doctors and ChatGPT to real-world health queries, the panel of healthcare professionals preferred ChatGPT's responses 79% of the time (Tilley, 2023). They also found ChatGPT's answers to be of higher quality in terms of information provided and perceived empathy, without knowing which responses came from the AI system (Tilley, 2023). Furthermore, ChatGPT has even demonstrated the ability to pass the rigorous medical licencing exam in the United States, scoring between 52.4 and 75% (Tilley, 2023).

According to a recent Goldman Sachs report, generative AI may also have a profound impact on legal workers, since language-oriented jobs, such as paralegals and legal assistants, are susceptible to automation. These jobs are responsible for consuming large amounts of information, synthesising what they learnt, and making it digestible through a legal brief or opinion. Once again, these tend to be low-level or entry jobs. However, AI will not completely automate these jobs since it requires human judgement to understand what a client or employer wants (Mok & Zinkula, 2023). We are already starting to see examples of AI being used in the legal field. DoNotPay, founded in 2015 is a bot that helps individuals fight against large organisations for acts such as applying wrong fees, robocalling and parking tickets (Paleja, 2023a). In February 2023, DoNotPay was used

to help a defendant contest a speeding ticket in a US court, with the programme running on a smartphone and providing appropriate responses to the defendant through an earpiece (Paleja, 2023a). In addition, AI judges are already being used in Estonia to settle small contract disputes, allowing human judges more time for complex cases (Hunt, 2022). Furthermore, a joint research project in Australia is currently examining the benefits and challenges of AI in courts (Hunt, 2022). Overall, we are seeing AI becoming more popular in courts worldwide. And this is certainly the case in China. In March 2021, China's National People's Congress approved the 14th Five-Year Plan which aimed to continue the country's judicial reform, including the implementation of ‘smart courts’ to digitalise the judicial system (Cousineau, 2021). ChatGPT is also demonstrating its ability to excel in legal exams. The latest iteration of the AI programme, GPT-4, recently surpassed the threshold set by Arizona on the uniform bar examination (Cassens Weiss, 2023). With a combined score of 297, it achieved a significant margin of success which, notably, places ChatGPT's performance close to the 90th percentile of test takers (Cassens Weiss, 2023).

Just like other industries, the emergence of ChatGPT has compelled education companies to reassess and re-examine their business models. According to Times Higher Education writers, Tom Williams and Jack Grove, the CEO of education technology firm Chegg, Dan Rosensweig, attributes a decline in new sign ups for their textbook and coursework assistance services to ChatGPT, believing that as midterms and finals approached, many potential customers opted to seek AI-based help instead (2023). Williams and Grove believe this shift in consumer behaviour serves as a ‘harbinger’ of how the rise of generative AI will disrupt education enterprises and is prompting companies to hastily adapt and future-proof their offerings (2023). They give the example of Turnitin, which has expedited the introduction of an AI detector, and Duolingo, which has incorporated GPT-4 to assist language learners in evaluating their language skills (2023). Williams and Grove also note that, simultaneously, a wave of newly established start-ups has emerged, offering a wide range of services, including personalised tutoring chatbots and proprietary AI detectors, each with varying levels of accuracy (2023). They quote Mike Sharples, an emeritus professor at the Open University's Institute of Educational Technology, saying that it is the larger companies that are successfully

integrating AI into their existing and well-established products that are thriving. Conversely, Sharples cautions that others run the risk of becoming like the 'Kodak of the late 1990s', unable to adapt swiftly or effectively enough to thrive in a competitive market (Williams & Grove, 2023). Sharples goes on to say that he anticipates that numerous companies in the education field, particularly distance-learning institutions, will face significant challenges in their survival, as students may perceive AI as capable of performing their tasks better; however, he cautions that whether or not that is the case remains to be seen (Williams & Grove, 2023). Williams and Grove also quote Rose Luckin, professor of learner-centred design at University College London Knowledge Lab. Luckin describes the advantages of platforms like ChatGPT, such as being able to effortlessly generate textbooks and course materials; however, she warns that there will be a great need for quality control to address errors (Williams & Grove, 2023). However, she points out that this is significantly more cost-effective than producing the materials from scratch (Williams & Grove, 2023). Williams and Grove therefore conclude that the publishing and educational technology sectors are going to undergo significant transformations due to these developments and stress that companies must recognise these changes and assess how student demands and industry requirements are evolving. This will eventually help them in identifying the areas where ChatGPT falls short, after which they can work to fill those gaps effectively (2023).

As we have seen, AI is leading to major changes in the job market, including job gains and job losses. However, what is interesting is that ChatGPT may not only be changing jobs but also creating jobs. In fact, OpenAI cofounder, Greg Brockman, expressed that concerns about AI tools taking away human jobs were exaggerated, and that AI would enable people to concentrate on essential work. Brockman believes that the key to the future will be more elevated skills, such as discernment and the ability to determine when to delve into details, and that AI will enhance what humans can accomplish (Waugh, 2023). According to Fiona Jackson, technology writer, some remote workers are already secretly using AI to complete multiple jobs at the same time, referring to themselves as 'overemployed' because ChatGPT helps them finish each job's workload in record time (2023). She reports that they are using the tool to produce high-quality written content, which may include anything from writing marketing materials to articles to blog posts, and are therefore able to work

multiple full-time jobs without their employers knowing (Jackson, 2023). She notes that the inception of such remote work can be traced back to the advent of the pandemic, which compelled many employees to assume additional jobs to sustain themselves in the wake of economic instability. Built upon this, she notes that the emergence of ChatGPT appears to have provided workers with an even more advanced online tool that is augmenting their remote work capabilities, helping them to effectively manage multiple roles at the same time (Jackson, 2023). However, Jackson points out that ChatGPT-generated text often contains errors, which some workers see as a positive, as it means their expertise is still required to check the AI's work (Jackson, 2023). Jackson further reports that many workers who use ChatGPT to supplement their income are living in fear of losing their jobs. These professionals recognise the possibility that the rapid advancements in AI could ultimately make their positions obsolete (Jackson, 2023). Apparently, one worker even likened the impact of AI on the workforce to the historical shift from weavers to a single loom operator in the textile industry (Jackson, 2023). Therefore, it seems that while AI can be a helpful tool, it also comes with some significant risks for those who rely on traditional employment. But what about non-traditional employment? What about the new jobs emerging?

We are even seeing that the advent of ChatGPT has led to the creation of a new job market where companies are actively seeking prompt engineers to harness the bot's potential; a job that involves enhancing the performance of ChatGPT and educating the company's staff on how to make the most of this technology (Tonkin, 2023). Often referred to as ‘AI whisperers’, prompt engineers specialise in crafting prompts for AI bots such as ChatGPT, and frequently come from backgrounds in history, philosophy or English language, where a mastery of language and wordplay is essential (Tonkin, 2023). And we are currently seeing a strong demand for prompt engineers, with Google-backed start-up Anthropic advertising a lucrative salary of up to $335,000 for a ‘Prompt Engineer and Librarian’ position in San Francisco; a role which involves curating a library of prompts and prompt chains and creating tutorials for customers (Tonkin, 2023). Additionally, another job posting offers a salary of $230,000 for a machine learning engineer with experience in prompt engineering to produce optimal AI output (Tonkin, 2023). Interestingly, the job postings encourage candidates to apply even if they don't meet all the qualifications.

Sam Altman is currently emphasising the significance of prompt engineers, stating that ‘writing a really great prompt for a chatbot persona is an amazingly high-leverage skill’ (Tonkin, 2023). Thus, a new job market has opened. But why is this happening so quickly and seamlessly? And why are people who did not meet all the qualifications being asked to apply? It all comes down to unlocking the potential of capability overhang.

One of the reasons prompt engineers do not have to have a background in computer science or machine learning is related to the concept of capability overhang. In his article ‘ChatGPT proves AI is finally mainstream – and things are only going to get weirder’, James Vincent highlights the concept of ‘capability overhang’ in AI, which refers to the untapped potential of AI systems, including latent skills and abilities that researchers have yet to explore (2022). The potential of AI remains largely untapped due to the complexity of its models, which are referred to as ‘black boxes’. This complexity makes it challenging to understand how AI functions and arrives at specific results. However, this lack of understanding opens up vast possibilities for future AI advancements (Vincent, 2022). Vincent quotes Jack Clark, an AI policy expert, who describes the concept of capability overhang as follows: ‘Today's models are much more capable than we think, and the techniques we have to explore them are very immature. What about all the abilities we are unaware of because we have not yet tested for them?’ (Vincent, 2022). Vincent highlights ChatGPT as a prime example of how accessibility has impeded the progress of AI. Although ChatGPT is built on GPT-3.5, an improved version of GPT-3, it was not until OpenAI made it available on the web that its potential to reach a wider audience was fully realised. Furthermore, as it was released free of charge, this further increased its accessibility. Moreover, despite the extensive research and innovation in exploring the capabilities and limitations of AI models, the vast and complex intelligence of the internet remains unparalleled. Now, with the sudden accessibility of AI capabilities to the general public, according to Vincent, the potential overhang may be within reach (2022).

So, what do the experts have to say about the potential impact of AI on the job market? Sam Altman holds an optimistic viewpoint, acknowledging that while technology will undoubtedly influence the job market, he believes there will be even greater job opportunities emerging as a result. Altman emphasises the importance of recognising AI tools like GPT as

tools, not autonomous entities (Bhuiyan, 2023). In Altman's perspective, GPT-4 and similar tools are poised to excel at specific tasks rather than completely supplanting entire jobs (Bhuiyan, 2023). He envisions GPT-4 automating certain tasks while concurrently giving rise to novel, improved job roles (Bhuiyan, 2023). However, Altman's optimism contrasts with the outlook of Sir Patrick Vallance, the departing scientific adviser to the UK government (Milmo, 2023c). Vallance adopts a more cautious stance, predicting that AI will instigate profound societal and economic shifts, with its impact on employment potentially rivalling that of the Industrial Revolution (Milmo, 2023c). Moreover, the Organisation for Economic Co-operation and Development (OECD) contends that major economies stand on the brink of an AI revolution, which could lead to job losses in skilled professions such as law, medicine and finance. According to the OECD, approximately 27% of employment across its 38 member countries, including the United Kingdom, United States and Canada, comprises highly skilled jobs vulnerable to AI-driven automation. The OECD specifically highlights roles in sectors like finance, medicine and legal activities, which require extensive education and accumulated experience, as suddenly susceptible to AI-driven automation (Milmo, 2023e). In fact, these predictions are already starting to materialise. In May 2023, IBM's CEO announced a temporary halt in hiring for positions that could potentially be replaced by AI, estimating that around one-third of the company's non-customer facing roles, approximately 7,800 positions, could be affected (Milmo, 2023c). The influence of AI has also reached the stock markets, as evidenced by the significant decline in the share price of UK education company Pearson following revised financial projections by US-based provider Chegg, attributing the impact to ChatGPT and its effect on customer growth (Milmo, 2023c). Therefore we can see that the negative influence of AI is already here, it is already happening.

AI's Impact on Education

In 2023, Felten et al. conducted a study to evaluate the degree to which advancements in AI language modelling capabilities could affect various occupations. Their findings indicate that the education sector is going to be hit particularly hard. Out of the 20 professions they identified as being most

at risk, 85% of these projected job losses were in the field of education. Starting with those with the highest risk, these include: psychology teachers; communications teachers; political scientists; cultural studies teachers; geography teachers; library science teachers; clinical, counselling and school psychologists; social work teachers; English language and literature teachers; foreign language and literature teachers; history teachers; law teachers; philosophy and religion teachers; sociology teachers; political science teachers; criminal justice and law enforcement teachers and sociologists (Felten et al., 2023).

We are also starting to see a shift in how graduates are being affected. According to the 2023 Artificial Intelligence Report, the percentage of new computer science PhD graduates from US universities specialising in AI has been increasing steadily over the years. In 2021, 19.1% of new graduates specialised in AI, up from 14.9% in 2020 and 10.2% in 2010 (Maslej et al., 2023). The trend is shifting towards AI PhDs choosing industry over academia. In 2011, a similar number of AI PhD graduates took jobs in industry (40.9%) and academia (41.6%). However, since then, a majority of AI PhDs are choosing industry, with 65.4% taking jobs in industry in 2021, which is more than double the 28.2% who chose academia (Maslej et al., 2023). In addition, the number of new North American faculty hires in computer science, computer engineering and information fields have remained relatively stagnant over the past decade (Maslej et al., 2023). In 2021, a total of 710 new hires were made, which is slightly lower than the 733 hires made in 2012. Furthermore, the number of tenure-track hires also saw a peak in 2019 with 422 hires, but then dropped to 324 in 2021 (Maslej et al., 2023).

There is also a growing difference in external research funding between private and public American computer science departments. A decade ago, the median total expenditure from external sources for computing research was similar for private and public computer science departments in the United States. However, the gap has widened over time, with private universities receiving millions more in funding than public ones (Maslej et al., 2023). As of 2021, private universities had a median expenditure of $9.7 million, while public universities had a median expenditure of $5.7 million (Maslej et al., 2023). In response to these changes, universities are taking various actions to adapt. They are focusing on several key areas, including their infrastructure, programme offerings, faculty recruitment and faculty

retention. Inside Higher Ed's Susan D'Agostino's May 2023 article provides recent information regarding how universities are reacting. Regarding universities' increased investments in AI faculty and infrastructure, she gives the following examples. The University at Albany, Purdue University and Emory University are currently actively hiring a substantial number of AI faculty members, while the University of Southern California is investing $1 billion in AI, to recruit 90 new faculty members and establish a dedicated AI school (D'Agostino, 2023). Similarly, the University of Florida is creating the Artificial Intelligence Academic Initiative Centre, while Oregon State University is building an advanced AI research centre with cutting-edge facilities (D'Agostino, 2023). In support of these efforts, the National Science Foundation is committing $140 million to establish seven national AI research institutes at US universities, each with a specific focus area (D'Agostino, 2023). However, D'Agostino quotes Victor Lee, an associate professor at Stanford's Graduate School of Education, as emphasising the importance of extending AI initiatives beyond computer science departments, suggesting that integrating diverse disciplines such as writing, arts, philosophy and humanities to foster a range of perspectives and critical thinking necessary for AI's development and understanding (2023). According to D'Agostino, colleges are also establishing new academic programmes in AI. For example, Houston Community College will introduce four-year degree programmes in applied technology for AI and robotics, as well as applied science in healthcare management, and Rochester Institute of Technology plans to offer an interdisciplinary graduate degree in AI (D'Agostino, 2023). Furthermore, the New Jersey Institute of Technology will launch two AI graduate programmes, and Georgia Tech will lead a statewide AI initiative with a $65 million investment, transforming a facility into an AI Manufacturing Pilot Facility (D'Agostino, 2023). In addition, Palm Beach State College is introducing an AI programme and aims to establish a graduate school offering AI courses (D'Agostino, 2023).

As can be seen, many universities are actively expanding their infrastructure and programmes to accommodate the growing interest in AI. However, these efforts are not without challenges, especially when it comes to recruiting AI faculty members. And this is further exacerbated by the existing shortage of computer scientists. In fact, these challenges predate the widespread public awareness of AI's potential, as American colleges

have long struggled to meet the high demand for computer science courses while grappling with a shortage of qualified faculty (D'Agostino, 2023). D'Agostino quotes Kentaro Toyama, a professor at the University of Michigan, who acknowledges that institutions planning to hire a significant number of faculty members may struggle to find individuals with the necessary teaching skills for these specialised classes (2023). Therefore, it is evident that universities are facing difficulties in recruiting faculty members at a pace that meets the demand. However, even if they can manage to hire new faculty, there is the additional challenge of retaining these new members due to their high demand in the industry. D'Agostino quotes Ishwar K. Puri, Senior Vice President of Research and Innovation at Southern California, who says that universities should carefully consider the difficulty of retaining computer scientists once they are hired (2023). This is because as faculty members gain expertise and establish themselves, they become highly sought-after by the private sector, which offers salaries that universities are unable to match. Furthermore, Puri points out that universities cannot provide the same opportunities for groundbreaking work in AI that is currently available in the AI corporations, which may be another reason academics choose to leave universities in favour of industry (D'Agostino, 2023). In order to address this issue, D'Agostino quotes Ravi Bellamkonda, provost and executive vice president for academic affairs at Emory University, who suggests the following: make starting salaries in computer science departments higher compared to other departments, even though it may potentially lead to other challenges within the university; and offer unconventional incentives (2023). One example he gives of an unconventional incentive is allowing faculty members to consult one day a week, thereby blurring the line between academia and industry (D'Agostino, 2023). As such, Emory University is now supporting collaborations with companies such as Google or Amazon, and many faculty members are already engaging in these collaborations or choosing to spend their sabbatical at a company instead of another academic institution (D'Agostino, 2023).

There are also reports coming out regarding concerns that schools in the United Kingdom are having due to the overwhelming pace of AI development and a lack of trust in technology companies' ability to protect students and educational institutions (Milmo, 2023d). To address these concerns, a group of headteachers has launched a body aimed at advising

and safeguarding schools from the risks associated with AI (Milmo, 2023d). However, their worries go beyond AI-powered chatbots simply facilitating cheating and are expanded to encompass the potential impact on children's well-being as well as the teaching profession itself (2023d). These concerns were expressed in a letter to *The Times*, highlighting the 'very real and present hazards and dangers' posed by AI, particularly in generative AI breakthroughs that can produce realistic text, images and voice impersonations (Milmo, 2023d). Led by Sir Anthony Seldon, the head of Epsom College, a fee-paying school, the group consists of heads from various private and state schools (Milmo, 2023d). The primary goal of the group is to provide secure guidance to schools amidst the rapidly evolving AI landscape, fuelled by scepticism towards large digital companies' ability to self-regulate in the best interests of students and schools (Milmo, 2023d). Their letter also criticises the government for insufficiently regulating AI. Therefore, to tackle these challenges, the group plans to establish a cross-sector body comprising leading teachers and independent digital and AI experts. This body will offer guidance on AI developments and assist schools in deciding which technologies to embrace or avoid. The United Nations Educational, Scientific and Cultural Organization (UNESCO) resonates with these concerns, amplifying them through their *Global Education Monitoring Report* (2023). The report spotlights inadequate oversight within the education technology sector, placing children's well-being at risk. Although they note that education technology oversight exists in 82% of countries, challenges arise from private actors. Thus, the report underscores the necessity to regulate privacy, safety and well-being. Moreover, the report unveils that out of 163 education technology products recommended during the pandemic, 89% collect children's information. However, just 16% of countries ensure data privacy in education. The report also raises the issue of AI algorithms deepening inequality, specifically affecting indigenous groups in the United States. Additionally, it highlights the surge in cyberattacks targeting education, with incidents doubling in 45 US districts between 2021 and 2022. Another concern in the report lies in the adverse effects of excessive screen time on children's well-being, noting that US children spend up to nine hours daily on screens. Yet, despite this, the report notes that there are limited regulations for screen time and most countries do not ban phones in schools. To address these challenges, UNESCO suggests that countries need to adopt comprehensive and tailored

data protection laws and standards for children and that policymakers should consider the voices of children to protect their rights during online activities. They call for sound education technology and data governance to ensure equitable and high-quality technology benefits while safeguarding children's rights to privacy and education. They also call for clear frameworks, effective regulations and oversight mechanisms to protect the rights of children in a world where data exchange is widespread (*Global Education Monitoring Report 2023: Technology in Education – A Tool on Whose Terms?* 2023).

AI's Impact on the World

So far in this chapter, we have examined various aspects of AI, including the emergence and growth of chatbots, challenges and ethical considerations in AI, AI's influence on the job market and its effect on education. Yet, a more overarching inquiry remains: What will be the impact of AI on the world? To delve into this question more deeply, we investigate the viewpoints of experts in the field. We start by considering opinions expressed before ChatGPT was publicly introduced and then transition to perspectives shared after its unveiling.

In 2017, prior to ChatGPT's introduction, Max Tegmark, a physicist and cosmologist renowned for his work in theoretical physics and AI, released ‘Life 3.0: Being Human in the Age of Artificial Intelligence’ (Tegmark, 2017). In this book, Tegmark navigates the potential influence of AI on human society and envisions the potential futures that AI's advancement could unfold. In particular, he looks into the realm of Artificial General Intelligence (AGI), analysing the potential pros and cons, which he believes span from the potential positives – such as advancements in science, medicine and technology – to the potential negatives, which encompass ethical dilemmas and existential risks. Tegmark also puts forward an array of hypothetical scenarios that could transpire as AGI evolves, including the prospects of utopian outcomes, dystopian visions and a middle ground where human and AI coexistence is harmonious. He further investigates the societal implications of AGI, including its potential impact on the job market, economy and governance. Based on this, he stresses the importance of ethical considerations and conscientious development to ensure that AGI

ultimately serves the collective benefit of all humanity. In 2019, following Tegmark's book, Gary Marcus, a Cognitive Scientist and Computer Scientist, and Ernest Davis, a Professor of Computer Science, published '*Rebooting AI: Building Artificial Intelligence We Can Trust*', in which they investigate critical aspects and challenges within the AI field, specifically focusing on the limitations and deficiencies prevalent in current AI systems. Through doing so, they raise critical questions about the trajectory of AI advancement. Marcus and Davis contend that, despite notable advancements in AI technology, fundamental constraints persist, hindering the development of genuinely intelligent and reliable AI systems. They underscore the lack of common sense reasoning, robustness and a profound understanding of the world in many contemporary AI systems – qualities inherent to human cognition. Based on this, they argue that prevailing AI development approaches, often centred on deep learning and neural networks, fall short in achieving human-level intelligence and true understanding. Within their work, Marcus and Davis place transparency, interpretability and accountability as prominent themes, emphasising the significance of rendering AI systems transparent and interpretable, particularly in domains where their decisions impact human lives. They assert that these considerations are crucial, especially in fields such as healthcare, finance and law, where comprehending how AI arrives at its decisions is vital for ensuring ethical and equitable decision-making (Marcus & Davis, 2019). Another publication in 2019 was '*Human Compatible: Artificial Intelligence and the Problem of Control*' by Stuart Russell, a computer scientist and professor at the University of California, Berkeley. Russell is widely acclaimed for his significant contributions to the field of AI, particularly in machine learning, decision theory and the intricate issue of control within AI systems. In his book, Russell explores a critical concern in AI advancement: the imperative to ensure that AI systems act in harmony with human values and aspirations. The central theme of his work is control, addressing the intricate challenge of designing AI systems that benefit humanity without entailing risks or unforeseen outcomes. Russell argues that the prevailing trajectory of AI development, which focuses on maximising specific objectives without sufficient regard for human values, could lead to AI systems that are difficult to manage and potentially harmful. As a result, he emphasises the paramount importance of early alignment between AI systems and human values and advocates for

establishing a framework that enables the regulation of AI behaviour (Russell, 2019).

As we can see, even before the public release of ChatGPT in November 2022, experts were engaged in discussions regarding concerns about the development of AI. But what is being said now that AI, such as ChatGPT, has been released to the public? It would appear that feelings are mixed. Some view it as an existential threat, while others argue that the risk is too distant to warrant concern. Some hail it as 'the most important innovation of our time' (Liberatore & Smith, 2023), while others caution that it 'poses a profound risk to society and humanity' (Smith, 2023). But what is the stance of AI companies themselves? Bill Gates, Sundar Pichai and Ray Kurzweil champion ChatGPT, highlighting its potential in addressing climate change, finding cancer cures and enhancing productivity (Liberatore & Smith, 2023). In contrast, Elon Musk, Steve Wozniak and a group of 2,500 individuals express reservations about large language models. In March 2023, they issued an open letter urging a pause in their development due to potential risks and societal implications (*Pause Giant AI Experiments: An Open Letter*, 2023). Moreover, in May 2023, Dr Geoffrey Hinton, a prominent figure in the field of AI, stepped down from his position at Google, citing apprehensions about misinformation, disruptions in employment and the existential threats posed by AI (Taylor & Hern, 2023). In particular, he is concerned about the potential for AI to exceed human intelligence and become susceptible to misuse (Taylor & Hern, 2023). Although Gates holds favourable opinions about AI, he supports enhanced regulation for augmented AI, especially due to issues such as misinformation and deepfakes (Gates, 2023). In a similar vein, Sundar Pichai stresses the necessity for AI regulation and is against the advancement of autonomous weapons (Milmo, 2023b). Additionally, technology experts, including the CEOs of DeepMind, OpenAI and Anthropic, are actively advocating for regulation to tackle existential concerns (Abdul, 2023). But are these calls for regulation being heeded?

Navigating the Shifting Landscape of AI Policies and Actions

Emerging worldwide, the landscape of AI policies is undergoing a notable expansion, marked by a surge in legal measures and legislative activities that mention ‘artificial intelligence’ (Maslej et al., 2023). In the United Kingdom, the Competition and Markets Authority (CMA) is actively engaged in a thorough review of AI, with a specific focus on addressing concerns surrounding misinformation and potential job disruptions (Milmo, 2023c). This comprehensive evaluation by the CMA is squarely directed at foundational models such as ChatGPT, aiming to foster healthy competition and ensure the protection of consumer interests (Milmo, 2023c). Ministers have tasked the CMA with a multifaceted mandate, encompassing safety, transparency, fairness, accountability and the potential for emerging players to challenge established AI entities (Milmo, 2023c). These initiatives underscore the mounting pressure on regulatory bodies to intensify their scrutiny of AI technologies. Simultaneously, the UK government is actively working on updating AI regulations to address potential risks (Stacey & Mason, 2023). On the other side of the Atlantic, the Vice President of the United States convened discussions with AI CEOs at the White House in May 2023, with the primary focus on safety considerations (Milmo, 2023c). In parallel, both the Federal Trade Commission and the White House are conducting investigations into the far-reaching impacts of AI (Milmo, 2023c) (*Blueprint for an AI Bill of Rights*, n.d.). At a broader international level, the EU's AI Act introduces a comprehensive and structured regulatory framework (‘EU AI Act: First Regulation on Artificial Intelligence’, 2023). This framework categorises AI applications according to varying levels of risk and seeks to establish itself as a global standard for promoting responsible AI practices (‘EU AI Act: First Regulation on Artificial Intelligence’, 2023). In July 2023, building upon the initiatives outlined earlier, a consortium of prominent technology firms, including OpenAI, Anthropic, Microsoft and Google (DeepMind's owner), introduced the Frontier Model Forum (Milmo, 2023f). The forum claims that its primary objective is to stimulate AI safety research, establish benchmarks for model evaluation, advocate for the conscientious deployment of advanced AI, foster dialogue with policymakers and academics on trust and safety concerns and explore favourable applications of AI, such as combating climate change and detecting cancer (Milmo, 2023f). The Forum acknowledges that it has built upon the significant contributions of entities such as the UK government and the European Union in the realm of AI

safety (Milmo, 2023f). Additionally, it's noteworthy that tech companies, particularly those leading the Frontier Model Forum, have recently reached agreements on new AI safeguards through conversations with the White House; these safeguards encompass initiatives such as watermarking AI content to identify deceptive materials like deepfakes and enabling independent experts to evaluate AI models (Milmo, 2023f). Indeed, it appears that developments are taking place within the realm of tech companies. However, the question that arises is whether we can have confidence in their commitment to fulfilling their pledges. Doubts persist among some. And this is not surprising given some of the things we have seen AI companies and individuals do and say.

For example, in October 2022, preceding the launch of ChatGPT, it was reported that Microsoft made a notable reduction in the size of its ethics and society team (Bellan, 2023). According to insider accounts, growing pressure from the CTO and CEO may have played a role in this decision, with the aim of getting the latest OpenAI models to customers as soon as possible (Bellan, 2023). Subsequently, in March 2023, it was reported that Microsoft decided to lay off the remaining members of this team (Bellan, 2023). Those within the team expressed a shared belief that these layoffs were likely influenced by Microsoft's intensified focus on rapidly releasing AI products to gain an edge over competitors, potentially leading to a reduced emphasis on long-term, socially responsible deliberations (Bellan, 2023). Despite this, it's important to note that Microsoft has retained its Office of Responsible AI, which carries the responsibility of setting ethical AI guidelines through governance and public policy initiatives (Bellan, 2023). Nevertheless, the action of dismantling the ethics and society team raises valid questions about the extent of Microsoft's commitment to authentically infusing ethical AI principles into its product design. Another instance emerged directly from the mouth of OpenAI CEO Sam Altman, who, just days after advocating for AI regulation in the US Congress voiced apprehension about the EU's efforts to regulate artificial intelligence (Ray, 2023). Altman expressed his belief that the EU AI Act's draft was excessive in its regulations and warned that OpenAI might withdraw its services from the region if compliance proved too challenging (Ray, 2023). This shift in stance was both sudden and significant, highlighting the considerable influence one individual can wield.

It is precisely these instances of power and actions that raise concerns for Rumman Chowdhury, a notable figure in the AI domain. Chowdhury recognises recurring patterns in the AI industry, akin to the cases mentioned above, which she considers as warning signals (Aceves, 2023). One of the key issues she highlights is the common practice of entities calling for regulation while simultaneously using significant resources to lobby against regulatory laws, exerting control over the narrative (Aceves, 2023). This paradoxical approach hinders the development of robust and comprehensive regulatory frameworks that could ensure the responsible use of AI technologies. Moreover, Chowdhury emphasises that the lack of accountability is a fundamental issue in AI development and deployment (Aceves, 2023). She points out how internal risk analysis within companies often neglects moral considerations, focusing primarily on assessing risks and willingness to take them (Aceves, 2023), as we saw with Microsoft. When the potential for failure or reputational damage becomes significant, the playing field is manipulated to favour specific parties, providing them with an advantage due to their available resources (Aceves, 2023). This raises concerns about the concentration of power in the hands of a few, leading to potential bias and adverse consequences for the wider population. Chowdhury further highlights that unlike machines, individuals possess diverse and indefinite priorities and motivations, making it challenging to categorise them as inherently good or bad (Aceves, 2023). Therefore, to drive meaningful change, she advocates leveraging incentive structures and redistributing power sources in AI governance (Aceves, 2023). This would involve fostering collaboration among various stakeholders, including governments, industries, academia and civil society, to collectively address complex AI-related issues, promote cooperation and reach compromises on a large scale (Aceves, 2023). By doing so, she believes we can ensure that AI technologies are developed and deployed in a way that benefits society as a whole, rather than serving the interests of a select few. In addition to Chowdhury's concerns, Karen Hao, senior AI editor at MIT Technology Review, expresses serious reservations about the interconnection between advanced AI and the world's biggest corporations (Hao, 2020). She points out that, as the most sophisticated AI methods demand vast computational resources, only the wealthiest companies can afford to invest in and control such technologies and consequently, tech giants have significant influence not just on the direction of AI research but also on the creation and

management of algorithms that impact our daily lives (Hao, 2020). These concerns highlight the critical importance of transparency, inclusivity and multi-stakeholder collaboration in shaping AI policies and regulations. The dialogue and actions surrounding AI governance must involve a diverse range of voices and perspectives to ensure that AI technologies are ethically developed, responsibly deployed and serve the collective interests of humanity. We return to these concerns later in this book. However, for now, our focus turns to the creation of a theoretical framework that will empower us to delve deeper into the complexities of AI.

Chapter 3

Theoretical Framework for Investigating ChatGPT's Role in Higher Education

Exploring the Need for a Theoretical Framework

In our research study, we undertake an exploratory case study to investigate the potential impact of Chat Generative Pre-trained Transformer (ChatGPT) on the roles of students, instructors and institutions of higher education. This type of live experiment provides valuable real-life insights and allows us to validate theoretical considerations. However, before delving into the study, it is essential to establish our theoretical framework. Theoretical frameworks, grounded in philosophy, are commonly employed in postmodern qualitative research to examine diverse perspectives and interpretations of a phenomenon. They help align the research with its objectives, consider the influence of social and cultural factors on our understanding of reality and provide valuable insights from a critical standpoint. In our study, we have chosen the qualitative research paradigm to explore the subjective experiences and meanings associated with ChatGPT, aiming to understand its impact on various stakeholders within our institution. Based on this, we needed to choose theoretical frameworks that would comprehensively address both the sociopolitical implications and the personal lived experiences associated with ChatGPT's integration in higher education. To achieve this, we decided to adopt the theoretical frameworks of critical theory and phenomenology. Critical theory, with its focus on societal structures and power dynamics, offers a lens through which we can critically interrogate the larger implications of technology in educational settings. On the other hand, phenomenology, rooted in understanding human experiences, provides an avenue to delve into the individual and collective consciousness of stakeholders interacting with

ChatGPT. The combined strength of both frameworks allows us to present a balanced and holistic view, capturing not only the macro-level impacts on institutional dynamics but also the micro-level nuances of personal experiences and interpretations. As our research advances, we employ these lenses to delve deeper into each theme as it emerges. This enables us to shed light on the broader implications of our research topic, gaining a comprehensive understanding of its significance.

Critical Theory and ChatGPT: Unpacking Power Dynamics and Social Structures

Critical theory serves as a powerful theoretical framework that delves into power dynamics, social structures and ideologies to scrutinise and challenge prevailing systems of inequality and oppression. This approach aims to uncover the underlying social and political factors that shape our perception of reality, with the ultimate goal of empowering marginalised groups (Tyson, 2023). When considering the impact of ChatGPT on the various stakeholders within a university, critical theory becomes invaluable for several compelling reasons:

- *Examining Power Dynamics*
  Critical theory facilitates an exploration of how ChatGPT could either disrupt or reinforce power dynamics within educational environments. It provides a lens through which to uncover potential inequalities that might arise from technology's utilisation and encourages a thoughtful analysis of how these dynamics could influence the landscape of teaching and learning.
- *Redefining Instructor Roles*
  The transformative potential of ChatGPT extends to reshaping the roles of instructors by offering automated responses and student assistance. Within this context, critical theory proves instrumental in dissecting how this shift might impact the authority, expertise and interaction dynamics between instructors and students. By prompting a critical examination, it opens the door to probing the implications and repercussions of such changes.
- *Reassessing Student Roles*

As students increasingly engage with artificial intelligence (AI)-powered tools like ChatGPT, their roles in the learning process are likely to evolve. Critical theory provides a framework for scrutinising how this transformation influences student agency, critical thinking and the development of independent learning skills. It invites an exploration of whether students become passive consumers of information or active participants in shaping their educational journey.

- *Institutional Implications*
  Critical theory's lens extends to encompass the broader landscape of higher education institutions as they integrate ChatGPT. It encourages a rigorous analysis of how institutional policies, structures and practices need to be reconsidered during the adoption of AI technologies. This introspection is vital for understanding how these changes may either reinforce or challenge existing power structures and inequalities within the educational ecosystem.

In order to enhance our understanding further, we decided to look into the works of renowned theorists in the field of critical theory: Clayton Christensen, Pierre Bourdieu and Karl Marx.

Christensen's Disruptive Innovation and the Transformative Potential of ChatGPT

At the forefront of business strategy theory is Clayton Christensen's seminal work, '*The Innovator's Dilemma*' (Christensen, 1997). Here, he introduces the world to 'disruptive innovation', a phenomenon where smaller companies with limited resources rise to challenge and eventually overtake well-established industry giants. Though their products might start in niche markets and initially appear inferior, they stand out because of their affordability and accessibility. Over time, these innovations gain traction, appealing to larger demographic and destabilising dominant market players. While Christensen's disruptive innovation and critical theory might initially seem unconnected, a closer examination reveals intricate intersections. Central to disruptive innovation is the shift in power dynamics: start-ups not only challenge but occasionally dethrone established giants. This movement mirrors the principles of critical theory, which is deeply invested in

studying power relations. Furthermore, disruptive innovations are characterised by their democratising potential. They transform products and services, once seen as exclusive luxuries, into accessible necessities. When viewed through critical theory, this democratisation process becomes even more compelling, offering insights into societal access and equity. Beyond market disruptions, Christensen, in collaboration with his colleagues, offers another analytical tool: the Theory of Jobs to be Done (Christensen et al., 2016). They suggest that consumers do not simply buy products or services for their features; they 'hire' them to perform specific tasks or 'jobs'. These jobs can be functional, like using a phone to call, social, such as buying a luxury car to denote status or emotional, akin to purchasing a fitness tracker for the satisfaction it provides. By comprehending these jobs, companies can design better, more targeted products. However, staying relevant requires continual monitoring and adaptation, as these jobs can evolve.

Applying Christensen's Theory of Jobs to be Done to investigate the impact of ChatGPT on various educational roles can provide valuable insights into the specific needs and motivations of stakeholders. By understanding the 'jobs' that ChatGPT may fulfil for each role, we can better analyse the potential effects on students, instructors and institutions of higher education. Regarding the role of the student, Christensen's theory can help us uncover the jobs that students aim to fulfil in their educational journey. ChatGPT may support students in researching and accessing information (functional job), promoting collaborative learning and peer interaction (social job) or enhancing their motivation and self-confidence (emotional job). Examining these jobs can shed light on how ChatGPT may influence students' learning experiences and outcomes. When it comes to the instructor, by applying the Theory of Jobs to be Done, we can examine the specific tasks and goals that instructors seek to accomplish in their role. ChatGPT may assist instructors in automating administrative tasks (functional job), facilitating student engagement and interaction (social job) or fostering creativity in lesson planning (emotional job). This understanding can guide the exploration of how ChatGPT may augment or transform the instructor's responsibilities. By analysing the jobs that institutions of higher education aim to fulfil, we can gain insights into how ChatGPT may impact their operations. This can include tasks such as enhancing accessibility and inclusivity (functional job), fostering innovation and collaboration across departments (social job) or adapting to

evolving educational demands (emotional job). Understanding these jobs can inform strategic decisions regarding the integration and utilisation of ChatGPT within educational institutions. Therefore, we believe that melding Christensen's disruptive innovation with critical theory presents a multi-dimensional framework, as it allows for a comprehensive exploration of technologies, like ChatGPT, not just as tools but as potential game-changers in industry and society.

ChatGPT Through Bourdieu's Societal Lens

Our second theorist, Pierre Bourdieu, was a sociologist and philosopher whose work focused on the relationship between social structures, cultural practices and individuals' behaviours. His theories of habitus, field and cultural capital provide a lens for understanding how social structures shape human behaviour and how individuals navigate these structures to achieve success (Webb et al., 2002). Bourdieu's habitus theory posits that an individual's environment shapes their habits, which unconsciously guide their thoughts, actions and preferences (Webb et al., 2002). These habits perpetuate social structures and contribute to the development and maintenance of power in social groups. His field theory emphasises the interplay between social structures and human agency, arguing that social reality is composed of various fields, each with its own set of rules and power relations (Webb et al., 2002). Bourdieu's theory of capital suggests that social class is determined not only by economic factors but also by cultural and symbolic capital. He identifies three forms of capital: economic, cultural and social, which individuals in different social classes possess to maintain or improve their social status (Webb et al., 2002). Bourdieu (1982) argues that cultural capital, in its external form, appears as a self-contained and consistent entity. Although it has roots in historical actions, it follows its own distinct rules, overriding individual desires. This idea is clearly exemplified by language, which does not solely belong to any one individual or collective. Importantly, cultural capital is not just a theoretical construct; it has real-world, symbolic and tangible power. This power becomes evident when people harness and employ it in diverse cultural domains, from arts to sciences. In these fields, individuals' success is often proportional to their understanding of this external form of capital

and their inherent cultural resources. Regarding language, Pierre Bourdieu understood language as being not just a tool for communication but a form of capital he termed ‘linguistic capital’. Central to this notion is the interplay between ‘linguistic habitus’ and the ‘linguistic market’, which Bourdieu puts forward in the following formula:

Linguistic habitus + linguistic market = linguistic expression, speech

At its core, Bourdieu's linguistic habitus reflects an individual's social history and is innate, being embodied within the individual (Bourdieu, 1986). This habitus, a product of societal conditions, dictates utterances tailored to specific social situations or markets. While one might be tempted to believe that knowledge of a language ensures effective communication, Bourdieu postulates that the actual execution of speech is governed by the situation's intrinsic rules – rules encompassing levels of formality and interlocutors' expectations (Bourdieu, 1978). This brings us to his concept of the ‘linguistic market’. Bourdieu believes it is not enough to simply speak a language correctly, one must also understand the sociolinguistic nuances of where and to whom one speaks (Bourdieu, 1978). This market is both tangible and elusive. At its most concrete, it involves familiar social rituals and a clear understanding of one's place in a social hierarchy. However, its abstract nature lies in the constantly evolving linguistic norms and the subconscious factors that influence our speech. Bourdieu's ‘linguistic capital’ encapsulates the tangible benefits that specific speakers can accrue (Bourdieu, 1978). Bourdieu's perspective accounts for scenarios where speech exists without genuine communication. Consider the ‘voice of authority’, where a speaker, backed by societal and institutional support, may say much while conveying little (Bourdieu, 1978, p. 80). Bourdieu believes linguistic capital is intrinsically tied to power dynamics. It shapes value judgements, allowing certain speakers to exploit language to their advantage. ‘Every act of interaction, every linguistic communication, even between two people, two friends, boy and girl, all linguistic interactions, are in a sense micro-markets which always remain dominated by the overall structures’ (Bourdieu, 1978, p. 83). Building on Bourdieu's insights, Webb et al. (2002) underscore language's role as a mechanism of power that is moulded by an individual's social standing. Interactions, verbal or otherwise, are reflective of the participants' societal positions. Bourdieu's

emphasis on language as a reservoir of social capital is especially poignant. When perceived as a resource, language functions as a blend of cultural capital. This fusion can be leveraged to forge potent relationships, granting the speaker access to invaluable resources within communities or institutions (Webb et al., 2002). Bourdieu's cultural reproduction theory, or legacy theory, suggests that social inequalities persist from one generation to the next through the transmission of cultural values and practices (Webb et al., 2002). This transmission takes place through family upbringing, education and socialisation in different institutions. Bourdieu argues that the cultural practices and beliefs of the dominant class are legitimised and reinforced through the educational system, which acts as a significant tool for social reproduction (Webb et al., 2002).

Applying Bourdieu's theory to investigate the impact of ChatGPT on various educational roles allows us to examine how social structures, cultural practices and individuals' behaviours intersect with the integration of this technology. Bourdieu's concepts of habitus, field, cultural capital and cultural reproduction can provide insights into the dynamics and potential consequences of ChatGPT regarding the role of students, instructors and institutions of higher education. Regarding the role of the student, with the introduction of ChatGPT, students may experience changes in their habitus and cultural capital. The technology may affect their learning practices, as well as their access to and utilisation of knowledge. ChatGPT's influence on language interactions and communication may shape the way students express themselves, engage with course materials and collaborate with peers. It may also impact students' relationship to authority and expertise, potentially challenging traditional hierarchies and sources of knowledge. ChatGPT's integration can impact the power dynamics within the educational field, as instructors navigate the interplay between their own habitus, cultural capital and the expectations and demands of using ChatGPT. The technology may alter the distribution of symbolic capital and redefine what knowledge and expertise are valued in the teaching profession. Instructors may need to negotiate their position and authority in relation to ChatGPT, potentially leading to a reconfiguration of the instructor's role and the skills required to be an effective educator. And finally, regarding the role of institutions of higher education, Bourdieu's theory suggests that the integration of ChatGPT may contribute to the cultural reproduction within institutions of higher education. It may

perpetuate existing power structures by privileging certain forms of knowledge and communication. The use of ChatGPT may impact institutional practices, curriculum development and assessment methods. Therefore, institutions need to critically consider the potential consequences of adopting ChatGPT, and how it aligns with their educational goals, values and commitment to social equity.

Marx's Theory of Alienation in the Context of ChatGPT

Karl Marx, the renowned German philosopher, economist, sociologist and revolutionary socialist, stands as a pivotal figure in history. At the heart of his philosophy and social thought lies the concept of communism, an alternative socio-economic system advocating for collective ownership of property and resources, as opposed to private ownership (Elster, 1986). Being a revolutionary socialist, Marx believed in the need for a radical, profound change in the system through revolutionary means, rather than incremental reforms. Challenging static ideas of human nature, Marx proposed that it is continually moulded by historical and social circumstances (Elster, 1986). He placed labour at the forefront of societal structures, asserting it as the primary generator of all wealth (Elster, 1986). Marx pinpointed a critical concern of capitalism: the capital owners exploit workers by taking the surplus value produced by their labour (Elster, 1986). This exploitation seeds class struggle, primarily between the bourgeoisie, the capitalist class and the proletariat, the working class (Elster, 1986). He envisioned a future where the proletariat would overthrow the bourgeoisie, paving the way for a socialist society, with collective ownership and control of production means (Elster, 1986). While Marx's theories highlighted the working class' misbelief that their interests are aligned with the ruling class, a notion often termed ‘false consciousness’, it's crucial to acknowledge that Marx never directly used this term (Althusser, 1971). Marx aimed his critique of political economy at uncovering the contradictions within capitalism, emphasising the role of material conditions, especially economic relationships, in crafting history (Elster, 1986). Capitalism, for Marx, was a phase in historical development, destined to transition to socialism and, ultimately, to communism (Elster, 1986). A significant pillar

of Marx's critique was the theory of alienation. He detailed how individuals under capitalism become distanced from the products of their labour, the labour process, their fellow humans and their innate creative potential (Mészáros, 2005). Workers, in the capitalist machinery, are stripped of control over production means, leading them to sell their labour for wages. Marx distinguished four alienation types: alienation from the created products, which become commodities controlled by the exploiting capitalists; alienation from the labour process, which becomes monotonous under the profit-driven motivations of capitalists; alienation from fellow workers, as capitalism promotes competition and individualism and alienation from one's inherent creative essence, as the capitalist system reduces individuals to mere production tools (Mészáros, 2005). These facets of alienation give rise to societal issues such as inequality, exploitation and the breakdown of genuine human connections (Mészáros, 2005). To address these deep-rooted problems, Marx championed the abolition of private ownership of production means and the dawn of a classless society, where collective control empowers individuals to shape their work and its outcomes (Mészáros, 2005). In conclusion, Marx's ideas paint a landscape deeply concerned with the intricate ties between economic mechanisms and societal interactions. His theories have had enduring impacts, resonating in various sociopolitical movements and analyses even in contemporary times. But how do these relate to ChatGPT?

Karl Marx's framework on alienation underscores the relationship between workers and the essence of their labour. By applying this theory to the modern context of higher education, we can ascertain the potential consequences and implications of technologies like ChatGPT on students, instructors and institutions. For Marx, education could be considered a type of labour, where students invest effort to gain knowledge and skills. Introducing ChatGPT could reshape this dynamic, altering the student's relationship with their educational labour. While ChatGPT might grant swift access to information, which might be an advantage for collaborative research or independent study, an over-reliance could stifle students' critical thinking abilities and reduce active engagement in the learning process. And, although ChatGPT has the potential to democratise access to information, there's a growing concern that education could further become a commodity, exacerbating the gulf between economically diverse student groups, especially if quality educational tools become stratified based on

purchasing power. Extending Marx's perspective to instructors, educators might feel estranged from their professional essence if ChatGPT or similar technologies encroach too deeply into their domain. Though ChatGPT could automate certain pedagogical tasks, potentially elevating the quality of education by allowing educators to concentrate on nuanced, human-centric aspects of teaching, there's a risk. If institutions prioritise technology over educators, it could lead to a form of professional alienation, relegating educators to secondary roles and potentially diminishing their perceived value in the educational process. Through a Marxist lens, the capitalist tendencies of institutions could be amplified with technologies like ChatGPT. These tools might be seen less as educational enhancements and more as cost-saving or profit-driving mechanisms. This could shift priorities from holistic education to market-driven objectives, echoing Marx's concerns about capitalist structures overshadowing true value. However, this does not have to happen. Ethical, student-centric integration of ChatGPT could lead to enriched collaborative experiences, blending traditional pedagogy with modern techniques. In essence, while ChatGPT and similar AI technologies hold vast potential for reshaping higher education, Marx's theory of alienation cautions us to think about the caveats. The challenge lies in ethically integrating these tools, focusing on augmenting human capabilities rather than sidelining them. It underscores the importance of continually reassessing institutional policies, emphasising the human aspect of education and ensuring that advancements in technology truly serve their primary stakeholders – the students, instructors and the broader educational community.

Phenomenology: Unveiling Insights into ChatGPT

Phenomenology, as a theoretical framework, centres on comprehending the subjective experiences and the significances that individuals ascribe to them. It delves into the lived encounters of individuals, striving to unveil the core nature of phenomena as perceived by those engaged (Patton, 2002). In the context of examining the influence of ChatGPT on the roles of diverse stakeholders within a university, phenomenology offers a valuable theoretical approach with the following implications:

- *Exploration of Subjective Experiences*
  Phenomenology allows researchers to delve into the subjective experiences of individuals involved in teaching and learning with ChatGPT. It helps uncover the lived experiences, perceptions and emotions of students and teachers in relation to the technology.
- *Understanding the Meaning-Making Process*
  Phenomenology seeks to understand how individuals make sense of their experiences and the meanings they attach to them. In the context of ChatGPT, it can shed light on how students and teachers interpret and understand the technology's impact on their roles and the educational process as a whole.
- *Examination of Changes in Teaching and Learning*
  Phenomenology can help researchers explore how ChatGPT may affect the roles of teaching and learning by investigating possible required shifts in pedagogical practices and instructional strategies. It provides insights into the ways in which the technology may influence the interaction between students and instructors and the overall educational experience.
- *Uncovering New Possibilities and Constraints*
  Phenomenology enables researchers to identify both the opportunities and limitations presented by ChatGPT in education. It allows for an exploration of the potential benefits, such as increased access to information or personalised learning experiences, as well as the challenges, such as the potential reduction of human interaction surrounding AI technology.
- *Emphasis on the Lived Experience*
  Phenomenology places emphasis on the first-person perspective and the experiential knowledge of individuals. This focus aligns with the aim of understanding the lived experiences of students and instructors as they navigate the integration of ChatGPT.

To enhance our understanding further, we looked into the works of one of the most famous theorists in phenomenological research, Martin Heidegger.

Heideggerian Reflections: AI and the Essence of Being

Heidegger, a German philosopher, made significant contributions to phenomenology, hermeneutics and existentialism. Despite criticism for his affiliation with the Nazi Party, his philosophy offers valuable insights into the impact of technology on human relationships and our sense of authenticity and connectedness to the world (Inwood, 2019). At the core of Heidegger's philosophy is the concept of Dasein, which refers to human existence and its unique ability to question its own being (Girdher, 2019). Heidegger's philosophy emphasises the pre-existing understanding of the world that shapes human existence, known as ‘being-in-the-world’ (Girdher, 2019). Heidegger's inquiry into the meaning of being revolves around what makes beings intelligible as beings. He distinguishes between ontical and ontological aspects, where ontical pertains to specific beings and ontological focuses on the underlying meaning of entities, referred to as the ‘Ontological Difference’ (Inwood, 2019). This distinction forms the basis of Fundamental Ontology, which aims to comprehend the meaning of being itself. Time is a crucial aspect of Heidegger's philosophy, not simply a linear sequence of events, but a fundamental aspect of all existence, shaping our understanding of the world and our place within it (Inwood, 2019). In Heidegger's philosophy, technology is seen as fundamentally transforming our relationship with the world, revealing and ordering it in a particular way, referred to as the ‘enframing’ or ‘challenging-forth’ nature of technology (Inwood, 2019). This perspective leads to a mode of being called ‘standing reserve’, where everything, including humans, is objectified and reduced to a means to an end (Inwood, 2019). He cautioned that this way of being obscures our authentic relationship with the world and disconnects us from our true nature (Inwood, 2019). However, Heidegger also acknowledged technology's potential for positive transformation, proposing a different approach characterised as ‘poetic dwelling’ or ‘releasement’ (Bida, 2018). He introduced the concept of ‘readiness-to-hand’, describing our seamless interaction with tools and objects in everyday life, where tools become extensions of ourselves, allowing for a sense of flow and efficiency (Inwood, 2019). In this view, technology should foster openness, attentiveness and a deeper connection

with the world, revealing and enabling our engagement with it (Bida, 2018). Heidegger's philosophy of technology significantly influences contemporary discussions on the ethical and existential dimensions of technology. It prompts us to reflect on the effects of technology on our lives, question the assumptions underlying our technological worldview, and explore alternative ways of relating to technology for a more meaningful and sustainable existence.

When considering the role of students, Heidegger's philosophy underscores their unique capacity to question their own being and the temporal nature of their existence. The presence of ChatGPT in education raises questions about students' relationship with knowledge. ChatGPT, as a tool for accessing information, may enhance the readiness-to-hand experience for students. By providing immediate and relevant responses to queries, ChatGPT can simplify the process of obtaining information, reducing cognitive load and enabling students to focus more on understanding and applying knowledge. However, with this comes a risk that excessive reliance on ChatGPT might lead to passive learning, diminishing students' inclination for exploration and critical thinking. To prevent this, students may need to reflect on the role of technology in their learning process and actively participate in shaping their understanding of being-in-the-world. In relation to instructors, Heidegger's concept of being-in-the-world suggests that their role is intertwined with their existence and understanding of the world. The introduction of ChatGPT may challenge their traditional role as the primary source of knowledge. This technology can assist them in preparing course materials, offering timely feedback and addressing common questions from students. However, it also raises questions about the readiness-to-hand experience of teaching. Instructors should be mindful of how their reliance on AI assistance might impact their authentic engagement with students and the learning process. Therefore, instructors may need to navigate the integration of technology in their teaching practices, re-evaluating their own relationship to knowledge and the facilitation of authentic learning experiences. As a result, the instructor's role may shift towards guiding students in their engagement with technology, fostering critical reflection and assisting students in uncovering their own understanding of being. The introduction of ChatGPT also prompts a re-evaluation of the temporal dimension of education for institutions of higher education. Institutions should critically assess how

this technology aligns with their educational values and goals. They must reflect on the balance between efficiency and the time needed for meaningful learning experiences. This integration of AI technology could impact institutional structures, curriculum design and the overall educational environment. By integrating ChatGPT into higher education institutions, access to information and resources can be streamlined, potentially increasing efficiency and reducing administrative burdens. However, caution is necessary to avoid over-reliance on AI technology. Institutions must carefully consider the balance between efficiency and the temporal space required for genuine learning experiences. Additionally, they should ensure that AI integration preserves the readiness-to-hand experience for both students and instructors while also aligning with their educational values and objectives. This will help maintain a holistic and effective learning environment while embracing the advantages of AI technology. Therefore, in summary, by applying Heidegger's philosophy to the examination of ChatGPT in education, we can gain a deeper understanding of the potential implications for students, instructors and institutions. It prompts us to reflect on the existential and temporal dimensions of education, encouraging a critical evaluation of how technology can shape our relationship with knowledge, authenticity and our sense of being-in-the-world.

Within this chapter, we have constructed a theoretical foundation to facilitate the examination of ChatGPT and similar AI technologies. Our framework encompasses two key components: critical theory, which delves into power dynamics, social disparities and cultural conventions; and phenomenology, enabling an understanding of conscious experiences as perceived directly by individuals. In Chapter 6, we revisit these theories, using them as a guide to conduct a comprehensive analysis of our findings.

Chapter 4

Exploring ChatGPT's Role in Higher Education: A Literature Review

Defining the Scope of the Literature Review

In this chapter, we present our literature review conducted in early April 2023, where we utilised Google Scholar to search for articles focusing on ChatGPT's impact on students, instructors and higher education. Our primary goal was to identify case studies exploring ChatGPT's integration in educational settings to gain valuable insights into its practical implications. As ChatGPT had only been publicly released on 30 November 2022, just over 4 months before our literature review began, we expected a scarcity of case studies due to limited time for in-depth research and analysis. As anticipated, our search revealed limited literature related to actual case studies involving ChatGPT. However, what we did discover was an emerging trend in content and document analysis studies examining secondary sources like media releases and social media discussions. Additionally, we identified meta-literature reviews synthesising the growing body of research around ChatGPT, often including preprints due to its recent public appearance and the limited time for peer-reviewed publications on this topic. Furthermore, we found several user case studies focusing on the individual experiences of instructors and researchers experimenting with aspects of ChatGPT. Considering that we were particularly interested in the implementation of ChatGPT in educational settings, we limited our scope to papers released following its public launch on 30 November 2022, concentrating on the 4-month period leading up to the commencement of our research. After conducting our initial review, we selected nine papers that we deemed most relevant to our research questions. These papers were categorised into three groups: content and

document analysis papers (three papers), literature review papers (two papers) and case studies focusing on user experiences (four papers). An overview of these is provided below.

Content and Document Analysis Papers on ChatGPT

Analysing the Role of ChatGPT in Improving Student Productivity in Higher Education

In their study, 'Analysing the Role of ChatGPT in Improving Student Productivity in Higher Education', Fauzi et al. (2023) aimed to explore the impact of ChatGPT on student productivity in higher education settings. Employing a qualitative research methodology, the researchers adopted a desk research approach and relied on secondary sources of information for data collection. By consulting various reference materials, including online media and journal databases, they guaranteed comprehensive coverage of relevant information related to ChatGPT's role in enhancing student productivity. During the data collection process, Fauzi et al. (2023) recorded relevant information, which they subsequently analysed using data reduction and data presentation techniques. Through simplifying, classifying and eliminating irrelevant data, they gained insights into ChatGPT's potential impact on student productivity. Their data presentation involved systematically organising it and using written discourse in the form of field notes to facilitate understanding and support the process of drawing conclusions. The study's findings revealed that ChatGPT holds the potential to contribute to various aspects of student productivity in higher education. Notably, ChatGPT provided valuable assistance to students by offering relevant information and resources for their assignments and projects. ChatGPT also assisted students in improving their language skills, grammar, vocabulary and writing style. Moreover, ChatGPT fostered collaboration among students, enabling effective communication, idea exchange and project collaboration. Additionally, it contributed to time efficiency and effectiveness by helping students organise their schedules, assignment due dates and task lists. Beyond that, ChatGPT served as a

source of support and motivation for students, offering guidance on stress management and time and task management strategies. Based on their findings, Fauzi et al. (2023) propose several recommendations. Firstly, they suggest that students should use ChatGPT judiciously and critically evaluate the credibility of the information it provides. Secondly, they emphasise that educators and educational institutions should consider integrating ChatGPT into learning processes to enhance student productivity, while also maintaining a balanced approach that values human interaction and student engagement. Thirdly, they recommended that technology companies continue advancing and refining language models like ChatGPT to further contribute to the improvement of student productivity and online learning. Fauzi et al.'s (2023) study sheds light on the positive implications of ChatGPT in higher education, particularly its potential to enhance student productivity. However, it is essential to address the study's weaknesses, such as the heavy reliance on secondary sources and the limited exploration of other aspects of ChatGPT's impact on education. To strengthen the validity and reliability of findings, it is suggested that future research should consider incorporating primary research methods and conducting broader investigations.

Fauzi et al.'s (2023) paper is of significant importance to our study, as it directly addresses our research topic on how ChatGPT may affect the roles of students, instructors and institutions of higher education. This paper adds value to our understanding of the research topic in several key ways.

- *Focus on Student Productivity*
  The paper provides a specific examination of the impact of ChatGPT on student productivity in higher education. It offers relevant insights into the role of ChatGPT in influencing student learning outcomes and academic performance through various means of support.
- *Practical Recommendations*
  The study's recommendations offer valuable guidance for educators and institutions seeking to effectively integrate ChatGPT into learning processes while maintaining a balance with human interaction and personalised instruction.
- *Broader Implications*
  While focusing on student productivity, the study indirectly informs our research on the roles of instructors and higher education institutions. It

illustrates how students' interactions with ChatGPT may influence instructors' teaching practices and institutional approaches to supporting student learning and academic success.

Overall, Fauzi et al.'s (2023) findings and recommendations offer valuable guidance for navigating the integration of ChatGPT effectively, while also raising important considerations for examining the roles of instructors and higher education institutions in the context of artificial intelligence (AI)-driven technologies.

Open AI in Education, the Responsible and Ethical Use of ChatGPT Towards Lifelong Learning

David Mhlanga's 2023 article, 'Open AI in Education: The Responsible and Ethical Use of ChatGPT Towards Lifelong Learning', employs document analysis, reviewing various sources, including news outlets, blog posts, published journal articles and books (Mhlanga, 2023). For the research, Mhlanga conducted a global search to identify papers that investigated OpenAI, the principles of responsible AI use in education and the ethical implications of AI in education (Mhlanga, 2023). From this search, he selected 23 publications that served as his primary sources, from which he derived a number of key themes. One of these key themes revolves around the challenges associated with using ChatGPT in education, in which he warns against the use of ChatGPT for grading written tasks, as it may threaten conventional methods of assessment, such as essays. Additionally, he raises concerns that students might outsource their work to ChatGPT, making it harder to detect instances of plagiarism. Despite these challenges, Mhlanga believes that a blanket ban on ChatGPT might not be the best approach. Instead, he urges educators and policymakers to address these challenges thoughtfully while considering the potential benefits of ChatGPT in education. Despite his concerns, Mhlanga also highlights various opportunities that ChatGPT brings, suggesting that the ability of ChatGPT to generate essays and written content can be a powerful tool to enhance learning. In addition, he suggests it can be used to improve assessment procedures, foster student collaboration and engagement and facilitate experiential learning. While Mhlanga acknowledges that ChatGPT can be disruptive, he also opines that it presents an excellent opportunity to

modernise and revolutionise education (Mhlanga, 2023). However, if implementing ChatGPT in educational settings, Mhlanga emphasises the importance of adhering to responsible and ethical practices, noting that protecting the privacy of users' data is paramount, and students must be informed about data collection, usage and security measures. Similarly, he warns that the responsible use of ChatGPT requires addressing potential biases and ensuring fairness and non-discrimination, particularly in grading and evaluation. Mhlanga also underscores that ChatGPT should not be viewed as a replacement for human teachers but rather as a supplement to classroom instruction. This is because he believes human instructors play a crucial role in understanding students' unique needs, fostering creativity and providing hands-on experiences that ChatGPT cannot replicate (Mhlanga, 2023). Furthermore, Mhlanga points out some of the limitations of ChatGPT, such as its inability to comprehend the context surrounding students, such as their culture and background. He believes this limitation makes ChatGPT unsuitable for providing personalised and experiential education, which, he notes, is essential for students' holistic learning. Therefore, he suggests that educators must educate their students about ChatGPT's limitations and encourage them to critically evaluate its output (Mhlanga, 2023). To ensure ethical AI use in education, Mhlanga suggests that transparency is crucial. Therefore, he suggests offering open forums, workshops and discussion groups for students and teachers to understand how ChatGPT functions and its capabilities. For Mhlanga, transparency should include informing students about the algorithms and data sources used and potential biases in the technology. He also believes it is essential to prioritise the adoption of open-source or transparent AI technology to provide access to the source code and underlying data. He believes that by educating students about AI's limitations and potential biases, we can empower them to use the technology responsibly (Mhlanga, 2023). Additionally, Mhlanga emphasises the significance of accuracy in education, noting that ensuring AI-generated content is accurate and reliable is essential to prevent misconceptions and misinformation among students. Therefore, he states that critical thinking and fact-checking must be encouraged when using AI tools in the educational process (Mhlanga, 2023).

Mhlanga's findings highlight the challenges and opportunities associated with using AI in educational settings and emphasise the importance of

responsible and transparent practices. The study underscores the need to educate students and instructors about AI's limitations and potential biases and stresses the irreplaceable role of human teachers in the learning process. Overall, Mhlanga's research offers valuable insights into the impact of ChatGPT on students, instructors and higher education institutions, addressing key aspects of our research question. However, it is suggested that further research be conducted to expand the sample size as well as considering AI's broader applications in education.

Mhlanga's (2023) study is relevant to our research in the following ways:

- *Challenges and Opportunities for Education*
  Mhlanga's research identifies both challenges and opportunities in using ChatGPT for education. Understanding these aspects can help inform how students and instructors should approach and leverage ChatGPT in educational settings. The concerns about potential plagiarism and the need for educators to adapt their assessment methods highlight the challenges institutions may face while implementing AI tools. Conversely, the opportunities presented by ChatGPT, such as improved assessment procedures and innovative teaching approaches, can inspire educators to explore its integration in a responsible manner.
- *Complementing Human Instructors*
  Mhlanga's findings suggest that ChatGPT should not replace human teachers but rather supplement their efforts. This aligns well with our research question about the roles of students and instructors in the AI-driven educational landscape. Gaining insights into how ChatGPT can facilitate and improve human instruction can provide valuable guidance for instructors to adjust their teaching approaches and for students to effectively engage with AI technologies.
- *Limitations and Awareness*
  Mhlanga's research underscores the importance of educating students about the limitations of ChatGPT. Understanding AI's capabilities and limitations is essential for students to critically evaluate AI-generated content and use the technology effectively. This aspect is highly relevant to our research regarding how students may interact with and perceive AI tools like ChatGPT.
- *Integration and Adaptation*

Mhlanga's (2023) study's focus on challenges and opportunities for integrating ChatGPT in education can inform how higher education institutions adapt to the AI-driven landscape. Understanding the potential disruptions and benefits can help institutions make informed decisions about adopting AI technologies.

- *Scope for Further Research*
  Mhlanga's article encourages further research and debate on the responsible use of AI in education. This aligns with our research goal of exploring the broader implications of AI on students, instructors and educational institutions. Our research can expand on Mhlanga's findings and delve into specific use cases and best practices for AI integration in education.

In conclusion, David Mhlanga's 2023 article is highly relevant to our research, as it provides valuable insights into the responsible and ethical implementation of ChatGPT in education. The study addresses key aspects of how ChatGPT affects students, instructors and higher education institutions, offering relevant perspectives on challenges, opportunities, ethical considerations and potential future directions. It serves as a foundation for understanding the implications of AI in education and can guide institutions in navigating the AI-driven educational landscape responsibly.

ChatGPT in Higher Education: Considerations for Academic Integrity and Student Learning

Sullivan et al.'s (2023) article titled ‘ChatGPT in higher education: Considerations for academic integrity and student learning’ presents an investigation into the disruptive effects of ChatGPT on higher education. Their study focuses on two main areas: analysing key themes in news articles related to ChatGPT in the context of higher education and assessing whether ChatGPT is portrayed as a potential learning tool or an academic integrity risk. Their research methodology involved conducting a content analysis of 100 media articles from Australia, New Zealand, the United States and the United Kingdom using specific search terms, which were then imported into EndNote and subsequently Nvivo for analysis. The authors followed a content analysis guidebook, refining a preliminary

codebook and coding the articles based on identified themes. They also examined how various stakeholders, including university staff, students and ChatGPT, were represented in the media. To assess sentiment and word usage, they employed Nvivo's Sentiment Analysis and Query. Overall, a number of themes emerged from the analysis. The authors found that the articles mainly focused on concerns related to academic integrity, particularly regarding cheating, academic dishonesty and misuse facilitated by AI, such as ChatGPT. Instances of using ChatGPT for cheating on university entrance exams were also identified. Educating students about AI's impact on academic integrity and setting clear guidelines was highlighted as crucial. The articles also explored universities' efforts to detect AI use in assignments, mentioning various tools like OpenAI's Open Text Classifier, Turnitin, GPTZero, Packback, HuggingFace and AICheatCheck. However, some scepticism was expressed about the accuracy and sophistication of these detection technologies, with academics relying on their familiarity with students' work and detecting shifts in tone to identify AI-generated content. In their study, Sullivan et al. (2023) also identified a significant theme concerning strategies to discourage the use of ChatGPT in education. Many articles discussed universities adjusting their courses, syllabi or assignments to minimise susceptibility to ChatGPT-generated content, often opting for invigilated examinations. However, some argued against relying solely on exams, suggesting task redesign to promote authenticity and assess critical thinking. The analysis also highlighted concerns about ChatGPT's proneness to errors, limitations and its impact on learning outcomes. Additionally, articles raised copyright, privacy and security concerns related to student data. Interestingly, some articles emphasised the inherent connection between learning and writing, underscoring the role of writing in exploring and solidifying thoughts on various subjects. Other concerns included the potential decline in critical thinking skills due to overreliance on AI for coursework completion, which may undermine genuine educational growth. In addition, Sullivan et al. (2023) found that a higher number of articles made references to institutions or departments that had imposed bans on ChatGPT compared to those allowing its use. However, they observed that the most commonly discussed response was the indecisiveness of certain universities regarding their policies. These universities were described as ‘updating’, ‘reviewing’ and ‘considering’ their policies, reflecting a cautious approach due to the

rapidly evolving nature of the situation. In the absence of official institutional policies, several articles mentioned that individual academic staff members would develop revised policies on a course-by-course basis. The researchers also noted that universities that had chosen to prohibit the use of ChatGPT had already updated their academic integrity policy or honour code, or they believed that AI use was already prohibited based on existing definitions of contract cheating. On the other hand, in cases where universities permitted the use of ChatGPT, it often came with the requirement to adhere to strict rules, including the disclosure or acknowledgement of its use in assignments. Additionally, the researchers highlighted that two articles clarified that while a specific university did not impose a ban on ChatGPT, individual academic staff members still had the discretion to prohibit its use in certain assessments or units. Furthermore, Sullivan et al. (2023) found that a significant portion of the analysed articles discussed integrating ChatGPT into teaching practices. These articles advocated for meaningful integration of AI in teaching and suggested specific ways to incorporate ChatGPT into assignment tasks, such as idea generation and feedback on student work. Various applications for ChatGPT in the learning experience were proposed, including personalised assignments, code debugging assistance, generating drafts, providing exemplar assignments and more. The articles acknowledged the difficulties of banning ChatGPT and recognised its relevance in future workplaces. Enforcing a complete ban was deemed impractical, leading to debates on investing in AI detection systems. ChatGPT was likened to calculators or Wikipedia, highlighting its disruptive nature. However, specific ways AI would be employed in the workplace were not extensively explored. The researchers noted a lack of focus on using ChatGPT to enhance equity outcomes for students. Few articles discussed mitigating anxiety or supporting accessibility challenges on campus. They also highlight that there was limited mention of ChatGPT's potential to improve writing skills for non-native speakers and promote a more equitable learning environment. They note that only one article touched briefly on disability-related considerations and AI's potential to empower individuals with disabilities. Regarding voices, Sullivan et al. (2023) found that university figures, including leaders, coordinators, researchers and staff, were extensively quoted in the media, with nearly half of the articles citing three or more representatives from respective institutions. In contrast, student

voices were relatively underrepresented, appearing in only 30 articles, and only seven of those included quotes from more than three students. Some articles focused on Edward Tien, the student behind ChatGPT Zero, while others used survey data to represent the collective student voice.

Based on their research, Sullivan et al. (2023) urge for a more balanced examination of the risks and opportunities of ChatGPT in university teaching and learning, as they believe media emphasis on cheating may influence readers' perceptions of education's value and student views on its appropriate use. Sullivan et al. (2023), therefore, suggest redesigning assessment tasks to reduce susceptibility to AI tools through personalised and reflective tasks. However, they acknowledge disagreements on the most effective adaptation strategies and the evolving nature of ChatGPT and detection software, potentially making some discussions in the articles outdated. They note that the need for policy revisions regarding AI tools and academic integrity is emphasised in the articles, but specific implementation details are lacking. They suggest that clearer policy positions are expected later in 2023. They also believe establishing explicit guidelines for ethical AI tool use is crucial, considering accessibility, sophistication and widespread adoption across industries. They deem an outright ban on AI tool usage impractical given student access. Sullivan et al. (2023) emphasise the need for clear guidelines for ChatGPT use, including acknowledging its limitations and biases. They highlight potential benefits for student learning, simplifying complex concepts and aiding test preparation. They believe incorporating ChatGPT into workflows could enhance employability, but that critical thinking skills to analyse AI outputs are essential. They also suggest more industry input is needed in workplace discussions and educators must foster unique skills for students to stay competitive in the job market. In addition, Sullivan et al. (2023) emphasise ChatGPT's potential to enhance academic success for diverse equity groups, but note limited attention in existing literature. They believe ChatGPT can support non-traditional students, non-native English speakers and students with accessibility needs. However, they caution about potential inaccuracies and biases. The authors report that they find the opportunities promising and look forward to AI's development in accessibility and inclusion in the future. Sullivan et al. (2023) acknowledge the media's predominant focus on academic and institutional perspectives regarding ChatGPT, neglecting student views. They stress the need for a more constructive and student-led

discussion, involving all stakeholders for an inclusive discourse on AI. They advocate for student associations and partnerships to collaborate with university staff, enhancing student engagement and institutional approaches to AI.

Sullivan et al. (2023) acknowledge the limitations of their study, focusing on mainstream news databases and a relatively small number of articles, and we are inclined to agree with them. They emphasise the importance of considering alternative sources like social media platforms and education blogs for a more comprehensive understanding of ChatGPT discourse. They also recommend expanding the sample size, exploring diverse cultural contexts and investigating the sources shaping media coverage to address existing biases. To address these limitations, Sullivan et al. (2023) propose future research opportunities, including exploring non-Western sources, conducting surveys and focus groups with students and investigating academic staff perspectives on ChatGPT. They emphasise the potential for AI tools to enhance student learning and access, highlighting the need for a more inclusive student perspective in discussions. The authors stress the importance of media framing and its impact on public perceptions of academic integrity and university responses to ChatGPT. The authors conclude that their findings emphasise the necessity for further research and dialogue concerning the implications of AI tools, highlighting the need to explore ethical use, innovative teaching and learning practices and the promotion of equitable access to educational opportunities. Finally, they assert that as AI technologies continue to evolve, it is crucial for universities to adapt and embrace their utilisation in a manner that supports student learning and prepares them for the challenges of an increasingly digital world.

Sullivan et al.'s (2023) investigation is relevant to our study in the following ways.

- *Academic Integrity Concerns*
  Sullivan et al. highlight that media articles predominantly focus on concerns related to academic integrity, such as cheating and academic dishonesty facilitated by ChatGPT. This finding underscores the importance of addressing these integrity concerns and developing clear guidelines for students to ensure ethical use of AI tools in our study.
- *Task Redesign and Avoidance Strategies*

The study reveals that universities are adopting strategies to discourage the use of ChatGPT, including task redesign and opting for invigilated examinations. These findings can inform our research on how institutions are adapting to the challenges posed by AI tools and maintaining the integrity of assessments.

- *Policy Challenges*
  Sullivan et al. report on the indecisiveness of certain universities regarding their policies on ChatGPT usage. This aspect is particularly relevant to our study, as it emphasises the need for institutions to develop explicit guidelines and policies for the ethical use of AI tools while ensuring academic integrity.
- *Embracing ChatGPT in Teaching*
  Despite concerns, the study highlights that some media articles advocate for meaningful integration of ChatGPT in teaching practices. This finding is significant for our research, as it provides insights into potential opportunities and benefits of incorporating AI tools in educational settings.
- *Equity and Accessibility Considerations*
  The study touches on the potential benefits of ChatGPT for equity and accessibility, such as assisting non-native speakers and students with disabilities. These considerations align with our research focus on understanding how AI tools can support all of our students, especially considering that the majority of our students are non-native speakers studying in an English-medium environment.
- *Student Engagement*
  Their study reveals that student voices are relatively underrepresented in media articles. This aspect is directly relevant to our research, emphasising the importance of involving students in the discussion and decision-making processes concerning AI integration in education.

In conclusion, Sullivan et al.'s (2023) investigation holds substantial relevance to our research, as it illuminates critical aspects essential for understanding the implications of integrating ChatGPT in the educational landscape. Their findings concerning academic integrity concerns, task redesign strategies, policy challenges, embracing ChatGPT in teaching, equity and accessibility considerations, media perception and student

engagement provide valuable groundwork for our study to explore the responsible and effective integration of AI tools in our educational context.

Literature Review Papers on ChatGPT

'We Need To Talk About ChatGPT': The Future of AI and Higher Education

In their 2023 paper titled 'We Need To Talk About ChatGPT': The Future of AI and Higher Education, Neumann et al. emphasise the diverse applications of ChatGPT for software engineering students. These applications include assessment preparation, translation and generating specific source code as well summarising literature and paraphrasing text in scientific writing. This prompted them to write a position paper with the aim of initiating a discussion regarding potential strategies to integrate ChatGPT into higher education. They, therefore, decided to investigate articles that explore the impact of ChatGPT on higher education, specifically in the fields of software engineering and scientific writing, with the aim of asking 'Are there lessons to be learned from the research community?' (Neumann et al., 2023). However, since ChatGPT had only recently been released, similar to our own situation, they observed a lack of peer-reviewed articles addressing this topic at the time of their writing. Therefore, they decided to conduct a structured grey literature review using Google Scholar to identify preprints of primary studies. A total of 5 preprints out of 55 were selected by the researchers for their analysis. Additionally, they engaged in informal discussions and conversations with lecturers and researchers, as well as examining their own test results from experimenting with ChatGPT. Through their examination of these preprints, Neumann et al. identified emerging challenges and opportunities that demanded attention (2023). The four areas in higher education, where they contend these challenges and opportunities are applicable are teaching, papers, curricula and regulations. In the context of teaching, Neumann et al. emphasise the importance of early introduction to foundational concepts, such as programming fundamentals, while specifying the appropriate use of ChatGPT (2023). They highlight the need for transparency, ensuring students are aware of ChatGPT's functionalities and limitations. They

suggest adapting existing guidelines or handouts, coordinating among teachers to avoid redundancy, and integrating ChatGPT into teaching activities. They also recommend that students practise using the tool for specific use cases, exploring both its possibilities and limitations. In addition, they note the potential integration of ChatGPT into modern teaching approaches like problem-based learning or flipped learning. Furthermore, they propose inviting practitioners to provide insights on integrating ChatGPT into practical work during courses. Overall, their recommendations aim to foster practice-based learning and enhance transparency. Regarding papers, according to Neumann et al., integrating ChatGPT into higher education presents challenges in scientific writing, especially in sections involving existing knowledge (2023). They suggest using a combination of plagiarism checkers and AI detection tools, with manual examination as a backup. Thorough reference checks and validation are emphasised as crucial. They also highlight identifiable characteristics of ChatGPT using GPT-3, such as referencing non-existent literature, which can assist in detection. They propose the use of additional oral examinations or documentation as additional measures. Furthermore, they recommend placing greater emphasis on research design and results sections to enhance scientific education. According to Neumann et al., adjusting a curriculum is a complex process that requires careful consideration of the impact on other courses and compliance with regulations (2023). However, they expect substantial discussions among lecturers due to varying opinions on integrating ChatGPT into lectures. Nonetheless, they believe these discussions will be valuable as they will provide an opportunity for mutual learning and the development of solutions to address the challenges that arise. In the context of regulations, the authors emphasise the importance of evaluating official regulatory documents, such as examination regulations (2023). They also highlight the need to consider various legal aspects, such as copyright and data protection, when integrating ChatGPT into teaching. To ensure consistency, the authors recommend re-evaluating existing examination regulations and establishing clear guidelines for students. Additionally, they stress the significance of thorough discussions among lecturers within a study programme to identify adoption opportunities by aligning course objectives, theoretical foundations and examination types. By addressing these areas, they believe successful integration of ChatGPT into university teaching can be achieved, leading to reduced uncertainties

and a focus on innovative education. Neumann et al. summarise their study by stating that their findings highlight the transformative impact of AI-based chatbots like ChatGPT on higher education, particularly in the realm of scientific writing (2023). However, they acknowledge the presence of several unresolved questions that require further investigation: Is text generated by ChatGPT a suspected plagiarism case? How should one reference text generated by ChatGPT? and What proportion of text generated with ChatGPT in relation to the total scope is acceptable? However, they acknowledge that numerous additional questions are likely to arise. To conclude, they highlight that as educators shape the future experts, it is important to equip our students with the essential skills for responsible use of ChatGPT. They, therefore, emphasise the need to address the integration of AI tools in higher education and acknowledge their work as a stepping stone towards initiating further inquiries, fostering discussions and discovering solutions.

Neumann et al.'s (2023) study's strengths lie in its focus on emerging AI technology's impact on higher education and its comprehensive exploration of various aspects of integration. The researchers incorporated informal discussions and practical experimentation with ChatGPT to supplement their findings, enhancing the study's insights. However, there are notable weaknesses and limitations to consider. The study's reliance on preprints and informal discussions may introduce potential biases and limit the generalisability of the findings. The small sample size of preprints (only 5 out of 55) might not fully represent the breadth of research on the topic, and the lack of peer-reviewed articles may affect the study's credibility. Additionally, the study's emphasis on software engineering and scientific writing may not fully capture ChatGPT's impact on other academic disciplines. Moreover, the authors acknowledge the presence of unresolved questions, indicating that certain aspects of ChatGPT's integration into higher education remain unaddressed. Furthermore, the study primarily explores the researchers' perspectives. Incorporating more diverse perspectives, including practitioners from different disciplines and institutions, could enhance the validity and reliability of the findings. In conclusion, Neumann et al.'s study provides valuable insights into the integration of ChatGPT into higher education, but it faces limitations related to sample size, representation and focus. Despite these limitations,

the study serves as a starting point for further inquiries and discussions on the responsible and effective use of AI tools in the educational landscape.

We believe Neumann et al.'s (2023) study has important implications for our research in the following areas:

- *Teaching Strategies and Early Introduction*
  The study emphasises the importance of early introduction to foundational concepts and transparent use of ChatGPT in teaching. Their recommendations for coordinating among instructors and integrating ChatGPT into teaching activities provide insights into how instructors may incorporate AI tools in their pedagogical approaches.
- *Curricular Adaptation and Regulations*
  The study identifies the need for discussions among lecturers to adjust curricula and comply with regulations when integrating ChatGPT. This insight informs our research on how institutions may need to adjust to accommodate AI tools.
- *Unresolved Questions and Further Inquiries*
  The study acknowledges unresolved questions related to ChatGPT's usage in academic settings. This serves as a guide for our research in which we may explore these unanswered aspects, such as how to reference AI-generated text.

Despite the limitations of Neumann et al.'s study, such as the small sample size and potential biases, their comprehensive exploration of AI technology's impact on higher education offers valuable insights. By building upon their work and conducting our own research, we can contribute to evidence-based practices and informed discussions on the responsible and effective integration of ChatGPT in higher education, thereby preparing students for the future AI-driven landscape.

ChatGPT: Bullshit Spewer or the End of Traditional Assessments in Higher Education?

In their 2023 paper titled ‘ChatGPT: Bullshit spewer or the end of traditional assessments in higher education?’ Rudolph et al. conduct a comprehensive literature review and experimental analysis of ChatGPT. Their literature review stands out as one of the pioneering peer-reviewed academic journal articles to explore the relevance of ChatGPT in higher

education to date, specifically in assessment, learning and teaching. Rudolph et al.'s paper primarily examines the implications of this technology for higher education and delves into the future of learning, teaching and assessment in the context of AI chatbots like ChatGPT. They contextualise ChatGPT within the realm of current research on Artificial Intelligence in Education (AIEd), discussing its applications for students, teachers and educational systems. The authors analyse the opportunities and threats posed by ChatGPT and conclude the article with recommendations targeted towards students, teachers and higher education institutions, with a particular focus on assessment. For their research, Rudolph et al. utilised a desktop analysis approach. They conducted Google Scholar searches, examined reference lists and explored embedded references in non-academic articles to conduct their literature review. However, due to the novelty of the topic, once again, similar to our own situation, they discovered there were only a limited number of relevant scholarly resources. As of 18 January 2023, the researchers found two peer-reviewed journal articles and eight preprints on ChatGPT's application in higher education, with a particular focus on assessment, learning and teaching. Based on their literature review, Rudolph et al. (2023) put forward the following implications of ChatGPT for education.

Rudolph et al. (2023) highlight that AIEd presents a unique opportunity for exploring diverse tools and applications in educational technology. Drawing from Baker and Smith's (2019) framework, they categorise educational contexts into student-facing, teacher-facing and system-facing dimensions, which they found valuable in their understanding of AI's utilisation in education. Regarding student-facing AI applications, Rudolph et al. emphasise the potential of AI applications like Intelligent Tutoring Systems (ITS) in personalising student learning through tailored instruction. They highlight ITS's ability to simulate human tutoring and provide personalised assistance in problem-solving. Additionally, they discuss the possibilities of personalised adaptive learning (PAL) facilitated by advancements in big data technology and learning analytics. While acknowledging ChatGPT's promise in enhancing tasks like language translation and question answering, they also point out its limitations in deeply comprehending subject matter. The authors say they find it ironic that concerns about AI-powered writing applications exist, as they believe ChatGPT can greatly benefit teachers in fostering innovative teaching and

learning approaches. Regarding teacher-facing applications, Rudolph et al. (2023) emphasise how teacher-facing AIEd systems reduce teachers' workload by automating tasks like assessment, plagiarism detection and feedback. They also note that AI-powered applications can provide valuable insights into students' learning progress, enabling targeted guidance and support. Their research explores AI-powered assessment methods, including Automated Essay Scoring (AES) systems, which offer students prompts to revise answers, extending assessment beyond multiple-choice tests. They conclude that AI-powered essay ratings generally align with human ratings, with some concerns persisting. Rudolph et al. also highlight the importance of combining AES with AI-enabled automatic feedback systems to enhance effectiveness. The adaptive evaluation of the feedback system ensures appropriate answers based on Bloom's cognitive levels and can recommend additional learning resources and challenges to students. They acknowledge the well-documented effectiveness of AI-powered grading applications for essays. However, they raise concerns about ChatGPT's potential disruption in the emerging subfield of AI-powered applications supporting students' writing skill development. Furthermore, they highlight various AI-based writing tools developed before ChatGPT, aiming to enhance writing skills and facilitate the writing process through automated feedback and assessment. The authors also emphasise AI-powered writing applications like Grammarly and Wordtune as valuable additions to the writing curriculum, noting that Grammarly offers immediate feedback and revision suggestions, effectively improving writing engagement through automated corrective feedback, and Wordtune, using natural language processing (NLP), assists English as a Foreign Language (EFL) students in formulating ideas and enhancing their writing quality. They note that research underscores the positive impact of AI-based interventions on students' self-efficacy and academic emotions in EFL contexts, supporting independent learning and improvement. They also suggest that ChatGPT should be analysed within the same category of AIEd tools. Regarding system-facing applications, Rudolph et al. (2023) point out that system-facing AI-powered applications receive less attention in the literature compared to student-facing and teacher-facing applications. Despite this, they emphasise the importance of a holistic approach when developing strategies to leverage ChatGPT for innovation in education, taking cues from Microsoft's incorporation of ChatGPT into its products.

They also mention that, since ChatGPT is a new product in the market, there is limited empirical research on its implications for education. Therefore, they suggest a discussion on the opportunities and challenges that ChatGPT may present for educational practitioners, policymakers and researchers is necessary (Rudolph et al., 2023).

Rudolph et al. (2023) highlight concerns about ChatGPT threatening the traditional essay assessment method, noting that instructors worry that students might outsource their assignments to ChatGPT, generating passable prose undetected by plagiarism tools. They believe these concerns may partly stem from instructors' resistance to adapting to new assessment methods, as written assignments are sometimes criticised for being ineffective in assessing students' learning. Rudolph et al. (2023) also express concerns about ChatGPT's limitations in understanding and evaluating information shared, as it is merely a text-generating machine. They believe this concern might prompt institutions to blacklist the AI application. However, with the potential integration of ChatGPT's technology into Microsoft products, they suggest a pragmatic approach to managing the challenges posed by the widespread use of ChatGPT in the future. From their research, Rudolph et al. (2023) note that language models offer a wide range of beneficial applications for society, such as code and writing autocompletion, grammar assistance, game narrative generation, improving search engine responses and answering questions. However, they also acknowledge the potential harmful applications of these models, saying that GPT-3, in particular, stands out for its enhanced text generation quality and adaptability, making it challenging to differentiate synthetic text from human-written text. Thus, they believe this advancement in language models presents both opportunities and risks, and that, in this context, the focus should be on exploring the potential harms of improved language models, not to imply that the harms outweigh the benefits, but to encourage research and efforts to address and mitigate potential risks. Rudolph et al. (2023) summarise by saying that introduction of disruptive education technologies in the classroom often brings forth various challenges in teaching and learning. As a result, education practitioners and policymakers are tasked with managing these situations to ensure that inadequate pedagogical practices are avoided.

Based on their research, Rudolph et al. (2023) discovered that ChatGPT's ability to generate essays presents challenges for educators, but

that some are enthusiastic about the potential for innovation in teaching and learning brought by this disruptive AI application. They reference literature suggesting that tools like ChatGPT may become as prevalent in writing as calculators and computers are in mathematics and science. Additionally, they note that some authors propose involving students and instructors in shaping and utilising AI tools to support learning instead of limiting their use. From their research, they also note that while ChatGPT is often seen as posing a threat to traditional essay assessments, they believe it also presents an opportunity for educators to introduce innovative assessment methods. They note that typically, assessments are used by instructors to evaluate students' learning, but opine that many instructors may lack the skills to use assessments for both learning and as a means of learning. They, therefore, believe that institutions should capitalise on this opportunity to enhance instructors' assessment skills and leverage disruptive AI applications like ChatGPT to enhance students' learning. Rudolph et al. (2023) highlight another opportunity for instructors to enhance their teaching strategies by leveraging ChatGPT. For instance, they suggest adopting a flipped learning approach where crucial classwork is completed during in-person sessions, allowing more emphasis on multimedia assignments and oral presentations rather than traditional assignments. Moreover, they believe this would enable instructors to dedicate more time to providing feedback and revising students' work. According to Rudolph et al. (2023), another significant advantage of ChatGPT is its potential to facilitate experiential learning. Based on their literature review, they propose that students should explore various strategies and problem-solving approaches through game-based learning and other student-centred pedagogies by utilising ChatGPT. Additionally, they believe that students who prefer hands-on, experiential learning will particularly benefit from using ChatGPT as a learning tool. According to the authors, ChatGPT can be effectively employed to promote collaboration and teamwork among participants through appropriate instructional strategies. They propose the incorporation of student-centred learning activities that can be conducted in groups. For instance, the ChatGPT application can generate diverse scenarios that encourage students to collaborate in problem-solving and achieving goals. They believe this will foster a sense of community, allowing students to learn from and support each other. Therefore, Rudolph et al. (2023) assert that instead of viewing ChatGPT as a disruptive force in the teaching and learning process,

it should be seen as a significant opportunity for learning innovators to revolutionise education.

Rudolph et al. (2023) conclude that AI, represented by tools like ChatGPT, is becoming increasingly mainstream, and its impact on higher education is still unfolding. While they note there are concerns about the potential implications of artificial intelligence on employment, they caution against alarmist reporting. However, they do emphasise the importance of monitoring and engaging with this rapidly developing space and the need to adjust teaching and assessment approaches in higher education. Additionally, they highlight that ChatGPT's work was not detected by their random testing with anti-plagiarism software, raising concerns about its potential to evade plagiarism checkers like Grammarly's professional version. Moreover, they observe that ChatGPT can be utilised to manipulate user input sentences to deceive anti-plagiarism software from reporting low originality scores. They reflect on the irony that anti-plagiarism software, which relies on AI, can be bypassed by other AI tools within seconds. They even point out that GPT-3 is capable of writing a review of a student's AI-generated assignment, leaving humans with minimal involvement and questioning the true value of the learning experience.

Based on their findings, Rudolph et al. (2023) offer general recommendations for dealing with ChatGPT in higher education. They suggest moving away from a policing approach that focuses on detecting academic misconduct and instead advocate for building trusting relationships with students through student-centric pedagogy and assessments for and as learning. They also emphasise the importance of constructive alignment, where learning objectives, teaching and assessments are all aligned. Their recommendations for faculty, students and higher education institutions are as follows. Regarding recommendations for higher education faculty, Rudolph et al. (2023) suggest exploring alternative assessment methods, such as physical closed-book exams with pen and paper or online exams with proctoring/surveillance software, but also caution against over-reliance on such traditional assessments. To combat the use of text generators like ChatGPT, they propose designing writing assignments that these AI systems are currently not proficient at handling, focusing on specific and niche topics, personal experiences and original arguments. The authors acknowledge that ChatGPT's current limitation is its lack of in-text

referencing and reference lists, but anticipate the emergence of tools like WebGPT that can access web browsing for improved information retrieval. They also highlight the availability of text generator detection software to address academic integrity concerns. The authors encourage faculty to foster creative and critical thinking in assessments, utilising authentic assessments and embracing students' interests and voices. They believe that involving students in peer evaluations and 'teach-back' exercises can further enhance learning experiences. The authors also emphasise the importance of creating an atmosphere where students are actively engaged in their learning and demonstrate the value of human writing while incorporating AI tools responsibly to nurture creativity and critical thinking (Rudolph et al., 2023). Regarding recommendations for students, Rudolph et al. (2023) note that, as digital natives, students often possess an inherent familiarity with technology, giving them a unique advantage in incorporating AI into their academic journey. Therefore, the authors stress the importance of understanding academic integrity policies and the potential consequences of academic misconduct. They believe that to fully harness the potential of AI, students should be encouraged to enhance their digital literacy and master AI tools like ChatGPT, as this proficiency could significantly boost their employability in the modern job market. However, they also caution against using AI as a mere shortcut for assignments, advocating instead for its use as a valuable set of tools to improve writing skills and generate original ideas. They also warn that it is essential to avoid plagiarism and prioritise high-quality sources, as well as remain vigilant against misinformation and disinformation when conducting research. To foster critical thinking, Rudolph et al. (2023) suggest that we should urge students to read widely, broadening their perspectives and enhancing their creative abilities. Furthermore, they suggest that students should be encouraged to explore the application of AI language tools like ChatGPT to write and debug code, providing additional opportunities for skill development. Ultimately, Rudolph et al. encourage students to actively practise using AI language tools to address real-world challenges and expand their problem-solving capabilities, and believe that by embracing AI responsibly and thoughtfully, students can seize its transformative potential and propel their educational journey to new heights (Rudolph et al., 2023). Regarding recommendations for higher education institutions, Rudolph et al. (2023) emphasise the critical importance of digital literacy education, advocating for the inclusion

of AI tools like ChatGPT in the curriculum. They suggest that to equip faculty with the necessary skills, training on AI tools, particularly ChatGPT, is essential. Simultaneously, they recommend that students should also receive training on academic integrity to promote responsible AI tool usage. Furthermore, they recommend that curricula and courses should be thoughtfully designed to be meaningful and relevant to students, reducing the likelihood of resorting to cheating. They believe that addressing the use of AI tools, institutions should update academic integrity policies and develop clear, easy-to-understand guidelines, and that these guidelines should define appropriate usage and outline the consequences for cheating. They also highlight that encouraging research on the effects of AI tools on learning and teaching is crucial to better understand their impact and foster informed decision-making. They believe that by adopting these recommendations, higher education institutions can navigate the evolving landscape of AI tools, creating an environment that supports responsible and innovative learning practices (Rudolph et al., 2023).

Rudolph et al.'s (2023) study explores ChatGPT's relevance in higher education, particularly in assessment, learning and teaching. However, the study has some limitations. The scarcity of scholarly resources on ChatGPT's application in higher education may have affected the depth of analysis. Additionally, relying on desktop analysis and lacking empirical evidence could impact the study's validity. Furthermore, a more comparative analysis of other AI writing tools' implications would provide a broader understanding of AI's impact on education. The study's positive view of AI's benefits may introduce bias, and a balanced assessment of risks and benefits would enhance objectivity.

The implications of Rudolph et al.'s (2023) study for our research on how ChatGPT may affect the role of students, instructors and institutions of higher education are as follows:

- *Understanding AI in Education*
  Rudolph et al.'s study provides valuable insights into the applications and implications of AI, specifically ChatGPT, in higher education. It offers a framework categorising AI applications into student-facing, teacher-facing and system-facing dimensions, enabling a comprehensive understanding of AI's role in education. This is a framework that we can

draw upon in our research to help us shed light on the diverse ways AI tools like ChatGPT can impact various educational contexts.

- *Innovative Assessment Methods*
  The study highlights concerns about ChatGPT's potential to disrupt traditional assessment methods, such as essays and online exams. As we investigate the impact of AI tools on assessment practices, Rudolph et al.'s findings can guide our exploration of innovative assessment approaches that leverage AI while addressing the challenges posed by text-generating AI applications.
- *Opportunities for Personalised Learning*
  Rudolph et al. emphasise the potential of AI tools, including ChatGPT, in personalising and adapting student learning experiences. This insight can inform our research on how AI can be utilised to tailor instruction, provide feedback and support student-centred pedagogies that foster individualised learning paths.
- *Leveraging AI for Instructor Support*
  The study discusses how AI can reduce teacher workload and enhance classroom innovation through automated tasks like assessment and feedback. Our research can explore how AI tools like ChatGPT can complement instructors' efforts, allowing them to focus more on guiding students and providing personalised support.
- *Addressing Ethical Concerns*
  Rudolph et al.'s study acknowledges concerns about academic integrity and the potential misuse of AI tools like ChatGPT for plagiarism. As we investigate the ethical implications of AI integration in education, their findings can help us examine strategies to promote responsible AI use and combat academic misconduct effectively.
- *Promoting Digital Literacy*
  The study emphasises the importance of digital literacy education for students and faculty. We can incorporate this insight into our research by exploring how educational institutions can integrate AI tools like ChatGPT into the curriculum while educating users on its responsible and effective use.
- *Collaborative Learning Opportunities*
  Rudolph et al. discuss the potential of AI tools, like ChatGPT, to promote collaboration and teamwork among students. Our research can

investigate how these tools can be integrated into group learning activities to foster a sense of community and mutual support.

- *Monitoring and Engagement*
  The study emphasises the need for ongoing monitoring and engagement with AI technologies in higher education. Our research can contribute to the ongoing discussion by examining how institutions can stay informed about AI advancements and adapt their teaching and assessment approaches accordingly.

Rudolph et al.'s (2023) study provides valuable insights into ChatGPT's implications in higher education, highlighting the transformative impact of AIEd tools on teaching and learning. Our research can build on these findings to understand how ChatGPT shapes student, instructor and institutional roles. However, limitations, such as scarce literature and lack of empirical evidence, warrant further exploration.

User Case Study Papers on ChatGPT

What if the Devil Is My Guardian Angel: ChatGPT as a Case Study of Using Chatbots in Education

Due to the global attention that ChatGPT has garnered, in their 2023 paper ‘What if the devil is my guardian angel: ChatGPT as a case study of using chatbots in education’ Tlili et al. (2023) ask ‘What are the concerns of using chatbots, specifically ChatGPT, in education?’ To address this question, they performed a qualitative instrumental case study to explore the utilisation of ChatGPT in education among early adopters. They accomplished this by analysing three types of data: social network analysis of tweets, content analysis of interviews and examination of user experiences. Tlili et al. (2023) employed social network analysis of tweets to examine public discourse on ChatGPT's use in education. They collected 2,330 tweets from 1,530 users between 23 December 2022, and 6 January 2023, using the search string ‘#ChatGPT* AND (education OR teaching OR learning)’. The researchers conducted sentiment and tSNE analysis on the tweets. For interviews, they selected diverse participants with ratings of familiarity with chatbots (average rating: 3.02) and different backgrounds,

including educators, developers, students and AI freelancers. Content analysis was performed on the interviews using a coding scheme. Additionally, they conducted hands-on experiences with ChatGPT involving three experienced educators, exploring various teaching scenarios and concerns (Tlili et al., 2023). Regarding the social network analysis of tweets, Tlili et al. (2023) found that the community formation around ChatGPT is fragmented, with individuals seeking information and discussion about its limitations and promises. The most used word pairs provide interesting insights, with some suggesting how to use AI-powered ChatGPT in education, while others hint at the turning point in educational systems. The researchers concluded that the public's view on ChatGPT is diverse, with no collective consensus on whether it is a hype or a future opportunity. While positive sentiments (5%) outweighed negative sentiments (2.5%), the majority of sentiments (92.5%) were non-categorised, indicating uncertainty about ChatGPT in education. Word cluster analysis revealed users' optimism about using AI-powered chatbots in education. However, there were also critical insights and concerns expressed, such as cheating and ethical implications. The researchers emphasise the need to examine the underlying AI technologies, like machine learning and deep learning, behind ChatGPT. Despite the optimistic overview, concerns about its use in education were also observed. The study concludes that negative sentiments demonstrated deeper and more critical thinking, suggesting caution in approaching ChatGPT's integration into education (Tlili et al., 2023). Regarding the content analysis of interviews conducted by Tlili et al. (2023), the findings highlighted users' positive perceptions of ChatGPT's significance in revolutionising education. Participants acknowledged its effectiveness in enhancing educational success by providing foundational knowledge and simplifying complex topics. This potential led the researchers to believe in a paradigm shift in instructional methods and learning reform. However, a minority of participants expressed concerns about learners becoming overly reliant on ChatGPT, potentially hindering their creativity and critical thinking abilities. Regarding the quality of responses provided by Chatbots in education, Tlili et al.'s (2023) study revealed that participants generally found the dialogue quality and accuracy of information from ChatGPT to be satisfactory. However, they also noted occasional errors, limited information and instances of misleading responses, suggesting room for

improvement. In terms of user experience, many participants in Tlili et al.'s (2023) study were impressed by the fluid and exciting conversations with ChatGPT. However, they also pointed out that ChatGPT's humaneness needs improvement, particularly in terms of enhancing its social role since it currently lacks the ability to detect physical cues or motions of users. The study also showed that users perceived ChatGPT as a valuable tool for diverse disciplines, reducing teachers' workload and providing students with immediate feedback. However, some users reported challenges with response accuracy, contradictions, limited contextual information and a desire for additional functionalities. On an ethical front, participants raised concerns about ChatGPT encouraging plagiarism and cheating, fostering laziness among users, and potentially providing biased or fake information. The study also highlighted worries about ChatGPT's impact on students' critical thinking and issues related to privacy through repetitive interactions.

Regarding investigation of user experiences, after daily meetings between the educators to compare the various results they obtained using ChatGPT, they identified ten scenarios where various educational concerns were present. These are as follows. The authors found that educators observed ChatGPT's ability to aid students in writing essays and answering exam questions, raising concerns about potential cheating and the effectiveness of cheating detection in education using chatbots (Tlili et al., 2023). Educators also recognised chatbots' proficiency in generating learning content but emphasised the need for content accuracy and reliability, questioning how to ensure content quality and verification for chatbot-generated content, including ChatGPT (Tlili et al., 2023). The educators each initiated a new ChatGPT chat using the same prompt. However, they all received different responses with varying answer quality, highlighting concerns about equitable access to high-quality learning content (Tlili et al., 2023). ChatGPT's generated quizzes varied in difficulty, leading to questions about the appropriateness of these learning assessments (Tlili et al., 2023). The educators stressed the importance of well-designed learning assessments for student understanding and problem-solving but found inconsistencies in chatbot-generated quizzes that could complicate teachers' responsibilities (Tlili et al., 2023). They noted that users' interaction styles influenced the level of learning assistance received from ChatGPT, raising questions about users' competencies and thinking styles to maximise its potential (Tlili et al., 2023). The educators emphasised the

need to humanise chatbots, including the ability to express emotions and have a personality, to encourage reflective engagement in students (Tlili et al., 2023). The educators observed ChatGPT occasionally providing incomplete answers, raising concerns about its impact on user behaviour, especially among young learners who might use it as an excuse for incomplete tasks or assignments (Tlili et al., 2023). The educators stressed the importance of exploring potential adverse effects on users (Tlili et al., 2023). They also highlighted concerns about data storage and usage, with ChatGPT denying conversation data storage, emphasising the need to safeguard user privacy, particularly for young individuals (Tlili et al., 2023). During an interaction with ChatGPT, one educator's request for a blog's American Psychological Association (APA) format led to intriguingly inaccurate information, raising questions about ensuring reliable responses from ChatGPT to prevent harm or manipulation (Tlili et al., 2023).

In their discussion, Tlili et al. (2023) express their belief that their findings demonstrate the potential of ChatGPT to bring about transformative changes in education. However, despite acknowledging its potential, they also raise several concerns regarding the utilisation of ChatGPT in educational settings. The authors acknowledge that while some institutions have banned ChatGPT in education due to concerns about cheating and manipulation, they propose a responsible adoption approach. This approach involves guidelines and interdisciplinary discussions involving experts from education, security and psychology. They note that, despite drawbacks, recent studies indicate educational opportunities in ChatGPT that can enhance learning and instruction, prompting a need for further research on the consequences of excessive reliance on chatbot technology in education. Highlighting the transformative impact of technology in education, the authors also emphasise ChatGPT's potential to simplify essay writing and introduce innovative teaching methods like oral debates for assessing critical thinking. They advocate for diverse assessment approaches and the reformation of traditional classrooms, along with exploring the balance between chatbots and human interaction, including collaborative potential with human tutors. Consequently, they call for further research to investigate how chatbots can enhance learning outcomes and promote effective human–machine collaboration in education. Regarding user experiences, Tlili et al. (2023) reveal variations

of output quality based on question wording, stressing the importance of learning how to obtain the most useful output for learning. They note that while ChatGPT doesn't demand extensive technical skills, critical thinking and questioning abilities are essential for optimal results. As a solution, they suggest further research on necessary competencies and their development for effective chatbot use, including ChatGPT. While ChatGPT shows partial humanisation, the authors highlight limitations in reflective thinking and emotional expression, which they believe may affect its effectiveness in education. Thus, they call for research on developing more humanised chatbots in education, drawing from relationship formation theories and exploring the impact of human–chatbot relationships on student learning outcomes. However, they express concerns about treating ChatGPT as a human, citing instances where it was listed as a co-author in academic articles, raising ethical, regulatory, originality, authorship and copyright questions. To ensure responsible design, the authors emphasise the need to consider inclusion, ethics and usability when implementing chatbots in education. They highlight instances where ChatGPT exhibited harmful behaviour, stressing the importance of responsible AI design that addresses biases, fairness and transparency. The authors advocate for user-centred design principles, taking into account social, emotional and pedagogical aspects. They recommend future research should focus on designing responsible chatbots aligned with human values and legal frameworks for safe use in education.

Tlili et al.'s (2023) study offers a comprehensive understanding of public discourse on ChatGPT in education through diverse data sources like tweets, interviews and user experiences. However, its small sample size and limited time frame for data collection raise concerns about generalisability and capturing evolving opinions. Content analysis may also introduce subjective interpretations and biases. Despite limitations, the study highlights the need for responsible implementation and guidelines in educational settings. It underscores the importance of adapting teaching practices and exploring human–chatbot relationships' impact on learning outcomes. Future research should focus on the need to upskill competencies and the development of more humanised and responsible chatbots for education. In addition, continuous research is crucial to maximise chatbots' potential while addressing concerns in educational contexts.

We believe the implications of Tlili et al.'s (2023) study for our research are as follows:

- *Comprehensive Understanding*
  Tlili et al.'s study provides a holistic view of public discourse and opinions on ChatGPT in education through the analysis of tweets, interviews and user experiences. This comprehensive understanding can help inform our research on how different stakeholders perceive and interact with ChatGPT in educational settings.
- *Potential Benefits and Concerns*
  The study highlights both the potential benefits and concerns associated with the use of ChatGPT in education. As we investigate the impact on students, instructors and institutions, it's essential to consider these aspects to develop a balanced perspective of the technology's implications.
- *Responsible Implementation*
  Tlili et al. suggests that rather than banning ChatGPT, responsible implementation should be emphasised. This implies the need for guidelines, policies and interdisciplinary discussions involving experts from education, security and psychology to ensure ethical and transparent use of ChatGPT in educational contexts. This is an aspect that we look to investigate in our research.
- *Adaptation of Teaching Practices*
  The study points out the transformative impact of technology in education, requiring educators to adapt their practices. As we examine the role of instructors, it's important to consider how ChatGPT may influence instructional delivery and assessment methods, and how educators can effectively incorporate chatbots into their teaching philosophies.
- *Ensuring Fairness and Equity*
  Tlili et al.'s findings raise concerns about the fairness and equal access to educational content provided by ChatGPT, which bears relevance to our research as we investigate how to provide equitable access to bots for all students.
- *Enhancing User Competencies*
  The study highlights that effective use of ChatGPT requires critical thinking and question-asking skills. Our research can explore how

students and instructors can develop the necessary competencies to optimally interact with chatbots and leverage their potential for enhanced learning experiences.

These implications can serve as valuable insights and guiding points for our research on the impact of ChatGPT on the role of students, instructors and institutions of higher education. By considering the potential benefits, challenges and responsible use of the technology, we can develop a comprehensive and balanced understanding of its implications in the educational landscape.

Exploring the Usage of ChatGPT in Higher Education: Frequency and Impact on Productivity

In the second instructor user experience paper, Firaina and Sulisworo (2023) conducted a study titled ‘Exploring the Usage of ChatGPT in Higher Education: Frequency and Impact on Productivity’, with the aim of gaining insights into lecturers' perspectives and decision-making processes regarding the adoption of ChatGPT in learning. To do this, they interviewed five lecturers to gather their experiences and viewpoints on ChatGPT, collected and analysed the data and interpreted it to deepen their understanding of the effects of using ChatGPT on learning and the factors influencing lecturers' choices. Their research aimed to identify challenges, needs and expectations of lecturers related to using ChatGPT for improving learning outcomes and provide recommendations for technology developers and education decision-makers. Their aim was to use their findings to offer valuable insights for lecturers to enhance the effectiveness of learning and inform decision-making in the education field. Based on the frequency of ChatGPT usage reported in the interviews, Firaina and Sulisworo (2023) found that most respondents preferred using it frequently and found it helpful for obtaining new ideas in everyday learning. However, they also acknowledged the need for additional tools in certain cases. The authors concluded that ChatGPT serves as a communication channel between respondents and the information needed for learning, functioning as a medium for accessing new information and ideas. They believe this aligns with the constructivist learning theory, where individuals actively construct knowledge based on experiences. Furthermore, the authors observed that

ChatGPT assists respondents in constructing new knowledge by providing access to fresh information and ideas, akin to a social media platform for learning. Thus, they emphasise the active role of individuals in constructing knowledge through experiences, reflection and interpretation. They note that, in the case of the respondents, ChatGPT was utilised as a source of information and ideas to facilitate the development of new knowledge and skills in the learning process. Based on the conducted interviews, the authors also discovered that using ChatGPT has a positive impact on productivity and learning effectiveness. They report how one lecturer highlighted how ChatGPT facilitated a quicker understanding of the material and saved time in searching for learning resources. However, the authors acknowledge the importance of conducting further research to ensure accurate responses from ChatGPT. They also report that another lecturer mentioned increased productivity, completing tasks more quickly and saving time in knowledge resource searches. Nonetheless, the authors emphasise the need for a clear understanding of the overall work to align with intended goals. From their findings, the authors connect the use of ChatGPT to communication theory, specifically symbolic interaction theory, which explains how humans communicate using symbolic signs and attribute meaning to them. They also draw upon media theory, particularly the theory of new media, which considers media as a social environment influencing interactions and information acquisition. Additionally, the authors suggest that the use of ChatGPT aligns with constructivist theory in learning, emphasising the process of knowledge construction by learners through experience and reflection (Firaina & Sulisworo, 2023). In addition, the authors found that ChatGPT can be a valuable tool for supporting various aspects of a lecturer's work. However, they note that the ability to select relevant commands was crucial in determining the usefulness of the obtained information. Furthermore, they report that the utilisation of ChatGPT was observed to be beneficial in several learning aspects for the respondents. This is because, firstly, it assisted them in translating scientific articles into English, which helped overcome their English proficiency limitations. And secondly, ChatGPT aided the respondents in searching for up-to-date ideas in learning that catered to their specific needs. The authors give the example whereby instructors could request suggestions on teaching with a constructivist teaching and learning approach and receive multiple alternative recommendations. In conclusion, Firaina and Sulisworo (2023)

found that despite its limitations, respondents recognised the benefits of using ChatGPT to enhance productivity and efficiency in learning. Consequently, they consider ChatGPT to be an intriguing alternative in education, emphasising the importance of maintaining a critical approach and verifying the information obtained. The authors suggest that further research, including additional interviews and case studies, is necessary to obtain a more comprehensive understanding of the use of ChatGPT in learning, as this would help to deepen knowledge and insights regarding its implementation and potential impact (Firaina & Sulisworo, 2023).

Firaina and Sulisworo's (2023) qualitative study stands out due to its in-depth interviews with five lecturers, providing rich insights into their experiences with ChatGPT in education. The researchers effectively connected their findings with educational theories, such as constructivist and communication theories, enhancing the credibility of their conclusions. The study highlights practical implications for lecturers and educational decision-makers, suggesting that ChatGPT positively impacts productivity and learning effectiveness. However, some limitations, like the small sample size and lack of a comparison group, should be considered when interpreting the results. Future research with larger and more diverse samples, along with comparative studies, can further explore the benefits and challenges of using AI-powered chatbots like ChatGPT in educational settings.

Firaina and Sulisworo's (2023) study has several implications for our research on how ChatGPT affects the role of students, instructors and institutions in higher education.

- *Faculty Perspectives*
  The in-depth interviews conducted by Firaina and Sulisworo provide valuable insights into how instructors perceive and utilise ChatGPT in their teaching and learning processes. Understanding faculty perspectives can help inform our study on how instructors perceive the integration of AI chatbots in educational practices and the factors influencing their decision-making.
- *Impact on Productivity*
  The findings from Firaina and Sulisworo's study suggest that ChatGPT positively impacts productivity and efficiency for instructors. This insight may serve as a basis for investigating how the adoption of AI chatbots in

higher education can enhance instructors' efficiency in tasks such as lesson planning, content creation and resource searching.

- *Practical Implications*
  The practical implications highlighted by Firaina and Sulisworo's study can inform our research on the potential benefits and challenges of integrating AI chatbots in higher education. Understanding how instructors navigate the use of ChatGPT can offer insights into best practices and strategies for effectively integrating AI chatbots in educational settings.

Overall, Firaina and Sulisworo's study serves as a valuable reference for our research, offering insights into how instructors perceive and utilise ChatGPT in higher education. By incorporating their findings and considering the study's implications, we can strengthen the theoretical foundation and practical relevance of our research on the effects of AI chatbots on students, instructors and institutions in the higher education context. From looking at instructor user experiences, we now turn to researcher user experiences.

Exploring the Role of Artificial Intelligence in Enhancing Academic Performance: A Case Study of ChatGPT

Alshater's 2022 study, titled ‘Exploring the Role of Artificial Intelligence in Enhancing Academic Performance: A Case Study of ChatGPT’, aims to investigate the potential of AI, specifically NLP, in improving academic performance, using the field of economics and finance as an illustrative example. The study adopts a case study methodology, using ChatGPT as a specific NLP tool to illustrate its potential for advancing research in this domain. By examining the application of ChatGPT in economics and finance research, Alshater explores its capabilities, benefits and limitations. His study also addresses the ethical considerations and potential biases associated with using ChatGPT and similar technologies in academic research, while also discussing future developments and implications. Through this case study approach, Alshater endeavours to offer valuable insights and guidance to researchers seeking to incorporate AI into their scholarly pursuits.

Alshater's findings revealed that the utilisation of ChatGPT and other sophisticated chatbots in research can have various implications, encompassing both advantages and disadvantages. According to Alshater (2022), the use of ChatGPT and other advanced chatbots in research offers numerous benefits. These include enhanced research efficiency through task automation, such as data extraction and analysis from financial documents, and the generation of reports and research summaries. Additionally, ChatGPT can contribute to improved research accuracy by detecting errors in data or analysis, ensuring greater reliability of findings. Moreover, the flexibility of ChatGPT enables researchers to address a wide range of research questions, generating realistic scenarios for financial modelling and simulating complex economic systems. The time-consuming tasks that typically require significant human effort, such as data analysis of large volumes of data or report generation, can be expedited through ChatGPT's automation. Furthermore, Alshater argues that ChatGPT and similar advanced chatbots can provide more objective insights by eliminating personal biases and subjective judgement and by identifying patterns or trends in financial data not immediately apparent to humans. Alshater also notes that these technologies can ensure greater consistency in research processes by following standardised procedures and protocols, aiding in conducting data analysis in a consistent and reproducible manner. In Alshater's study, he not only explores the benefits of ChatGPT and advanced chatbots but also highlights their limitations. One significant factor influencing their effectiveness is the quality and relevance of their training data, as inadequate or biased data can hamper their performance. Moreover, Alshater points out that these chatbots may lack expertise in specialised fields like economics and finance, affecting their ability to accurately analyse data and interpret findings. The ethical implications of using chatbots in research are also a concern raised by Alshater. He discusses the potential displacement of human labour and the perpetuation of biases present in the training data, urging researchers to consider these ethical issues carefully. Additionally, he warns of the risk of chatbots being misused for unethical purposes, such as generating spam or impersonating others, emphasising the need for vigilance and preventive measures. Alshater notes that as technology advances, the capabilities of chatbots evolve and that this means researchers must adapt their methods and approaches accordingly to keep up with these technological advancements.

However, he also notes that it's important to acknowledge that chatbots, including ChatGPT, may occasionally generate repetitive or irrelevant responses due to their lack of contextual understanding, necessitating caution when using them in research. Alshater's study also delves into the ethical considerations and potential biases related to utilising ChatGPT and similar technologies in academic research. He highlights the crucial role of extensive training data in these technologies and the potential for biases or inaccuracies in the generated output. He gives the example whereby if the training data predominantly represents specific demographics or cultural backgrounds, it may lead to biased results or reinforce existing stereotypes. To address this, Alshater emphasises the need for careful evaluation and understanding of biases within the training data and proactive measures to mitigate them, ensuring fairness and impartiality in the model's outcomes. Additionally, Alshater sheds light on the intricate algorithms and processes involved in these technologies, which may not always be fully transparent or understood by users. This lack of transparency can pose challenges in holding the technologies accountable for potential biases or errors that may arise. Thus, he underscores the importance of prioritising transparency in the functioning of these technologies, allowing for scrutiny and ensuring fairness and impartiality in their operations. Moreover, Alshater emphasises the significant role of human oversight and intervention when using these technologies, noting that, as ChatGPT and similar technologies are not fully autonomous, careful consideration of the roles and responsibilities of humans in their implementation is essential. This includes the ability to intervene and address any errors or biases that may occur, ensuring the technologies are used responsibly. Alshater raises legitimate concerns about privacy and data protection when incorporating technologies into academic research, as personal data collection and processing may be necessary. Therefore, he emphasises the importance of implementing suitable measures to safeguard individuals' privacy, preventing unauthorised access or misuse of their data and upholding ethical standards in research practices. While acknowledging the potential benefits of these technologies in specific research tasks, such as data analysis, Alshater cautions against overreliance and the complete replacement of human judgement or interpretation. He advocates for a balanced approach that leverages the strengths of these technologies while respecting the significance of human expertise in research.

Overall, Alshater believes that ChatGPT as an advanced and versatile NLP tool has the potential to bring about a revolutionary impact on academic research (2022). He expresses his belief that the tool's impressive capabilities in generating human-like text, analysing data and simulating scenarios make it an invaluable asset for researchers in various fields. However, he also highlights the importance of considering limitations such as generalisability, data quality and domain expertise when utilising ChatGPT and similar tools. Despite these limitations, he asserts that the potential benefits outweigh the drawbacks. Alshater concludes by emphasising how these technologies empower researchers to efficiently process and analyse vast amounts of data, create realistic scenarios for theory testing and effectively communicate their findings. He expresses his belief that these capabilities hold great promise in advancing research across diverse fields and driving transformative discoveries and insights that enhance our understanding of the world.

Alshater's (2022) study delves into ChatGPT's advantages, including enhanced productivity, improved research accuracy, flexibility in research questions, accelerated speed, objectivity and consistency. The research also acknowledges weaknesses, like the reliance on training data quality and limited domain knowledge. Ethical considerations are addressed, including algorithmic bias and technology misuse. However, the small sample size and focus on economics and finance may limit generalisability. Therefore, we believe future research should explore other disciplines and employ larger and more diverse samples. Alshater's approach to ethics is commendable, but challenges persist in ensuring complete fairness in AI systems. By recognising limitations and focusing on responsible practices, we believe researchers can leverage AI's potential for academic advancement. Continuous vigilance and improvement are also essential for the ethical integration of AI in academia.

In light of Alshater's (2022) study, several implications arise that are directly relevant to our research investigating the impact of ChatGPT on the role of students, instructors and institutions in higher education.

- *Enhancing Student Learning Experiences*
  Alshater's study highlights the potential benefits of ChatGPT for students, particularly in terms of enhancing their learning experiences. By automating certain tasks and providing immediate access to

information and research summaries, ChatGPT can offer students more opportunities to focus on deeper learning activities, positively influencing their overall educational journey. This is something we look to investigate.

- *Empowering Instructors with Advanced Teaching and Research Tools*
  The study emphasises how ChatGPT can be a valuable tool for instructors to improve their teaching and research practices. Through automated data analysis and report generation, instructors can streamline research processes and discover new insights, leading to more effective teaching approaches and enriching the classroom experience. This is an area we aim to explore further.
- *Addressing Data Quality and Biases for Ethical Use*
  The study underscores the importance of data quality and ethical considerations when utilising ChatGPT. As we delve into its impact on higher education, it is crucial to be mindful of potential biases and ensure the responsible use of the technology, safeguarding against discriminatory consequences. This is an area we plan to investigate.
- *Extending Research Scope for Comprehensive Insights*
  Alshater's research is primarily focused on economics and finance, but it encourages us to extend our investigation to other academic disciplines. By conducting in-depth studies with diverse samples, we can gain comprehensive insights into how ChatGPT influences various areas of higher education. Our exploratory case study into a different discipline will help to add to Alshater's insights.

Acknowledging and applying the insights from Alshater's study may help us to navigate the transformative landscape of ChatGPT in higher education responsibly, paving the way for a more efficient, inclusive and ethically sound academic environment. Moreover, the implications he presents serve as valuable guidance for shaping our own research.

ChatGPT User Experience: Implications for Education

In Zhai's 2022 paper titled ‘ChatGPT User Experience: Implications for Education’, our second researcher user experience paper, the author aims to explore the yet unknown potential impacts of ChatGPT on education. Recognising the significant capacity of ChatGPT, the study acknowledges

the potential to bring about substantial changes in educational learning goals, learning activities and assessment and evaluation practices. Zhai conducted a study involving the use of ChatGPT to draft an academic paper titled ‘Artificial Intelligence for Education’, noting that this particular task was selected due to its highly intellectual nature, typically performed by professionals. According to Zhai, the objective of piloting ChatGPT in this manner was to assess its ability to generate accurate, organised, coherent and insightful writing. Zhai reports that the text in the paper was directly generated by ChatGPT, with the author's contribution limited to adding subtitles and making minor adjustments for logical organisation. To conduct the pilot with ChatGPT, Zhai utilised a predefined set of queries to compose the paper, developed through interactive trials and engagements with ChatGPT. Initially, Zhai prompted ChatGPT to generate the introduction for a scholarly paper focusing on the utilisation of AI in education; as a response, ChatGPT introduced the background information on AI for Education and narrowed down the paper's scope. Based on this scope, Zhai identified the structure of the paper, which encompassed two main sections: the potential and challenges of AI for Education, as well as future research directions. To delve into the potential section, Zhai reports querying ChatGPT about the history of AI for Education, noting that in response, ChatGPT provided three paragraphs that chronologically detailed the history of AI in education, starting from the 1960s up to the present day. The author reports that this description was comprehensive, including relevant examples and notable milestones in the development of AI for Education. The author also reports that within the aforementioned writing, ChatGPT provided detailed descriptions of three specific applications of AI in education: personalised learning, automating administrative tasks and tutoring and mentorship. In order to delve deeper into these applications, Zhai posed separate queries regarding the use cases for each application. As a result, each query yielded a comprehensive definition of the application, a list of typical uses and a concise summary; for instance, when inquiring about personalised learning, ChatGPT offered Zhai a definition along with a comprehensive list of use cases as an illustrative example. To delve even deeper into the use cases, Zhai conducted additional queries on the history and potential of each aspect of personalised learning. This investigation led to the identification of four specific uses: adaptive learning, personalised recommendation, individualised instruction and early identification of

learning needs. Zhai reports that for each of these use cases, the results provided by ChatGPT encompassed the definition, historical background, evidence of potential and a concise summary. Zhai also conducted queries on automating administrative tasks in education, after which ChatGPT provided the definition, description, five use cases and a summary. From this, Zhai proceeded to query the history and potential of the five use cases associated with automating administrative tasks in education, stating that the results yielded a comprehensive description of the following: enrolment and registration, student record management, grading and assessment, course scheduling and financial aid. For the second aspect of the study, Zhai explored the challenges associated with implementing AI in the classroom. Through queries posed to ChatGPT, the author obtained a direct list of challenges, which encompassed ethical concerns, technological limitations, teacher buy-in, student engagement and integration with existing systems. Seeking a deeper understanding of these challenges, Zhai proceeded to query each specific challenge and potential solutions associated with them. In the third part of the study, Zhai explored the future prospects of AI in education. Through queries directed at ChatGPT, the author obtained five potential developments. These included the increased utilisation of AI for personalised learning, the development of AI-powered educational games and simulations, the expanded use of AI for tutoring and mentorship, the automation of administrative tasks through AI and the creation of AI-powered education platforms. In the final stage, Zhai requested ChatGPT compose the conclusion of an academic paper that discussed the role of AI in driving innovation and improvement in education. The author reports that the conclusion began by reiterating the potential of AI in transforming education positively and that, additionally, it emphasised the need to acknowledge and address the limitations of AI, highlighting ethical, technological and other challenges associated with its implementation in education. Zhai reports that the conclusion urged the implementation of appropriate measures to ensure the ethical and effective use of AI in the education system.

Zhai (2022) describes the findings as follows. During the piloting process, the author followed the scope suggested by ChatGPT and used subsequent queries to delve deeper into the study. Zhai notes that the entire process, including generating and testing queries, adding subtitles, reviewing and organising the content, was completed within 2–3 hours with

minimal human intervention. Zhai also observes that the writing generated by ChatGPT exhibited four key characteristics: coherence, partial accuracy, informativeness and systematicity. Furthermore, for each query, Zhai reports that the responses encompassed essential information and maintained a smooth flow between paragraphs. By changing the topic while addressing the same aspects, Zhai found that the responses followed an identical format: ChatGPT would introduce the topic, provide a brief historical overview, present evidence of potentials and limitations and conclude with a summary of the topic. Zhai also reports that, interestingly, even with slight variations in wording, ChatGPT consistently produced the same results, believing this indicates its ability to address queries expressed in different forms. Through this process, Zhai acknowledges that ChatGPT demonstrates a remarkable capacity to organise and compose components of articles effectively.

Zhai's (2022) study provides valuable insights into the use of ChatGPT in education. Firstly, Zhai suggests that educators should reassess literacy requirements in education based on ChatGPT's capabilities. The study acknowledges the efficient information processing capabilities of computers and the impressive writing proficiency of AI, surpassing that of the average student. Zhai believes this finding prompts the consideration of whether students should develop the ability to effectively utilise AI language tools as part of future educational goals. Zhai argues that education should prioritise enhancing students' creativity and critical thinking rather than focusing solely on general skills. To achieve this, the study advocates for further research to understand which aspects of human intelligence can be effectively substituted by AI and which aspects remain uniquely human. Secondly, Zhai emphasises the importance of integrating AI, such as ChatGPT, into subject-based learning tasks. The study points out that AI's problem-solving abilities closely mirror how humans approach real-world challenges. Zhai posits that, as AI, including ChatGPT, continues to advance towards AGI, educators are presented with an opportunity to design learning tasks that incorporate AI, thereby fostering student engagement and enhancing the overall learning experience and that this integration of AI into domain-specific learning tasks aligns with the way contemporary scientific endeavours increasingly rely on AI for prediction, classification and inference to solve complex problems. Thirdly, Zhai addresses the potential impact of ChatGPT on assessment and evaluation in

education. The study highlights traditional assessment practices, such as essay writing, and raises concerns about students potentially outsourcing their writing tasks to AI. As AI demonstrates proficiency in generating written content, Zhai argues that assessment practices should adapt their goals to focus on areas that cannot be easily replicated by AI, such as critical thinking and creativity. This shift in assessment practices aligns with the evolving needs of society and the corresponding shifts in educational learning objectives. To effectively measure creativity and critical thinking, Zhai suggests educators explore innovative assessment formats that are beyond AI's capabilities. In conclusion, Zhai's study underscores the transformative potential of ChatGPT in education and calls for timely adjustments to educational learning goals, learning activities and assessment practices. By recognising the strengths and limitations of AI technologies like ChatGPT, educators can better prepare students to navigate a future where AI plays an increasingly vital role. As AI reshapes the field of education, it is essential to consider its integration thoughtfully and ensure that the emphasis remains on cultivating skills that remain uniquely human while harnessing the capabilities of AI to enhance the learning process.

Zhai (2022) explores ChatGPT's impact on education, focusing on learning goals, activities and assessments. Using a pilot study, ChatGPT efficiently drafted an academic paper with minimal human intervention, showcasing its potential in generating scholarly content. While innovative, the study's small sample size and limited scope may restrict its generalisability. Additionally, ChatGPT's lack of deeper understanding and biases in predefined queries may affect its applicability in certain educational tasks. We believe further research, with a mixed-methods approach and larger samples, is needed to fully understand AI's role in education and its long-term implications on pedagogy and learning experiences. Nonetheless, Zhai's study sets the stage for future investigations into AI's impact on education.

Zhai's (2022) study offers crucial implications for our research.

- *Rethinking Learning Goals*
  Zhai's findings indicate that AI, like ChatGPT, has efficient information processing capabilities and impressive writing proficiency. As we investigate the role of ChatGPT in education, it becomes essential to

reassess traditional learning goals. Integrating AI language tools into educational objectives may prompt a shift towards prioritising the development of students' creativity and critical thinking, which are areas where AI might not fully replace human intelligence. This is something we aim to investigate.

- *Innovating Learning Activities*
  The study emphasises the significance of incorporating AI, such as ChatGPT, into subject-based learning tasks. As AI's problem-solving capabilities mirror human approaches, it presents an opportunity for educators to design engaging learning activities. This integration aligns with the increasing use of AI in real-world problem-solving and scientific endeavours. This is a subject we intend to explore.
- *Transforming Assessment Practices*
  Zhai's study raises awareness of potential challenges, such as students outsourcing writing tasks to AI. To address this, we may need to rethink assessment practices. Focusing assessments on areas where AI cannot replicate human abilities, such as critical thinking and creativity, can ensure that educational evaluations remain relevant and meaningful. We intend to look into this further.
- *Considering Limitations and Ethical Implications*
  While ChatGPT demonstrates remarkable capabilities, the study acknowledges its limitations, including the lack of deeper understanding and potential biases in predefined queries. As we examine the role of ChatGPT in education, we believe it is essential to consider these challenges and potential ethical implications.

In conclusion, Zhai's study urges educators and institutions to approach the integration of AI language tools like ChatGPT thoughtfully. By considering the implications outlined in the study, we believe our research can contribute to a responsible and effective adoption of AI in education while preserving the unique strengths of human intelligence and creativity in the learning process.

Identifying Themes, Methodologies and Gaps in the Literature

The nine studies in the literature review delved into the implications of integrating ChatGPT in education. Some studies emphasised the need to address potential biases and data privacy concerns, while others explored the potential impact on teaching practices and student productivity. The literature also discussed the transformative potential of AI in education, calling for a re-evaluation of traditional learning goals and assessment practices. While the studies differed in methodologies and focus, they collectively provide guidance for educators and institutions on effectively integrating ChatGPT. However, certain limitations and gaps were evident. Some studies lacked comprehensive exploration or diverse samples, and there was a scarcity of case studies directly investigating ChatGPT's impact on education. The literature also lacked sufficient representation of student perspectives, and a deeper understanding of necessary adaptations in educational objectives and activities is needed. To address these gaps, our research project aims to fill the scarcity of case studies and actively include student perspectives through in-depth qualitative research. We seek to understand how ChatGPT is influencing students' learning experiences and instructors' teaching practices. Furthermore, we intend to explore necessary adaptations in educational objectives and activities to leverage the potential of AI chatbots effectively. By addressing these gaps, our research project will contribute valuable insights into the transformative role of AI chatbots in revolutionising teaching and learning practices, providing guidance for responsible AI use in educational settings.

Chapter 5

Research Methodology

Research Context

This research is conducted at MEF University, a non-profit, private, English-medium institution located in Istanbul, Turkey. Established in 2014, MEF University holds the distinction of being the world's first fully flipped university. Embracing a flipped, adaptive, digital and active learning approach, the university incorporates project-based and product-focused assessments instead of relying on final exams. Furthermore, digital platforms and adaptive learning technologies are seamlessly integrated into the programmes, while MOOCs are offered to facilitate self-directed learning opportunities. In addition, since 2021, a data science and artificial intelligence (AI) minor has been made available for students from all departments. Caroline Fell Kurban, the principal investigator and co-author of this book, plays a central role in leading the investigation. She balances dual responsibilities, serving as both the principal investigator for the project and the instructor in the in-class case study. To ensure comprehensive data analysis, interpretation phases and the formulation of theoretical and practical implementation suggestions, she received support from the MEF University Centre for Research and Best Practices in Learning and Teaching (CELT). As flipped learning is a fundamental aspect of MEF's educational approach and is specifically featured in this case study, we provide more information here.

Flipped learning is an instructional approach that reverses the traditional classroom model, allowing students to learn course concepts outside of class and use class time for active, practical application of the principles. In this approach, teachers become facilitators or coaches, guiding students through problems and projects while providing personalised support and feedback. The focus shifts from content delivery to creating a student-

centred learning experience. To ensure the effectiveness of a flipped learning course syllabus, it is crucial to anchor it on proven learning frameworks. These frameworks, rooted in learning theories, offer valuable insights into the cognitive processes essential for successful learning. They empower instructors to comprehend, analyse and anticipate the learning process, guiding them in making informed decisions for teaching and learning implementation. A pivotal aspect of designing a successful flipped learning syllabus is recognising the interconnectedness between curriculum, assessment and instruction. For learning to be impactful, these three components must align cohesively, with a focus on learning outcomes (Gollub et al., 2002). In flipped learning courses, this approach should permeate all three elements. To achieve this, MEF courses draw upon four well-established learning frameworks, which act as the foundation for each stage of the flipped learning syllabus design. *These frameworks include Understanding by Design (UbD), Bloom's Taxonomy, Assessment For, As, and Of Learning and Gagne's Nine Events of Instruction, collectively fostering cohesion between curriculum, assessment and instruction, and ultimately leading to effective learning.* We describe how we bring these theories together to plan for our flipped courses below.

At the heart of our flipped learning course design is Understanding by Design (UbD), a model originated by Jay McTighe and Grant Wiggins during the 1990s (Wiggins & McTighe, 1998). UbD presents a holistic strategy for shaping curriculum, assessment and instructional methods. This methodology revolves around two core principles: prioritising teaching and assessment for genuine understanding and learning transfer and structuring curriculum by first determining the intended outcomes. The UbD framework is anchored in seven guiding principles:

(1) Thoughtful curricular planning enhances the learning journey, and UbD provides a flexible structure to facilitate this without imposing rigid guidelines.
(2) UbD guides curriculum and instructional strategies towards cultivating profound comprehension and the practical application of knowledge.
(3) Genuine understanding emerges when students independently employ and expand their learning through authentic performance.
(4) Effective curriculum design adopts an inverse path, commencing with long-term desired outcomes and progressing through three stages –

Desired Results, Evidence and Learning Plan, which guards against potential pitfalls like excessive reliance on textbooks or prioritisation of activities over clear learning objectives.

(5) Educators assume the role of facilitators, favouring meaningful learning experiences over mere content delivery.

(6) Regular evaluations of curriculum units against design benchmarks enhance quality and encourage meaningful professional discourse.

(7) The UbD framework embodies a continuous enhancement approach, wherein student achievements and teaching efficacy steer ongoing improvements in both curriculum and instruction.

(Wiggins & McTighe, 1998).

UbD is a widely recognised framework for underpinning flipped courses (Şahin & Fell Kurban, 2019).

Instructors employing UbD in course curriculum development proceed through three distinct stages: Stage 1 – identify desired results (curriculum), Stage 2 – determine acceptable evidence (assessment) and Stage 3 – create the learning plans (instruction).

Stage 1

The initial phase of UbD centres on defining desired outcomes, encompassing several key elements. This process involves establishing clear objectives, designing enduring understandings, formulating essential questions and specifying what students should ultimately learn and achieve. Instructors should derive explicit goals from university programme standards, accreditation criteria and course purpose. These objectives then shape the creation of enduring understandings. An enduring understanding encapsulates a fundamental concept with lasting relevance beyond the immediate learning context. It is a profound notion that embodies essential principles within a subject. These understandings offer students deeper insights, fostering a comprehensive grasp of the subject beyond surface-level facts. Crafting a robust enduring understanding begins with identifying a pivotal concept then distilling it into a clear statement resonating with students. For instance, ‘Water cycles impact both Earth and

society' succinctly captures a significant idea in UbD. Essential questions follow, serving as UbD's cornerstone. Understanding their essence is crucial. These questions are open-ended, thought-provoking and engaging, promoting higher order thinking and transferable concepts. They necessitate reasoning, evidence and sometimes further inquiry. Notably, essential questions recur throughout the learning journey, pivotal for design and teaching. For example: How do water cycles affect ecosystems and natural processes? In what ways do human activities influence water cycles? Essential questions come in two types: overarching, which apply to multiple topics, and topical, which focus on specific subject matter (McTighe & Wiggins, 2013).

After establishing the course aim, enduring understanding and essential questions, the next step is to develop learning outcomes, i.e. what the students will know and be able to do by the end of the course. For this purpose, Bloom's taxonomy proves to be an effective framework (Bloom et al., 1956). This taxonomy classifies educational goals into different categories, with each category representing a higher level of cognitive functioning than the one below it. It follows a hierarchical structure where each lower category serves as a prerequisite for achieving the next higher level. The cognitive processes described within this framework represent the actions through which learners engage with and apply knowledge. Examples of some of these, adapted from Armstrong (n.d.), are as follows, going from higher to lower levels of cognition.

- *Create (produce new or original work)*
  Design, compose, create, combine, formulate, invent, substitute, compile, construct, develop, generalise, modify, organise, produce, role-play
- *Evaluate (justify a stand or decision)*
  Criticise, evaluate, appraise, judge, support, decide, recommend, summarise, assess, convince, defend, estimate, find errors, grade, measure, predict, rank
- *Analyse (make connections from ideas)*
  Analyse, compare, classify, contrast, distinguish, infer, separate, explain, categorise, connect, differentiate, divide, order, prioritise, subdivide, survey
- *Apply (use information in new situations)*

Solve, apply, illustrate, modify, use, calculate, change, demonstrate, discover, experiment, show, sketch, complete, construct, dramatise, interpret, produce

- *Understand (explain ideas or concepts)*
  Explain, describe, interpret, paraphrase, summarise, classify, compare, discuss, distinguish, extend, associate, contrast, convert, demonstrate
- *Remember (recall basic facts and concepts)*
  Define, identify, describe, label, list, name, state, match, recognise, select, examine, locate, memorise, quote, recall, reproduce, tabulate, tell, copy

Although we've provided the complete Bloom's taxonomy spectrum here, it's important to acknowledge that in specific learning situations, such as introductory courses, the priority might be understanding and applying existing knowledge, rather than generating novel content or solutions. In such cases, the inclusion of the 'Create' level of cognitive functioning in the learning outcomes might not be essential. The emphasis could instead be on remembering, understanding and applying the acquired information.

To align with Bloom's taxonomy, an additional knowledge taxonomy can be implemented, encompassing the domains of factual, conceptual, procedural and metacognitive knowledge (Armstrong, n.d.). Factual knowledge includes familiarity with terminology, specific details and elements within a subject area. Conceptual knowledge pertains to familiarity with classifications, categories, principles, generalisations and a grasp of theories, models and structures. Procedural knowledge encompasses mastery of subject-specific skills, algorithms, techniques, methods and the ability to determine appropriate procedures. Metacognitive knowledge involves strategic and contextual understanding of cognitive tasks, including self-awareness and conditional knowledge. From this, course learning outcomes can be formulated by identifying action verbs from Bloom's taxonomy.

Stage 2

Once the course aim, enduring understanding, essential questions and learning outcomes have been established, the instructor proceeds to Stage 2:

determining acceptable evidence (assessment). At this stage, instructors should ask some key questions including: How will we know if students have achieved the desired results? What will we accept as evidence of student understanding and their ability to use (transfer) their learning in new situations? and How will we evaluate student performance in fair and consistent ways? (Wiggins & McTighe, 1998). To answer these questions, UbD encourages instructors to think like assessors before developing units and lessons. The assessment evidence should match the desired outcomes identified in Stage 1. So, it is therefore important for instructors to think ahead about the evidence needed to show that students have achieved the goals. This approach helps to focus the instruction. In Stage 2, there are two main types of assessment – performance tasks and other evidence. Performance tasks ask students to use what they have learnt in new and real situations to see if they really understand and can use their learning. These tasks are not for everyday lessons; they are like final assessments for a unit or a course. Everyday classes teach the knowledge and skills needed for the final performance tasks. Alongside performance tasks, Stage 2 includes other evidence like quizzes, tests, observations and work samples to find out what students know and can do. However, before we move on to discuss how we can design the performance task and other types of evidence, first let's take a look at our third learning framework, Assessment For Learning (AfL), Assessment As Learning (AaL) and Assessment Of Learning (AoL) framework (*Rethinking Classroom Assessment with Purpose in Mind: Assessment for Learning; Assessment as Learning; Assessment of Learning*, 2006).

The AfL, AaL and AoL framework serves as a valuable tool for developing these assessments, as it emphasises how different aspects of the learning process have distinct roles in enhancing students' understanding and performance. AoL, often referred to as summative assessment, is what most people commonly associate with testing and grading. This involves assessing students' knowledge and skills at the end of a learning period to determine their level of achievement. AoL aims to measure how well students have met the learning outcomes and to assign grades or scores. While the primary purpose of AoL is to provide a summary judgement of student performance, it can also offer insights into the effectiveness of instructional methods and curriculum design. AoL forms the foundation of the end-of-course performance task. However, it is also supported by AfL

and AaL. AfL, also known as formative assessment, focuses on using assessment as a tool to support and enhance the learning process. The primary purpose of AfL is to provide timely feedback to both students and educators. This feedback helps students understand their strengths and areas that need improvement, allowing them to adjust their learning strategies accordingly. Teachers can use the insights from formative assessments to tailor their instruction, addressing students' needs more effectively. AfL promotes a learner-centred approach, where assessment is seen as a means to guide and enhance learning rather than merely to measure it. Therefore, AfL should be incorporated throughout the semester to support the students to achieve the learning outcomes in the end-of-course performance task. However, AaL should also play an important part in this process. AaL is about promoting a metacognitive approach to learning. Here, assessment is viewed as an opportunity for students to actively engage with the material and reflect on their learning process. Students take on a more active role by monitoring their own learning, setting goals and evaluating their progress. AaL encourages students to develop self-regulation skills and become independent learners. This approach shifts the focus from external evaluations to internal self-assessment and personal growth. Therefore, AaL should also be incorporated throughout the semester to support students towards evaluating their learning and setting their goals for the end-of-course performance task. Thus, these three types of assessment are not mutually exclusive; rather, they complement each other within the broader framework of educational assessment.

To design the end-of-course performance task, following UbD, it is recommended that instructors follow the Goal, Role, Audience, Situation, Performance/Product and Standards for assessment (GRASPS mnemonic), as this ensures an authentic context that equips students with essential skills for their future careers. Following Wiggins and McTighe (1998), GRASPS works as follows:

- Goal – What task do I want the students to achieve?
- Role – What is the student's role in the task?
- Audience – Who is the student's target audience?
- Situation – What is the context? The challenge?
- Performance – What will students create/develop?
- Standards – On what criteria will they be judged?

After devising the end-of-course task, it becomes crucial to establish precise assessment standards through a rubric aligned with the learning outcomes. These rubrics are invaluable aids benefiting both students and educators. They provide students with a clear grasp of project expectations right from the outset, and they provide instructors with a structured means to impartially evaluate work based on predefined criteria. Rubrics can also facilitate conversations about performance levels and can serve in self and peer assessment. By incorporating rubrics, instructors empower students and promote their active engagement in the learning journey. Furthermore, rubrics prove instrumental in assessing the resilience of an assessment task against AI influence, a topic explored further in Chapter 9, Educational Implications.

Once the end-of-course performance task has been designed, the instructor can proceed to develop assessments for various types of other evidence, such as quizzes (AfL), experiments (AfL) and reflections (AaL). These will support students in making progress towards the final performance task. In the context of the flipped learning approach, the pre-class phase plays an important role; therefore, we take a deeper look at this here. In flipped learning, students are required to engage with pre-class videos or study materials before attending the class session. To ensure the effectiveness of this approach, these pre-class materials should be accompanied by pre-class quizzes or other graded activities. This serves the dual purpose of holding students accountable for their learning and enabling instructors to assess their comprehension and preparedness. These assessment methods often involve quizzes (AfL), short questions (AfL) or introspective prompts that guide students in self-assessing their understanding (AaL). During the course, the instructor can use the data from these pre-class assessments to tailor their in-class activities, discussions and examples to effectively address specific gaps in learning. This brings us to Stage 3.

Stage 3

Stage 3 of UbD involves planning learning experiences and instruction that align with the goals established in Stage 1. This stage is guided by the following key questions that shape the instructional process: How will we

support learners as they come to understand important ideas and processes? How will we prepare them to autonomously transfer their learning? What enabling knowledge and skills will students need to perform effectively and achieve desired results? What activities, sequence and resources are best suited to accomplish our goals? (Wiggins & McTighe, 1998). According to Wiggins and McTighe, during this stage, instructors need to go beyond mere content delivery and consider the holistic learning experience. They note that traditionally, teaching has often focused on conveying information and demonstrating basic skills for acquisition, neglecting deeper understanding and real-world application. However, they point out that genuine understanding requires active engagement, including inference and generalisation, to avoid surface-level comprehension, which they believe involves applying knowledge to new contexts and receiving constructive feedback for improvement. They suggest that taking this approach transforms educators into facilitators of meaning-making and mentors who guide effective content utilisation rather than mere presenters. It is at this stage that all the required elements are structured into comprehensive units to facilitate learning.

Following our flipped learning approach, within each unit, we draw on Gagne's Nine Events of Instruction to ensure effective learning. Robert Gagne's Nine Events of Instruction offers a robust framework for structuring instructional activities. The model is based on the information processing model of mental events that occur during learning when individuals are exposed to different stimuli (*Gagne's 9 Events of Instruction*, 2016). From this model, Gagne derived nine events of instruction, which provide a valuable structure for designing instructional activities. These are as follows:

(1) gain attention,
(2) inform learners of objectives,
(3) stimulate recall of prior learning,
(4) present the content,
(5) provide ‘learning guidance’,
(6) elicit performance (practice),
(7) provide feedback,
(8) assess performance,
(9) enhance retention and transfer to the job.

However, for flipped learning to be effective, we believe the sequence of these events needs to be rearranged in the following ways:

- *Pre-class/Online*

  – Unit overview;
  – Introduction to key terms;
  – Prior knowledge activity;
  – Introduction to concepts (via video, article);
  – Hold students accountable for their learning (formative assessment).

- *In Class*

  – Start-of-class/bridging activity to review the pre-class concept;
  – Structured student-centred activities to practise the concept;
  – Semi-structured student-centred activities to practise the concept;
  – Freer student-centred activities to practise the concept;
  – Self-reflection (at the end of a lesson or unit, either in class or out of class).

In conclusion, these four frameworks serve as the recommended foundation for MEF's flipped courses, emphasising andragogical principles. Together, they assist instructors in formulating course aims, enduring understandings, essential questions and learning outcomes. This comprehensive approach further facilitates the creation of authentic assessments, which then guides the development of suitable instructional strategies and activities. By aligning curriculum, assessment and instruction, this framework ensures a cohesive and effective teaching and learning experience.

Research Approach

This research centres on an investigation of the impact of ChatGPT on students and instructors in higher education. Our primary objectives are to explore, understand and assess how this AI chatbot may influence the roles of students and instructors within an academic setting. By delving into the implementation of ChatGPT, we aim to uncover potential challenges and

opportunities that may arise, providing valuable insights into its transformative role in the educational landscape. Ultimately, our goal is to comprehensively examine how the integration of ChatGPT specifically affects the roles of students, instructors and higher education institutions. As such, similar to Rudolph et al. (2023), we categorise our areas of research into student-facing, teacher-facing and system-facing. However, we introduce another category, 'researcher-facing', as it provides an additional metacognitive perspective on how ChatGPT influenced the research process which, ultimately, will also affect institutions of higher education.

On planning our research approach, we decided a qualitative research paradigm would be the most suitable, as it is an exploratory approach which aims to understand the subjective experiences of individuals (not just the technology) and the meanings they attach to those experiences. This approach is particularly useful when investigating new phenomena, such as ChatGPT, where there is limited knowledge and experience. Using such an approach enables us to gain a deeper understanding of the impact of ChatGPT on the role of students, instructors and our institution as a whole and to explore the subjective experiences and perspectives of those involved. Within this paradigm, a case study approach seemed most appropriate. Case studies involve conducting a thorough investigation of a real-life system over time, using multiple sources of information to produce a comprehensive case description, from which key themes can be identified (Cresswell & Poth, 2016). This approach, commonly employed in the field of education, entails gathering and analysing data from diverse sources like interviews, observations, documents and artefacts to gain valuable insights into the case and its surrounding context. Case studies are a useful approach when a case can be considered unique and intrinsic (Yin, 2011).

Our case is both unique and intrinsic, as it involves looking at the potential effect of ChatGPT on various stakeholders at our university, something that, at the time of writing, had not been studied extensively before. Due to this, we decided to employ Yin's (1984) methodology, which uses an instrumental case study research design proposed by Stake (1995). Yin's design follows five phases of analysis: compiling, disassembling, reassembling, interpreting and concluding. It is particularly useful for understanding a phenomenon within a specific context, as is the case with ChatGPT and its potential impact on various stakeholders in education. It

also takes into consideration the historical background, present circumstances and potential future developments of the case. In such a case, data can be gathered via interviews, focus groups, observations, emails, reflections, projects, critical incidents and researcher diaries, after which, following Braun and Clarke (2006) a thematic analysis can be conducted.

Data Collection

This study took place from December 2022 to August 2023, starting with the release of ChatGPT-3.5 on 30 November 2022. We used the free version of ChatGPT-3.5 for data collection, publicly available since November 2023, to ensure fair participation of students without requiring them to purchase a paid version. However, it should be noted that the training data in ChatGPT-3.5 only extend up to September 2021. During the write-up phase, GPT-4 was used. As discussed previously, the literature review focused on papers published between December 2022 and early April 2023 to ensure current resources. However, considering ChatGPT's ever-evolving nature, we continued to collect extant literature from media sources throughout the study until the final write-up.

Adopting a case study approach, our research aims to collect diverse and comprehensive data. In line with Yin's (1994) case study protocol, we identified six specific types of data we would gather, including documentation, archival records, reflections, direct observation, participant observation and physical artefacts. To collect data for this study, relevant documents such as reports, policies and news articles on ChatGPT in education were continuously gathered from internet searches throughout the investigation. The objective was to gain comprehensive insights and perspectives on the integration of ChatGPT in education. The collected data formed the basis for Chapter 2 in this book. The principal investigator made sure to maintain reflexivity throughout, considering her positionality and biases and sought diverse perspectives from various sources to enhance data validity and reliability. This approach ensures a well-rounded study.

The researcher-facing aspect of this study involved the principal investigator documenting the impact of ChatGPT on the research process. A comparative approach was taken, analysing how research stages were conducted in previous projects, before ChatGPT's availability, and how they

could be approached since the availability of ChatGPT. This meta-perspective allowed for reflection on the research process, providing insights into the researcher's perspective. The data collection for this aspect took place from December 2022 to June 2023, using a research diary digitally maintained in Google Sheets following Patton's (2002) guidelines. The diary tracked insights, challenges and adjustments made while incorporating ChatGPT into the research, enhancing self-awareness and understanding of research practices with AI technologies. Researcher-facing data are referenced as RFD in Chapter 6, Findings and Interpretations.

The teacher-facing part of this study aims to investigate the impact of ChatGPT on the instructor's role, in which the principal investigator, in the role of instructor, conducted a comparative analysis between a previous course (before ChatGPT) and an upcoming course in the spring semester of 2023. The course in question was HUM 312 Forensic Linguistics, which follows MEF University's flipped learning approach. Throughout January and February 2023, the instructor actively evaluated and adjusted the course design to incorporate ChatGPT effectively. This involved analysing the syllabus, course overview, assessments and rubrics, and in-class activities to identify suitable opportunities for ChatGPT integration. To record these procedures and contemplations, the instructor utilised a Teacher's Research Diary (TFD) in Google Sheets, showcasing reflexivity through self-examination, noting choices and critically evaluating both past and revised course materials. Observations were conducted while the course unfolded in the spring 2023 semester. During this period, the instructor engaged in rigorous self-reflection, contributing significantly to the data collection process. This approach helped address possible biases and assumptions, ensuring valuable insights from student feedback.

The student-facing aspect of the research took place within the new HUM 312 Forensic Linguistics course. The course was conducted online whereby pre-class activities were made available on the university learning management system prior to class, and weekly classes took place via Zoom where hands-on, interactive learning were employed. The course was a 16-week course, with one 2-hour lesson per week. The course had first run in the spring semester of 2020, when it moved from face-to-face to online due to the COVID pandemic, and has run every year since, continuing in its online format. The new iteration of the course ran in spring 2023 with a

cohort of 12 students. An overview of the new iteration of the course is provided below.

- *Course Aim*
  The overall educational aim of this course is for students to investigate the role linguistic analysis plays in the legal process. It focuses on the increasing use of linguists as expert witnesses where linguistic analysis is presented as evidence.
- *Course Description*
  This course aims to provide students with an understanding of forensic linguistics, focusing on the role of linguistic analysis in the legal process. Forensic linguistics involves a careful and systematic examination of language, serving justice and aiding in the evaluation of guilt and innocence in criminal cases. The field is divided into two major areas: written language, which analyses various texts like police interviews, criminal messages and social media posts, and spoken language, which examines language used during official interviews and crimes. Through a case-based approach, the course explores how crimes have been solved using different linguistic elements, such as emojis, text message abbreviations, regional accents and dialects, handwriting analysis and linguistic mannerisms, among others.
- *Enduring Understanding*
  Forensic Linguistics aids justice by analysing language to uncover truth in criminal cases.
- *Essential Questions*
  Overarching Essential Questions

  – How does linguistic analysis contribute to legal case analysis in forensic linguistics?
  – How is the emergence of AI reshaping the legal field?

  Topical Essential Questions

  – In what ways do communication methods such as emojis, text messages and punctuation impact understanding in forensic linguistics cases?
  – What ethical and legal aspects surround mandating preferred transgender pronouns, and how does this relate to freedom of speech

and discrimination concerns?
  - How can slang, regional dialects, linguistic mannerisms and handwriting be utilised to identify a potential suspect in forensic linguistic investigations?
  - How can the analysis of acoustic phonetics in speech help identify whether someone is intoxicated or sober?
  - In the realm of forensic linguistics, how does the study of pragmatics present challenges in accurately interpreting an individual's intended meaning during communication?
- *Learning Outcomes*

  - Analyse how language affects legal decisions.
  - Deconstruct aspects of language from lawsuits and manipulate language from the suits from one form to another.
  - Analyse how language was used in real-life cases to convict or acquit a defendant.
  - Compose a mock closing argument on a specific aspect of language in a real-life case and justify your argument.
- *Assessment*

  - pre-class quizzes (20%),
  - in-class assessed activities (40%),
  - Semester Project 1 (20%).
  - You will take on the role of either the defence or prosecution, with the goal of getting the defendant acquitted or convicted in one of the cases. Your audience will be the judge and jury. The situation entails making a closing argument at the end of a trial. As the product/performance, you are required to create a closing argument presented both in writing and as a recorded speech. The standards for assessment include: providing a review of the case, a review of the evidence, stories and analogies, arguments to get the jury on your client's side, arguments attacking the opposition's position, concluding comments to summarise your argument and visual evidence from the case.
  - Semester Project 2 (20%)
  - You will develop your own individual projects related to an aspect of forensic linguistics and ChatGPT or the law and ChatGPT. You will also develop your own rubric for evaluation. You will present your

project to an audience of peers and professors in the final lesson and answer any questions posed to you.

The selection of this course for investigation was driven by several factors. Firstly, the principal investigator was the instructor for this course and had expertise in exploring educational technologies. Additionally, she had previously investigated and been involved in the design of the Flipped, Adaptive, Digital and Active Learning (FADAL) approach, making her well-suited for this investigation. The instructor's deep understanding of the course, its planning processes and her ability to teach it again in the upcoming semester provided an ideal opportunity to compare pre- and post-ChatGPT course planning. Moreover, the linguistic components of the Forensic Linguistics course made it suitable for testing ChatGPT's capabilities across various linguistic aspects. The students enrolled were from the Faculty of Law, a field expected to be heavily impacted by AI advancements, making their involvement in the investigation valuable for raising awareness about AI's impact on the legal profession. Data collection occurred between March and June 2023, aligning with the spring semester. To investigate the effects on students, a diverse set of data was gathered. This started with a survey administered at the beginning of the course to assess students' existing familiarity and usage of ChatGPT. In the second lesson, students were presented with a video that introduced them to ChatGPT, followed by open-ended questions to capture their impressions. Pre-class questions were employed throughout the course to find out about the specific interactions students had with ChatGPT and how these interactions had influenced their learning experiences. A reflective questionnaire was conducted at the end of the course to gain more information about the students' insights, impressions and perspectives of their experiences with ChatGPT throughout the course. Furthermore, complementary data sources were incorporated into the study. Padlets, screenshots and students' reflections were gathered to provide a more comprehensive perspective on the student experience. To further enrich the analysis, students granted permission for their projects to be included in the data assessment. The student-facing data are referred to as SFD.

The focus of the system-facing aspect of this study was to examine the implications of ChatGPT from the viewpoints of different stakeholders at the university, including instructors, department heads, deans and vice-

rectors. Peripheral participants, including visiting teachers at workshops and discussions with professors from different institutions and educational leaders at conferences, provided additional insights. The data collection period for this aspect was from January to June 2023. Various methods were used for data collection. Email communications from university stakeholders were collected, providing valuable insights into discussions surrounding ChatGPT's impact on the university. Zoom recordings and workshop activities were collected from institutional workshops about ChatGPT to understand the institutional response. Interviews with instructors and stakeholders were conducted via Zoom or Google Chats. Critical incidents arising from conversations and conferences were recorded in a system-facing diary, helping to identify patterns, themes, challenges and opportunities related to ChatGPT's integration in education. This served as a valuable tool for documenting and reflecting upon insights and challenges. Information recorded in this diary was member-checked, wherever possible, with those involved to verify accuracy and validity of data and ensure perspectives were accurately represented. System-facing data are referred to as SYFD.

Data Analysis Methods and Techniques

To analyse our data, we followed Braun and Clarke's (2006) thematic analysis approach, which involves systematically coding and categorising the data to identify patterns or themes. It involves six phases: familiarisation with the data, coding, searching for themes, reviewing themes, defining and naming themes and writing up. While there are six phases to this process, following Braun and Clarke's advice, we viewed each phase as iterative, not linear, requiring us to revisit previous phases as needed. In order to ensure the credibility and dependability of the study, following Thurmond (2001), we employed data triangulation using multiple data collection tools to achieve a comprehensive and in-depth understanding.

We began by immersing ourselves in the dataset, engaging in repeated reading and noting initial observations to gain familiarity. Subsequently, we developed codes to capture significant features that were relevant to our research questions. This process encompassed both data reduction and

analysis, aiming to comprehensively capture the semantic and conceptual meaning embedded in the data. Initially, the principal investigator undertook the task of creating the codes, carefully reviewing the data and establishing preliminary coding categories. Following this, a collaborative approach was adopted, involving members of the MEF Centre for Research and Best Practices in Learning and Teaching (CELT). The codes were reviewed, critiqued and revised as necessary, ensuring a comprehensive and accurate representation of the data. Through this iterative process, we arrived at our final set of codes and definitions, as shown below:

- Ability to translate
  ChatGPT has the ability to translate text from one language to another.
- ChatGPT demonstrates competency in completing assigned student tasks.
  ChatGPT exhibits proficiency in successfully accomplishing tasks assigned to students.
- ChatGPT unable to perform assigned student tasks
  This indicates situations where ChatGPT is unable to successfully complete tasks or assignments given to students.
- Culturally specific database
  The information in ChatGPT's database is specific to a particular culture or cultural context, which may not be relevant to the user's needs.
- Disciplinary context limitations
  ChatGPT demonstrates limitations in its understanding of specific disciplinary contexts or lacks specialised knowledge in a particular field.
- Enriches the user's ideas
  ChatGPT has the ability to enhance and expand the user's ideas through its generated responses.
- Gaps in knowledge
  ChatGPT demonstrates a lack of information or understanding on certain topics or areas.
- Gender bias in pronoun usage
  This refers to the tendency of ChatGPT to default to male pronouns unless prompted otherwise during interactions.
- Gives incorrect information
  ChatGPT provides inaccurate or incorrect information in its responses.
- Imparts specific knowledge, skills or concepts to users

ChatGPT provides users with specific information, skills or concepts through its responses.

- Inhibits user learning process
  This refers to the negative impact of ChatGPT, which can hinder or diminish users' ability to actively engage in the learning process and acquire knowledge independently.
- Input determines output quality.
  The quality of the output generated by ChatGPT is influenced by the quality of the input provided to it.
- Interactivity of communication
  This refers to the dynamic and responsive nature of the interaction between users and ChatGPT.
- Lack of standard referencing guide for ChatGPT
  This refers to the absence or inadequate guidelines for citing and referencing sources derived from ChatGPT in academic and research contexts.
- Lack of response relevance
  This refers to instances where the responses generated by ChatGPT are not pertinent or closely related to the input or query.
- Need for giving a clear context
  This highlights the importance of providing a clear and specific context when interacting with ChatGPT to ensure accurate and relevant responses.
- Need to fact-check
  This highlights the importance of verifying or confirming the information provided by ChatGPT through independent fact-checking.
- Occurrences of refusal or reprimand by ChatGPT
  This signifies instances where ChatGPT refuses to provide a response or issues reprimands to the user for certain inputs or queries.
- People perceive ChatGPT as providing opinions rather than predictions.
  This highlights the difference between instances where ChatGPT appears to provide personal opinions, while in reality, it generates responses based on predictive models.
- Perceived human-like interactions with ChatGPT
  This refers to the phenomenon where users perceive or experience ChatGPT as exhibiting human-like qualities in its interactions, despite its artificial nature.

- Reduces cognitive load
  ChatGPT can alleviate cognitive burden or mental effort by providing assistance or performing tasks on behalf of the user.
- Requires multiple iterations to get what you want
  Achieving the desired outcome or response from ChatGPT may require multiple interactions or iterations.
- Reviews work and gives suggestions for improvement
  ChatGPT can analyse and provide feedback on the work or content presented to it, offering suggestions for improvement.
- Speeds up the process
  ChatGPT can accelerate or expedite certain tasks or processes compared to traditional methods.
- Text register modification
  This refers to the capability of ChatGPT to adapt its writing style, tone or formality to match specific registers, including the ability to mimic the style of particular individuals.
- Unquestioning trust in information
  This refers to instances where users place complete trust in the information provided by ChatGPT without critical evaluation or scepticism, even when it is giving incorrect information.
- Useful in other areas of life
  ChatGPT can have practical applications and benefits beyond just educational use.

The process of refining codes into coherent themes involved several cycles of careful evaluation. We began by generating initial codes and then organising them into meaningful themes. Thorough exploration of various groupings and potential themes ensured their accuracy and validity. To validate these themes, we meticulously cross-referenced them with the coded data extracts and the entire dataset. Additional data, such as critical incidents observed during conferences and workshop discussions, posed a challenge as they emerged after we had established our codes and completed the thematic analysis. However, since these incidents contained relevant new data that could enrich our analysis, we revisited the coding and thematic analysis process three times to integrate these additional data. This iterative approach resulted in more robust codes and themes. Collaborative discussions further led to the formulation of concise and

informative names for each theme. Through this iterative approach, we attained data saturation, indicating that no further new information or themes were coming to light. The final themes that were collectively agreed upon and their respective codes are as follows:

- *Input Quality and Output Effectiveness*
  Need for giving a clear context, input determines output quality, requires multiple iterations to get what you want
- *Limitations and Challenges of ChatGPT*
  Lack of standard referencing guide for ChatGPT, gives incorrect information, lack of response relevance, occurrences of refusal or reprimand by ChatGPT, gender bias in pronoun usage, need to fact-check
- *Human-Like Interactions with ChatGPT*
  Interactivity of communication, perceived human-like interactions with ChatGPT, people perceive ChatGPT as providing opinions rather than predictions, unquestioning trust in information
- *Personal Aide/Tutor Role of ChatGPT*
  Enriches the user's ideas, speeds up the process, reduces cognitive load, useful in other areas of life, ability to translate, reviews work and gives suggestions for improvement, text register modification, imparts specific knowledge, skills, concepts to users
- *Impact on User Learning*
  ChatGPT demonstrates competency in completing assigned student tasks, inhibits user learning process, ChatGPT unable to perform assigned student tasks
- *Limitations of a Generalised Bot for Educational Context*
  Gaps in knowledge, disciplinary context limitations, culturally specific database

To facilitate the mapping and analysis of the themes, the researchers utilised a Google Sheet for each theme, incorporating the following sections: code, code definition, examples from the extant literature, examples from the literature review and supporting examples from the data. This comprehensive framework allowed for a systematic examination of each of the themes in relation to our research questions. From this, the following interconnectivity of the themes was derived (Fig. 1).

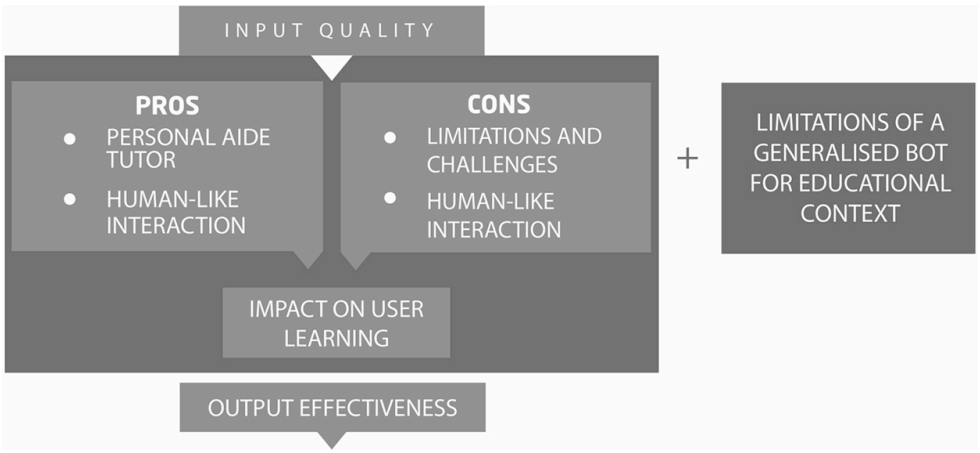


Fig. 1. Interconnectivity of Themes.

Throughout this study, obtaining informed consent from all participants, including interviewees, instructors, and students, was a top priority. Participants were fully informed about the research purpose, procedures, potential risks, and benefits, with the freedom to decline or withdraw without consequences. Our communication with participants remained transparent and clear, ensuring data privacy and confidentiality. Ethical review and approval were obtained from the university's ethics committee to comply with guidelines and protect participants' rights. To mitigate bias, the researcher remained mindful of personal biases during data collection and analysis. However, during the research process, an ethical issue emerged concerning consent related to the research diaries, which served as a hidden form of data collection. The researcher began to perceive every interaction and event as potential data, while participants may not have viewed them in the same light (Hammersley & Atkinson, 1995). This raised concerns about ensuring proper consent for the use of information gathered through such situations. As, on most occasions, the researcher did not recognise the relevance of these incidents to the investigation until after they occurred, this meant the researcher had not explicitly communicated to participants that the content of the interactions could be used in the research. Therefore, to protect the confidentiality of the individuals involved and respect their privacy, the researcher took measures to provide anonymity when referencing extracts from the research diaries in the writing.

In the next chapter, we present our findings and interpretations of the data, encompassing a thorough analysis and derivation of insights from our outcomes. This chapter systematically provides an overview of the collected data, aligning it with the extant literature and the literature review. Subsequently, we interpret these findings within the framework of our theoretical approach. Employing this information, we re-examine our research questions, specifically exploring the potential impacts of ChatGPT on students, instructors, and higher education institutions. Through this process, we convert our raw data into valuable insights, enriching our understanding of the subject.

Chapter 6

Findings and Interpretation

Input Quality and Output Effectiveness of ChatGPT

The theme of ‘Input Quality and Output Effectiveness’ underscores the crucial role of input in determining the quality and effectiveness of ChatGPT's output. Large language models like ChatGPT can generate human-like text, but their outputs may not always align with human values due to their focus on predicting the next word rather than understanding broader context. This misalignment can result in challenges related to reliability and trust, such as a lack of helpfulness when the model fails to accurately comprehend and execute specific user instructions. In order to overcome this, users need to provide ChatGPT with a clear context, quality input and undergo multiple iterations to get the desired output. This was seen in the following ways.

Need for Giving a Clear Context

According to the researcher (the principal investigator in her research role), ‘You have to input your own ideas, personal experiences, and reflections first in order for ChatGPT to come up with research questions relevant to your situation’ (RFD). The instructor (the principal investigator in her teaching role) noted that ‘ChatGPT helps write enduring understandings. These can be tricky to word. By getting it to define enduring understandings first and then telling it about your course, it can help with the wording’ (TFD). Similarly, when it comes to writing a course aim, the instructor highlighted the need to input clear information about students, department, and institution to receive accurate suggestions from ChatGPT (TFD). The instructor also emphasised the importance of providing a lot of specific

information about the course and students to obtain useful learning outcomes (TFD). Additionally, ChatGPT's ability to generate suggestions for lesson plans depended on knowing the context of the class (TFD). Furthermore, inputting the text or video text from the pre-class activity allowed ChatGPT to provide suggestions for pre-class quizzes, provided that the teacher specified the type of quiz questions they wanted (TFD).

The literature review supports the finding that providing a clear context is crucial when interacting with ChatGPT. Mhlanga (2023) highlights that ChatGPT, being a machine, lacks the ability to comprehend contextual factors such as culture, background and experiences in the same way as human educators. This aligns with the fact that ChatGPT's outputs may not align with human values because its focus is on predicting the next word rather than understanding the broader context. Similarly, Alshater (2022) observes that language models like ChatGPT can generate unrelated or generic responses due to their lack of contextual understanding. In addition, Sullivan et al.'s (2023) study highlighted the limitations of ChatGPT's contextual understanding, as evidenced by the generation of unrelated or generic responses.

Looking at the importance of giving a clear context through the lens of Christensen's Theory of Jobs to be Done highlights the importance of users understanding their specific needs and desired outcomes when hiring ChatGPT. Users must clearly articulate their requirements and objectives in order to effectively utilise ChatGPT's capabilities. This involves providing a clear and specific context for ChatGPT to generate accurate and relevant responses. Bourdieu's social theory sheds light on the power dynamics and social structures that influence the interaction with ChatGPT. It emphasises the need to consider linguistic norms, cultural capital and social dynamics that shape communication with the artificial intelligence (AI) system. Instructors must navigate these factors when engaging with ChatGPT to ensure meaningful and appropriate responses. Heidegger's Theory on Being highlights the distinction between ChatGPT's predictive nature and the broader contextual understanding of human educators. Users must recognise that ChatGPT's focus is on predicting the next word rather than comprehending the broader context.

Input Determines Output Quality

When students were asked to create a SWOT analysis regarding ChatGPT and the law, the quality of the response varied based on the quality of the input data. As observed by the instructor, ‘If they gave it good quality data, it created an effective chart; however, if they just asked it to do it for them, they did not end up with such a good result’ (TFD). This was also seen by a teacher in a workshop who commented, ‘When you give the right prompts, it gives you the lesson plan immediately. You don't really need to do anything’ (SYFD). ChatGPT also showcased its effectiveness in generating research ideas and suggesting methodologies and codes, contingent upon the user providing pertinent and precise information. According to the researcher, ‘ChatGPT was good for generating ideas for my research, but only if relevant and accurate information about the study was input first’ (RFD). The researcher also mentioned, ‘It was relatively easy for me to identify a research methodology based on previous experience and existing knowledge. However, asking ChatGPT for suggestions led to a broader array of suggestions that enriched my choice. But, this only works well if you have input your precise research problem and questions’ (RFD). Additionally, ChatGPT's capability to suggest codes from textual data was noted by the researcher, who stated, ‘ChatGPT can come up with suggested codes from textual data rather well, as long as the textual data is well-written in the first place’ (RFD). This sentiment was echoed by a teacher's remarks during a workshop, ‘The questions designed do not always meet the prompts or the specifications we provided if they are not mentioned precisely’ (SYFD). ChatGPT also proved useful for coming up with rubrics for evaluation, but again, this was dependent on the clarity of input given by the user. The instructor mentioned, ‘Once an assessment has been written, ChatGPT can easily come up with a suggested rubric for evaluation, but only if the assessment task is written precisely’ (TFD).

The need for quality input into ChatGPT was also supported by the literature. In their 2023 research, Firaina and Sulisworo emphasise the significance of selecting relevant commands to determine the usefulness of the obtained information. This aligns with our understanding that the quality of input plays a critical role in achieving desired outcomes when working with ChatGPT. Therefore, focusing on improving quality of input is crucial for obtaining optimal results and maximising the value derived from ChatGPT.

Requires Multiple Iterations to Get What You Want

Users often found it necessary to refine their prompts or requests for satisfactory results. The researcher shared their experience, stating, ‘I made several revisions with ChatGPT before achieving the desired outcome’ (RFD). Similarly, a student reflected on their use of ChatGPT, noting the need for multiple revisions when creating the closing argument for the Unabomber case (SFD). These instances demonstrate the iterative nature of the process, where multiple iterations and modifications were crucial to achieving the desired outcomes. The importance of refining prompts and engaging in multiple interactions is further highlighted by the researcher's comment: ‘If you are not happy with the wording, you can provide ChatGPT with prompts until it generates better-worded questions’ (RFD). Echoing this sentiment, a teacher in a workshop said, ‘It is important to review and regenerate responses until they align with your needs’ (SYFD). Additionally, the researcher mentioned how ChatGPT's capabilities can be leveraged in an iterative manner for refining codes and themes: ‘It can… group the codes and suggest themes. This can be done iteratively until you are happy with the outcome’ (RFD). These examples emphasise the iterative nature of working with ChatGPT, where multiple iterations, prompts and revisions are often necessary to fine-tune the generated output and meet the user's specific needs and expectations.

This finding is supported by Sullivan et al.’s (2023) study, which emphasised the value of the iterative refinement process in working with ChatGPT, underscoring the importance of developing information literacy skills to successfully engage with ChatGPT and other AI tools.

The iterative nature of engagement and the importance of context and interpretation align with Heidegger's concept of ‘being-in-the-world’. Achieving the desired outcome from ChatGPT may require multiple iterations and an ongoing process of refining our understanding of both the technology and our own existence. The existential engagement with ChatGPT involves adapting and refining our understanding to foster desired outcomes.

How ChatGPT May Affect the Roles of Stakeholders

From our analysis, we believe the role of the student will change in the following ways.

The student's role will involve providing clear and specific input to ChatGPT to ensure accurate and relevant responses. They will also need to understand the limitations of ChatGPT's output and critically evaluate its responses to ensure alignment with their own goals. Moreover, students will need to develop information literacy skills and engage in iterative refinement, continuously refining their input to optimise the effectiveness of ChatGPT's responses.

Regarding the role of the instructor, instructors can leverage ChatGPT to assist with tasks such as writing enduring understandings, course aims, learning outcomes, lesson plans and pre-class quizzes. However, the effectiveness of ChatGPT in these tasks will depend on the provision of specific information. Instructors will need to input clear details about the course, students and institution to receive accurate suggestions from ChatGPT. They will also need to consider the context of the class and provide relevant information for ChatGPT to generate valuable suggestions. Additionally, instructors will play a crucial role in guiding and refining the use of ChatGPT by students. They will need to ensure that students understand the importance of input quality and help them navigate the iterative nature of working with ChatGPT. Instructors will also contribute their expertise in evaluating and contextualising ChatGPT's output, bridging the gap between AI-generated responses and the creativity, originality and hands-on opportunities that human teachers bring to the educational experience.

Institutions of higher education will need to provide the necessary resources and support for instructors and students to effectively use ChatGPT. This may include offering training programmes on how to leverage ChatGPT in educational tasks and promoting information literacy skills development. Moreover, institutions must foster a culture of continuous learning and adaptation, encouraging instructors and students to embrace the iterative refinement process when working with ChatGPT. By recognising the multifaceted implications of AI in education, institutions can actively shape the integration of ChatGPT and other AI tools to align with their educational goals and values.

In summary, our analysis reveals key insights on ChatGPT's impact, emphasising the significance of clear input, iterative refinement, contextual awareness and user engagement. Ensuring high-quality input by training

both students and instructors to effectively use ChatGPT in academic endeavours will maximise its benefits in education.

Limitations and Challenges of ChatGPT

ChatGPT undoubtedly brings numerous benefits and opportunities to users in various domains. However, it is essential to recognise that ChatGPT is not without its limitations and challenges. In this theme, we investigate the potential shortcomings and difficulties that users may encounter when interacting with ChatGPT, shedding light on the critical areas where considerations are necessary.

Lack of Standard Referencing Guide for ChatGPT

Users in academic contexts may encounter a significant challenge due to the lack of a standard referencing guide for ChatGPT. This issue encompasses two crucial areas: the absence of references provided by ChatGPT for the sources it uses and the lack of established guidelines for users to reference ChatGPT-generated information. As we have discussed, the reliance of generative AI on data from undisclosed sources raises concerns regarding copyright infringement and fair compensation for creators. Altman's acknowledgement of these concerns without providing definitive answers suggests that ChatGPT may not adopt a referencing model for its sources. Consequently, users face the difficulty of determining the origins of ChatGPT's information and referencing it appropriately. Data examples highlight these challenges: ‘When we asked it, ChatGPT gave some suggestions for how we should reference it, but there is currently no standard referencing guide for using ChatGPT’ (TFD); ‘If the students are getting information directly from ChatGPT, they are unable to reference the source as we don't know where the data has come from’ (TFD); ‘ChatGPT hasn't done a very good job of what evidence to use and how’ (SFD); ‘The system told me that it cannot do the references itself and that I should look for expert opinions and academic papers on this subject. So therefore I checked what ChatGPT said through academic papers on the internet… I think it would be much better if the system itself indicated where it gets the information it uses’ (SFD). Furthermore, without clear guidelines and

standards in place, users face challenges in citing and referencing information derived from ChatGPT. The absence of a standard referencing guide raises concerns about the transparency and traceability of sources used in academic and research outputs incorporating ChatGPT-generated content.

To address this challenge, the instructor in this case study collaborated with Dr Thomas Menella, a senior research fellow for the Academy of Active Learning Arts and Sciences, to devise a referencing system for students for the spring 2023 semester. The students were instructed to quote all content from ChatGPT and provide in-text citations with chronological numbering, like 'Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua' (ChatGPT, 1). Failure to comply would be considered plagiarism. Additionally, they were required to create a separate 'ChatGPT Citations' page after the references section, including the date of ChatGPT content generation, corresponding prompts used and at least one source for fact-checking validation. The students were warned that ChatGPT-generated content couldn't be deemed accurate until verified, and they were accountable for thoroughly fact-checking the content they included in their assignments, regardless of authorship. So what was the feedback on this system? The instructor said, 'I asked my students to reference when they have used ChatGPT following the system Tom and I developed. However, it is not ideal, a better referencing system is required' (TFD). Additional comments were, 'I think the referencing system is not described well in the document. It should be more clear how I should do my referencing. I took most of my time since I didn't understand for a long time' (SFD); 'More guidance and examples on how to use it properly and consistently would help' (SFD); 'The document helped me, but it was very detailed and this caused confusion in my opinion, the document should be more general and details that cause confusion should be removed' (SFD); 'It was a bit difficult and complicated to reference ChatGPT. It can be made simpler' (SFD). In summary, the students requested clearer instructions, more guidance and a simpler approach to referencing to avoid confusion.

These challenges were also seen in the literature. Neumann et al. (2023) highlight that when integrating ChatGPT into higher education, particularly in scientific writing tasks, sections that involve existing knowledge can pose difficulties. This is because ChatGPT may generate text that references

non-existent literature or fails to provide accurate and reliable references. Rudolph et al. (2023) also raise this issue, pointing out that ChatGPT has a limitation in providing sources and quotations, which is essential for academic assignments. However, they note that there are promising developments to address this limitation, such as the prototype WebGPT, which is being developed with web browsing capabilities, allowing it to access recent information, verified sources and quotations. Additionally, they point out that AI research assistants like Elicit offer assistance in finding academic articles and providing summaries from a vast scholarly paper repository. They believe these advancements will enhance the quality and credibility of academic work by incorporating up-to-date information and reliable sources (Rudolph et al., 2023).

Through Christensen's lens, users in academic contexts are trying to ‘hire’ ChatGPT to fulfil the job of generating accurate and reliable information for their academic work. However, due to the lack of a standard referencing guide, ChatGPT may not be effectively fulfilling this job. Users encounter difficulties in determining the origins of ChatGPT's information and referencing it appropriately, hindering their ability to rely on ChatGPT as a trustworthy source. This unfulfilled job highlights the need for a solution that provides clear guidelines and standards for referencing ChatGPT-generated information, enabling users to confidently incorporate its content into their academic work. From a Bourdieusian perspective, the absence of a standard referencing guide for ChatGPT reflects the power dynamics and struggles over legitimacy in the academic field. The lack of clear guidelines puts users at a disadvantage, as they are unable to conform to the established norms of referencing and may face criticism for not adhering to the traditional referencing practices. This situation reinforces the dominant position of established sources and conventional referencing systems, which may hinder the recognition and acceptance of ChatGPT-generated information within academic discourse. ChatGPT relies on surveillance data from undisclosed sources, which raises concerns about copyright infringement and fair compensation for creators. The absence of clear guidelines for referencing ChatGPT-generated content further exacerbates the commodification of information and the devaluation of labour in the production of academic knowledge. Users are left grappling with the challenge of appropriately citing and referencing information derived from ChatGPT while the sources remain undisclosed and

uncompensated. From Heidegger's perspective, the lack of a standard referencing guide can be seen as a consequence of the instrumentalisation of technology in the academic context. The focus on efficiency and productivity in using ChatGPT as a tool for generating content overlooks the essential nature of referencing as a means of acknowledging the origins and authenticity of knowledge. The absence of clear guidelines reflects a reduction of referencing to a technical task, neglecting its ontological significance in preserving the integrity and transparency of academic work.

Gives Incorrect Information/Lack of Response Relevance

The extant literature highlighted that ChatGPT may generate inaccurate information, which is due to limitations in its capabilities and training techniques. Examples from the data illustrate this. ‘Sometimes ChatGPT cites sources that are not there’ (SFD); ‘What I have found is that it is really bad with giving credible sources. They are often non-existent’ (SFD); ‘When asked about transgender pronouns in Turkey, ChatGPT said that there was an issue with transgender pronouns in Turkey. However, this information was completely wrong. There is no gender in pronouns in Turkish’ (TFD); ‘At a conference, a professor from a university was giving a presentation about a new initiative that was about to be released in 2023. One of the participants on my table used ChatGPT to look up information about the university and the initiative and was incorrectly given information that the initiative started in 2019’ (SYFD). Other examples are as follows: ‘It made suggestions for future improvements and research directions, but I don't think it's relevant to my project because I don't think my project should mention future developments’ (SFD); as commented on by a teacher in a workshop, ‘What ChatGPT prepares might not be what you want or may not be relevant to your students' needs and interests’ (SYFD); ‘ChatGPT generated jokes, but the jokes weren't particularly funny or didn't seem to make much sense’ (SFD); ‘Sometimes it gives answers that are not quite related to the topic you are asking about’ (SFD).

The literature also supports these concerns. Instructors, as highlighted in Rudolph et al.’s 2023 paper, raised significant concerns about ChatGPT's limitations in understanding and evaluating the relevance or accuracy of the information it produces, saying that while ChatGPT can generate text that appears passable, it lacks a deep comprehension of the subject matter. In

addition, according to Tlili et al.'s (2023) study, participants generally found the dialogue quality and accuracy of information provided by ChatGPT to be satisfactory. However, they also acknowledged that ChatGPT is prone to occasional errors and limited information, noting that while responses from ChatGPT were generally considered reasonable and reliable, there were instances where misleading information was present alongside the answers.

Through Christensen's lens, users of ChatGPT are hiring it to provide accurate and reliable information. However, the examples from the data demonstrate that ChatGPT often fails to fulfil this job, as it generates inaccurate information or lacks relevance in its response. This misalignment between users' expectations and the actual performance of ChatGPT indicates a gap in fulfilling the job it is hired for. Bourdieu's sociological perspective emphasises the role of social structures and cultural capital in shaping individuals' actions and preferences. In the case of ChatGPT, instructors, as highlighted by Rudolph et al. (2023), express concerns about its limitations in understanding and evaluating information. These concerns are influenced by the instructors' position as experts in the educational field, where accuracy and relevance of information are highly valued cultural capital. The instructors' scepticism towards ChatGPT's ability to fulfil this role reflects their reliance on established knowledge and expertise, and it is this concern that is reflected in their evaluation of the technology. Through a Marxist lens, the limitations and inaccuracies in ChatGPT's performance may be attributed to the inherent contradictions and dynamics of capitalist production, where the pursuit of efficiency and profit often takes precedence over ensuring comprehensive and accurate information. The potential biases and shortcomings of ChatGPT may be seen as by-products of the capitalist system's influence on technological development. Through Heidegger's lens, ChatGPT's ability to generate text that appears passable but lacks deep comprehension of the subject matter raises existential concerns. Heidegger argues that technology can lead to a mode of being characterised by instrumental rationality, where human activities become reduced to mere means to an end. In the context of education, ChatGPT's limitations in grasping and assessing information raise questions about its impact on the genuine understanding and critical thinking skills of students. It highlights the need to reflect on the role of technology in shaping educational practices and the nature of knowledge acquisition.

Occurrences of Refusal or Reprimand by ChatGPT

Instances of refusal or reprimand by ChatGPT occur when the system declines to provide a response or admonishes the user for specific inputs or queries. This behaviour is likely a result of OpenAI's implementation of the Moderation API, the AI-based system aimed at detecting language violations and ensuring compliance with their content policy, which targets misogyny, racist remarks and false news. However, it is important to acknowledge that this system is not flawless. As mentioned in the extant literature, there have been instances where users have managed to bypass the moderation system, leading to the generation of inappropriate content by ChatGPT.

Notably, our data indicate that ChatGPT may have been overly reliant on the moderation system, resulting in instances of refusal or even what could be interpreted as reprimand. For example, one student reported, ‘ChatGPT does not use slang words and does not respond when asked questions using slang words’ (SFD). The instructor said, ‘We were inputting terms that were used by the Unabomber and that ultimately led to him being identified, so they were an important part of the case. However, ChatGPT refused to discuss some of the slang items as they were considered derogatory and it even reprimanded us for asking about these terms’ (TFD). Similarly, when asking about the suicide of Kurt Cobain and certain words in one of the notes, the instructor noted, ‘ChatGPT refused to discuss the topic, deeming it inappropriate, and it also refused to discuss some of the words, such as “bitch,” considering them derogatory language’ (TFD). Furthermore, students in the study discovered that ChatGPT does not use swear words (SFD). Interestingly, occurrences of refusal or reprimand did not come up in the literature.

Through Christensen's lens, users of ChatGPT expect it to provide accurate and reliable information. However, the instances of refusal or reprimand indicate a misalignment between users' expectations and the actual performance of ChatGPT. Users may have specific tasks or queries in mind that they want ChatGPT to fulfil, but the system's limitations and reliance on the moderation system can lead to frustrating experiences for users who are unable to get the desired responses. These instances of refusal or reprimand by ChatGPT may also be viewed through the lens of Bourdieu's cultural capital, where the system is programmed to avoid language violations and promote compliance with the content policy. The

instructors' experiences, where they were reprimanded for discussing certain topics or using specific language, reflect the clash between their expertise and established knowledge and the system's limitations in understanding the context and nuances of their queries. The pursuit of efficiency and profit may prioritise the moderation system's effectiveness in addressing language violations, but it may fall short in fully understanding and addressing the complexity of user queries and intentions. Taking a Heideggerian stance, ChatGPT's reliance on the moderation system and instances of refusal or reprimand raises existential concerns. Users may question the role of technology in shaping their interactions and limiting their freedom to engage in certain discussions or use specific language. It raises broader questions about the impact of AI systems like ChatGPT on genuine understanding, critical thinking skills and the nature of knowledge acquisition in educational settings.

Gender Bias in Pronoun Usage

ChatGPT tended to default to male pronouns unless specifically instructed otherwise. As seen in the extant literature, gender bias in AI systems, including ChatGPT, is a well-documented issue. This may be because the training data are predominantly created by men, which then introduces biases into the system that perpetuate stereotypes and reinforce power imbalances, resulting in allocative and representation harm. Examples of this were seen in our data: ‘When using ChatGPT to craft a letter including reference to the president and vice provost at George Washington university, ChatGPT defaulted to using male pronouns, even though one of the people I was referring to was female’ (SYFD); ‘When I asked ChatGPT to summarise a text about the researcher - in reference to myself, a female - it automatically defaulted to he/him’ (RFD).

This was also seen in the literature. Mhlanga (2023) drew attention to potential bias in ChatGPT arising from its training data and cautioned against AI algorithms exacerbating biases and discrimination, leading to the further marginalisation of under-represented groups. In line with promoting fairness and impartiality, Alshater (2022) emphasised the need to prioritise equitable treatment and avoid any form of discrimination when developing and utilising ChatGPT and similar technologies. He underscored the significance of acknowledging and addressing potential biases or

discriminatory consequences that may arise from these technologies. Additionally, Alshater drew attention to the training process of ChatGPT and similar technologies, specifically noting the potential biases or inaccuracies that can arise from extensive datasets.

Through Christensen's lens, the job that ChatGPT is being hired to do is the accurate and unbiased usage of pronouns in AI systems like ChatGPT. Customers expect these systems to understand and respect gender identities and use appropriate pronouns. The gender bias observed in ChatGPT's defaulting to male pronouns reflects a failure to adequately fulfil this job, as it overlooks the diverse gender identities and perpetuates stereotypes. Through the lens of Bourdieu, the training data of AI systems like ChatGPT, which is predominantly created by men, reflect the power dynamics and social structures that exist in society. This leads to the reproduction of biases and power imbalances, reinforcing the dominant social norms and marginalising under-represented groups. The gender bias in pronoun usage can be seen as a manifestation of the symbolic power wielded by certain groups in shaping AI systems and perpetuating unequal social relations. From a Marxist perspective, the issue of gender bias in pronoun usage can be understood as a reflection of the broader class struggle and exploitation within capitalist societies. The dominance of young white men in creating the training data for AI systems like ChatGPT is a result of the power dynamics and economic structures that prioritise certain groups over others. The gender bias in pronoun usage reinforces the existing power imbalances by marginalising and excluding under-represented groups, thereby perpetuating their subordination within the capitalist system. In the context of gender bias in pronoun usage, Heidegger's notion of technology as a mode of revealing can be applied. ChatGPT's defaulting to male pronouns reveals the underlying biases and assumptions embedded in its programming and training data. It highlights how technology can reinforce and perpetuate societal norms and power structures, limiting the possibilities for authentic and inclusive interactions. By recognising and addressing this bias, individuals and society can strive for a more open and inclusive understanding of gender and language.

Need to Fact-Check

The importance of fact-checking is highlighted by the following examples from the data: ‘To fact-check the information from ChatGPT, I did my own research and double-checked it. For instance, when ChatGPT mentioned the title of the Unabomber's manifesto as “Industrial Society and Its Future,” I made sure to check it myself before using it in my conclusion’ (SFD); ‘I think ChatGPT is useful for research, but you need to check the information against other sources to make sure it is giving the correct information’ (SFD); ‘I did the homework with ChatGPT but I checked the information it gave me with another source’ (SFD); ‘We can't rely on the accuracy of all the information it gives us. We need to check it by researching it ourselves’ (SFD); ‘ChatGPT was very poor at generating real and relevant literature… Therefore, always fact-check what it is saying’ (RFD); ‘I found it a useful starting point to get ChatGPT to generate ideas about gaps in the literature, but felt it was more accurate to rely on my own identification of gaps from reading all the papers’ (RFD). In addition, the instructor made the following observation: ‘Students used ChatGPT as a search engine to ask about the Unabomber case. However, we didn't know where any of the information came from. We thought there were two problems with this. The first is that if you use this information, you are not giving any credit to the original author. The second is that ChatGPT is a secondary source and should not be treated as a primary source, therefore we agreed that everything taken from ChatGPT should be fact-checked against a reliable source’ (TFD).

This was also seen in the literature. Mhlanga (2023) emphasised the importance of critically evaluating the information generated by ChatGPT and discerning between reliable and unreliable sources. In line with this, Firaina and Sulisworo (2023) recognised the benefits of using ChatGPT to enhance productivity and efficiency in learning, but they also emphasised the need to maintain a critical approach and verify the information obtained. They stressed the importance of fact-checking the information generated by ChatGPT to ensure its accuracy and reliability. Similarly, Alshater's (2022) research underscored the importance of fact-checking and verifying the information produced by these technologies.

Through Christensen's lens, we can observe that users hire ChatGPT for specific purposes such as generating information, assisting with research tasks and improving productivity and efficiency in learning. However, as we saw, due to limitations within the system, users also recognise the need for fact-checking as a crucial task when utilising ChatGPT. Fact-checking

allows users to ensure the accuracy and reliability of the generated information, fulfilling their goal of obtaining trustworthy and verified knowledge. This aligns with the principle of Christensen's theory, where users seek solutions that help them accomplish their desired outcomes effectively. Through the lens of Bourdieu, we can view the emphasis on fact-checking as a manifestation of individuals' cultural capital and critical thinking skills. Users demonstrate their ability to engage in informed decision-making by recognising the importance of critically evaluating information and distinguishing between reliable and unreliable sources. In terms of Marx's theory, the focus on fact-checking reflects the power dynamics between humans and AI systems. Users exert their power by independently verifying information, reducing the potential influence of AI systems on their knowledge and decision-making processes. Fact-checking can be seen as a way for individuals to assert their agency in the face of technological advancements. Considering Heidegger's philosophy, fact-checking represents the individual's active engagement with the information provided by ChatGPT and their critical interpretation of its accuracy. Users understand that AI-generated information is fallible and recognise the importance of their own engagement and interpretation to arrive at a reliable understanding of the world.

How ChatGPT May Affect the Roles of Stakeholders

The challenges posed by ChatGPT will require students to navigate the lack of a standard referencing guide, which can make it difficult for them to appropriately reference the information generated by the system. This challenge raises concerns about the transparency and traceability of sources used in academic and research outputs that incorporate ChatGPT-generated content. Students will need to develop strategies to verify the origins and credibility of the information provided by ChatGPT and integrate it effectively into their academic work. Instructors will need to address the limitations and challenges associated with ChatGPT. These include its potential for providing incorrect or irrelevant information, which may affect instructors' reliance on the system for academic purposes.

Instructors will have to be cautious and verify the accuracy of the information generated by ChatGPT before incorporating it into their lessons or assignments. They may also need to guide and assist students in critically

evaluating and fact-checking ChatGPT-generated content to ensure the reliability and validity of the information used in their coursework. This reliance on fact-checking will place a greater emphasis on critical evaluation skills and information literacy among students. Instructors and institutions may need to incorporate fact-checking strategies and promote a culture of critical inquiry to ensure that students are equipped to evaluate and validate the information they obtain from ChatGPT.

In summary, our analysis highlights key insights regarding ChatGPT's limitations and challenges. It lacks a standardised referencing guide, demanding fact-checking for accuracy. The moderation API restricts user engagement, and gender bias in defaulting to male pronouns needs addressing. To overcome these issues, comprehensive AI literacy training and ethical policies are essential for responsible AI integration in academia.

Human-like Interactions with ChatGPT

This theme explores the nature of communication and the perceived human-like interactions that users experience when interacting with ChatGPT. By exploring the theme of human-like interactions in users' engagement with ChatGPT, encompassing interactivity, perception and trust, we can gain valuable insights into the social and psychological dimensions of utilising this AI system.

Interactivity of Communication/Perceived Human-like Interactions with ChatGPT

The interactivity of communication, highlighting the dynamic and responsive nature of the interaction between users and ChatGPT, becomes evident as users perceive or experience ChatGPT exhibiting human-like qualities despite its artificial nature. This phenomenon was observed in the data, with students describing their collaboration and engagement with ChatGPT as a mutual interaction. One student expressed the impact of this interaction on their learning and project development, stating, ‘ChatGPT definitely helped me learn and develop in my project. The most important effect of this was that it analysed the incident for me and gave me an example to give me an idea about the incident. For example, we analysed

the article Industrial Society and Its Future together' (SFD). The sense of connecting with a human was also highlighted by students who emphasised ChatGPT's ability to provide advice and make research more conversational. They described feeling a connection with ChatGPT, stating, 'ChatGPT can give advice to people who apply to them like a lawyer' (SFD) and 'I can chat with it as if I were talking to a human being' (SFD). These experiences were not limited to academic contexts but extended to personal interactions as well. The researcher shared their experience of setting up custom personas for different theorists and engaging in discussions through those personas, highlighting the interactive nature of the communication process (RFD). Furthermore, the principal investigator's daughter also demonstrated the human-like perception of ChatGPT, creating a custom persona and engaging in conversations about her life, seeking recommendations and treating the bot as a companion (RFD).

In Tlili et al.'s (2023) study, many participants were impressed by the smoothness of their conversations with ChatGPT, describing the interactions as exciting and enjoyable. However, it was noted that ChatGPT, being limited to a textual interface, lacked the ability to detect physical cues or emotions from users. This led participants to express the need for improving the human-like qualities of ChatGPT, particularly in terms of enhancing its social role.

Through the lens of Christensen, the findings show that users perceive ChatGPT as fulfilling the job of providing interactive and human-like communication. Users express the experience of collaborating and engaging with ChatGPT as a mutual interaction, indicating that they see it as a tool that enables productive and engaging conversations. They describe how ChatGPT helps them in their learning and project development by analysing incidents and providing examples, thus assisting them in their educational tasks. Users also highlight the role of ChatGPT in providing advice and making research more conversational, suggesting that it fulfils the job of facilitating advisory and conversational interactions. From a Bourdieusian perspective, the interactions with ChatGPT can be understood in terms of the social and cultural capital embedded within them. Users attribute value and significance to their interactions with ChatGPT, perceiving it as a resource that enhances their learning and project development. They describe a sense of connection and treat ChatGPT as a companion, suggesting that it holds symbolic value and contributes to their social

experiences. From a Marxian standpoint, the findings imply a potential shift in labour dynamics. ChatGPT is described as providing advice and engaging in conversational interactions, which traditionally might have required human professionals such as lawyers. This raises questions about the displacement of certain job roles and the impact of technology on labour markets. Additionally, the smoothness and enjoyable nature of interactions with ChatGPT might contribute to users' satisfaction and well-being, reflecting the potential for technology to shape individuals' experiences in a capitalist society. Through a Heideggerian lens, the findings indicate that users perceive ChatGPT as a tool that bridges the gap between artificial and human intelligence, providing a sense of connection and mutual understanding. Users describe engaging in discussions and even developing custom personas to interact with ChatGPT, highlighting the existential significance of these interactions as a means of relating to the world and others. It suggests that ChatGPT, despite its artificial nature, becomes part of users' lived experiences and influences their sense of self and social interactions.

People Perceive ChatGPT as Providing Opinions Rather Than Predictions/Unquestioning Trust in Information

People's perception of ChatGPT often leads them to view it as a source of personal opinions rather than predictions. Furthermore, users' unquestioning trust in the information provided by ChatGPT, even when it is incorrect, underscores the importance of critically evaluating and approaching AI-generated content with scepticism. This was seen in the data in the following ways. The instructor stated, ‘In a lesson on the use of transgender pronouns, ChatGPT put forward ideas about transgender rights, even though it was not prompted to. This was perceived by the students as ChatGPT giving an opinion. This led to a discussion about how ChatGPT is not human and is based on text prediction from its database and cannot, therefore, give an opinion, even though it sounds like it is giving an opinion’ (TFD). Furthermore, the researcher recounted, ‘At a conference, a professor from a university was giving a presentation about a new initiative that was about to be released in 2023. One of the participants on my table used ChatGPT to look up information about the university and the initiative and was incorrectly given information that the initiative started in 2019. His

immediate reaction was that there was an error in the presentation, not with the information from ChatGPT. He was instantly willing to believe ChatGPT over the presenter' (SYFD). These examples highlight instances where users' perceptions and unwavering trust in ChatGPT's information influenced their interactions and decision-making.

This was also seen in the literature review. According to Mhlanga (2023), teachers must play a crucial role in helping students develop a critical and informed perspective on the application of AI in the classroom by encouraging students to question and analyse the output of ChatGPT and other AI systems, promoting a deeper understanding of how these technologies work and their potential shortcomings. As accuracy is essential in education, Mhlanga underscores the importance of critical thinking for both teachers and students when using ChatGPT, urging them to verify information from reliable sources to ensure its accuracy. This highlights the responsibility of educators to guide students in discerning reliable information and avoiding blind trust in the output of AI systems. Sullivan et al. (2023) emphasised the need to establish clear conditions, acknowledge potential inaccuracies and biases in ChatGPT's outputs and promote critical thinking and information literacy skills among students. The authors cautioned against blindly trusting the information provided by AI systems like ChatGPT, emphasising the importance of critically evaluating and verifying it. By developing these skills, they believe students can become discerning consumers of information and make informed decisions when engaging with AI tools. According to Rudolph et al. (2023), ChatGPT, being an AI language model, lacks true comprehension and knowledge of the world. It simply generates text based on patterns and examples from its training data, without genuine understanding of the content or context. As a result, there is a potential risk that ChatGPT may produce responses that sound intelligent and plausible but are not factually accurate or contextually appropriate. Rudolph et al. (2023) also point out that while ChatGPT may be perceived as giving opinions, it is only providing text predictions based on statistical patterns in the training data, which can include both accurate and inaccurate information. Thus, they highlight the importance of educators and institutions being aware of this limitation and ensuring that students are equipped with the necessary critical thinking and information literacy skills to effectively engage with and evaluate the outputs of ChatGPT. They highlight that it is crucial to

emphasise the importance of verifying information from reliable sources and not solely relying on ChatGPT for accurate and trustworthy information to avoid the propagation of inaccuracies or misleading information in educational settings.

Viewed through Christensen's perspective, users' perception of ChatGPT as a source of personal opinions rather than predictions suggests a desire for not just accurate information but also a sense of personal validation or perspective. This implies that users might seek affirmation or information that aligns with their existing beliefs or opinions. However, it is essential for users to recognise that ChatGPT's main function is to provide text predictions based on statistical patterns, not to offer personal opinions. Bourdieu's theory of social reproduction and cultural capital provides a deeper understanding of why some users unquestioningly trust the information from ChatGPT, even when it's incorrect. According to Bourdieu, users' habitus, shaped by their social and cultural backgrounds, significantly influences this behaviour. Those with lower cultural capital or limited exposure to critical thinking may be more susceptible to blindly trusting ChatGPT. In contrast, individuals with higher cultural capital approach it with scepticism, critically evaluating its outputs. This perspective emphasises the importance of fostering information literacy and critical thinking, especially among users with limited cultural capital, to prevent the spread of inaccuracies and misleading information through blind trust in ChatGPT. Bourdieu's ‘voice of authority’ theory further supports this alignment, where users with limited exposure to critical thinking may accept ChatGPT's information as authoritative, even when incorrect. On the other hand, users with higher cultural capital can easily critically assess ChatGPT's output. Symbolic power associated with reputable institutions reinforces the perception of ChatGPT as an authoritative source. Hence, promoting digital literacy and critical thinking is crucial for more informed engagement with AI technologies like ChatGPT. Marx's theory of alienation becomes relevant in the context of users' unwavering trust in ChatGPT's information, shaping their interactions and decision-making. This blind trust can be interpreted as a form of alienation, where users rely on an external entity (ChatGPT) for information and decision-making, foregoing their own critical thinking and access to diverse sources of knowledge. Such dependency on ChatGPT reinforces power dynamics between users and the technology, as users surrender their

agency to the AI system. Through a Heideggerian lens, as ChatGPT operates based on patterns and examples in its training data without a deep understanding of the content or context, this raises existential questions about the nature of AI and its role in providing meaningful and reliable information. Users' blind trust in ChatGPT's output can be seen as a result of the technological framing, where users perceive AI as all-knowing or infallible, despite its inherent limitations.

How ChatGPT May Affect the Roles of Stakeholders

With its ability to generate human-like conversations and coherent responses, students perceive ChatGPT as a tool for mutual interaction, collaborating on projects, analysing incidents and receiving advice. This blurs the boundary between human and AI interaction and has the potential to make their learning more conversational and connected. However, this comes with caveats. It is essential for students to develop critical thinking skills to discern between opinions and predictions. They should also learn to verify information from reliable sources to avoid blind trust in ChatGPT's output and ensure the accuracy and reliability of the information they receive.

Instructors will need to play a crucial role in guiding students' interactions with ChatGPT. They need to educate students about the limitations of AI systems like ChatGPT and encourage them to question and analyse the output critically. By promoting critical thinking and information literacy skills, instructors can help students develop a discerning approach to AI-generated content. It is also important for instructors to stay updated with advancements in AI and adapt their teaching methodologies to incorporate ChatGPT effectively into the learning process. They should provide guidance on responsible and ethical use of AI, acknowledging potential inaccuracies and biases in ChatGPT's outputs. By establishing clear conditions for its use and integrating information literacy into the curriculum, instructors can ensure that students are equipped with the necessary skills to effectively engage with ChatGPT and make informed decisions.

Institutions of higher education have a responsibility to integrate AI literacy and critical thinking skills into the curriculum and provide resources and support for students and instructors towards this. Institutions

should also establish clear guidelines for the ethical use of AI in education, considering the limitations of ChatGPT and other AI systems. By doing so, institutions can ensure that students are aware of the potential risks of unquestioning trust in AI-generated content and promote responsible and ethical engagement with AI tools.

In summary, users perceive ChatGPT as more than just an AI language model, fostering a sense of connection. However, this perception can lead to unquestioning trust in its information, emphasising the need for critical thinking and information literacy training. Thus, educators must address sociocultural factors and power dynamics influencing user trust. Practical actions, including AI literacy training, promoting critical thinking and implementing ethical guidelines, are essential for responsible engagement with AI technologies like ChatGPT in education.

Personal Aide/Tutor Role of ChatGPT

In the theme, ‘A Personal Aide/Tutor’, the focus is on exploring the diverse advantages and capabilities of ChatGPT as a personal tutor or aide. It encompasses codes such as enriching the user's ideas, speeding up the process, reducing cognitive load, usefulness in other areas of life, ability to translate, reviewing work, giving suggestions for improvement, text register modification and imparting specific knowledge, skills and concepts.

Enriches the User's Ideas

The capacity of ChatGPT to enrich users' ideas is evident in the data. The researcher stated, ‘It was relatively easy for me to identify a research methodology based on my previous experience and existing knowledge. However, asking ChatGPT for suggestions led to a broader array of suggestions that enriched my choice. This was also the same when it came to data collection ideas and research methods’ (RFD). The researcher further commented, ‘ChatGPT was excellent at identifying limitations, implications, and conclusions as well as ideas for further research from my text. It even made suggestions that I had not thought of’ (RFD). Similarly, the instructor stated, ‘ChatGPT very rapidly suggested cases for the forensic linguistics course. Some of these were cases I had not heard of before’

(TFD). She also noted that ChatGPT provided numerous ideas for activities to add variety to lessons, enhancing the teaching experience (TFD). Additionally, students used ChatGPT to generate ideas for their final projects (SFD).

These findings align with the literature. According to Sullivan et al. (2023), ChatGPT can help users overcome writer's block and provide prompts for writing, offering new perspectives and alternative approaches to stimulate creativity. Neumann et al. (2023) also discussed ChatGPT's potential to provide fresh ideas for activities and assignments, highlighting its innovative potential in primary tasks. Rudolph et al. (2023) mentioned ChatGPT's ability to generate ideas and suggestions for students' writing tasks, contributing to the enrichment of their ideas. They also noted that exposure to well-written examples generated by ChatGPT can improve students' understanding of effective writing styles. Tlili et al. (2023) found that ChatGPT enhances educational success by providing comprehensive knowledge on various topics, potentially sparking new ideas and facilitating deeper learning. They also noted that instructors found ChatGPT useful in generating specific and relevant learning content, enhancing understanding and inspiring new ideas. In addition, they discovered that ChatGPT also prompts teachers to explore new teaching philosophies and assessment methods that promote critical thinking and idea generation. Similarly, Firaina and Sulisworo (2023) found that ChatGPT serves as a communication channel for users, providing access to fresh information and ideas, facilitating the development of new knowledge and skills. Furthermore, Alshater (2022) highlighted ChatGPT's flexibility in addressing a wide range of research questions, such as generating realistic scenarios for financial modelling or simulating complex economic systems, stating that this flexibility allows researchers to explore new ideas and perspectives. In the pilot study by Zhai (2022), ChatGPT generated coherent and insightful writing for an academic paper on the topic of ‘Artificial Intelligence for Education’. ChatGPT's responses guided the author in organising the paper, developing a clear outline and providing valuable information on the history, potential and challenges of AI in education. ChatGPT also provided detailed descriptions and use cases, enriching the understanding of AI concepts and their applications in education.

Through Christensen's lens, in the context of ChatGPT enriching users' ideas, individuals are seeking a solution to enhance their creative and intellectual endeavours. ChatGPT serves as a tool that assists users in generating ideas and expanding their knowledge base. By providing prompts, alternative perspectives and well-written examples, ChatGPT fulfils the job of stimulating creativity and facilitating idea generation. Bourdieu argues that individuals' actions and preferences are influenced by their social position and access to cultural, social and economic capital. In the context of ChatGPT, its usage and accessibility may be influenced by factors such as educational background, institutional support and economic resources. Users with greater access to education and resources may be more likely to benefit from ChatGPT's idea-enriching capabilities, while others with limited access may face barriers in fully utilising the tool. Marx highlights the commodification of knowledge and labour in capitalist societies, where intellectual and creative work is often undervalued or exploited. In the case of ChatGPT, it serves as a tool that can potentially replace certain tasks performed by educators and researchers. This raises questions about the impact on labour dynamics and the potential devaluation of human expertise. While ChatGPT can enhance idea generation and support research, it is essential to consider the broader socioeconomic implications and ensure that the tool's use does not lead to the erosion of human labour or exacerbate inequalities. Heidegger argues that technology can shape human experience and understanding, often leading to a loss of authenticity and a distancing from our essential being. In the context of ChatGPT enriching users' ideas, Heidegger's perspective prompts us to reflect on the impact of relying on AI-driven tools for intellectual and creative pursuits. While ChatGPT offers valuable assistance, it is crucial to maintain a critical awareness of its limitations and not allow it to replace the role of human creativity, interpretation and critical thinking. Balancing the use of technology like ChatGPT with human agency and reflection is essential to preserve the authenticity of our intellectual endeavours.

Speeds Up the Process

ChatGPT offers the advantage of speeding up various tasks or processes when compared to conventional methods. The students commented: ‘It is

very useful for the learning part, because when you are researching on your own you are very likely to get wrong information. It also takes much longer… Another example is that I was able to finish a project that would normally take much longer in a shorter time' (SFD); 'ChatGPT helped me learn. It enabled me to learn effectively in a short time' (SFD); 'When I ask it for information, I do it to shorten the time I spend researching' (SFD); 'ChatGPT has improved my ability to access resources and my academic speed' (SFD). One student also commented, 'ChatGPT is very easy for new generation people… people catch the information very easily. Therefore, learning new information is very easy, cheap, and fast for people' (SFD). In a workshop, one teacher commented: 'I think it is really useful for preparing authentic lesson contents for teachers. The teachers don't need to waste their time and energy creating new materials, but they can save more time for their students' specific needs' (SYFD). Another teacher commented, 'I think it works like an assistant which shows you the best options according to what you want from it. It is very useful and saves you time' (SYFD). The phenomenon of speeding up the process was captured beautifully in a comment made in a meeting with a ChatGPT think tank, with one participant saying, 'ChatGPT is like having a superpower, I can lift more (intellectually) than I could ever lift before, I can do everything ten times faster than I could do before' (SYFD). The researcher made the following comments: 'Using ChatGPT to quickly summarise literature sped up the process of identifying which literature was most relevant' (RFD), and 'Asking ChatGPT for suggestions led to a broader array of suggestions that enriched my choice. It also sped up the process' (RFD). The researcher also commented, 'Using ChatGPT as a tool for developing the research design really sped up the process' (RFD); 'Getting ChatGPT to generate surveys and interview questions was extremely efficient, it saved a lot of time' (RFD); 'ChatGPT can very quickly combine documents, saving a lot of time' (RFD). The instructor commented: 'ChatGPT very rapidly suggested cases for the forensic linguistics course. Some of these were cases I had not heard of before… This process was much faster than my original way of scouring the internet' (TFD), and 'ChatGPT can very quickly come up with scripts for pre-class videos as well as suggesting images and visuals that can be used in the video' (TFD). The instructor also said, 'ChatGPT was very good at coming up with ideas for in-class assessments. This certainly saved me time' (TFD). From observations

during lessons, the instructor noted that: ‘Students wrote down traditional gendered pronouns in English and then tried to research online contemporary genders in English. They then tried the same through ChatGPT. ChatGPT was more efficient at this activity, thus saving the students time’ (TFD).

In the literature, Fauzi et al. (2023) emphasised that students can optimise their time management by leveraging ChatGPT's features, such as storing and organising class schedules, assignment due dates and task lists. This functionality enables students to efficiently manage their time, reducing the risk of overlooking important assignments or missing deadlines. Similarly, Firaina and Sulisworo (2023) reported that using ChatGPT had a positive impact on the quicker understanding of material. According to the lecturers interviewed in their study, ChatGPT facilitated a quicker understanding by providing access to new information and ideas. Alshater (2022) reported that ChatGPT and similar advanced chatbots can automate specific tasks and processes, such as extracting and analysing data from financial documents or generating reports and research summaries, concluding that by automating these tasks, ChatGPT saves researchers’ time and expedites the research process. Alshater also noted that the ability of ChatGPT to swiftly analyse large volumes of data and generate reports and research summaries contributes to the accelerated speed of research (2022). Zhai (2022) utilised ChatGPT in his study to compose an academic paper and was able to complete the paper within 2–3 hours. This demonstrates how ChatGPT expedites the writing process and enables efficient completion of tasks. Zhai further observed that ChatGPT exhibited efficient information processing capabilities, swiftly finding the required information and facilitating the completion of tasks within a short timeframe. These findings highlight the central focus on enhancing productivity, time management, understanding complex topics and expediting processes.

This aligns with Christensen's theory by recognising how users are hiring ChatGPT to complete these productivity and learning-related tasks. Through a Bourdieusian lens, the use of ChatGPT can be viewed as a means to acquire additional social and cultural capital. Students and researchers can leverage ChatGPT to gain access to information, knowledge and efficient tools, thereby enhancing their learning outcomes and research productivity. Through a Marxist lens, the potential of ChatGPT and similar

technologies to automate tasks, save time and expedite processes raises concerns about the impact on labour and employment. While ChatGPT improves efficiency for individuals, there are implications regarding job displacement and the concentration of power and resources among those who control and develop these technologies. Heidegger's perspective prompts critical reflection on the consequences of heavy reliance on AI technologies like ChatGPT for tasks traditionally performed by humans. While ChatGPT offers convenience and efficiency, it raises questions about the potential loss of human connection, critical thinking and creativity. This invites us to contemplate the role of technology in shaping our understanding, relationships and overall existence in the world.

Reduces Cognitive Load

ChatGPT emerged as a powerful tool to alleviate cognitive load and reduce mental effort by providing valuable assistance and performing tasks on behalf of users. The data highlight the diverse ways in which ChatGPT achieves this objective. For instance, the instructor commented, ‘We used ChatGPT to create mnemonics as a memory guide. This was a great activity because the students could focus on using the mnemonic instead of using their cognitive load to come up with one in the first place’ (TFD). And, ‘We got ChatGPT to summarise long articles in class. This was very useful for the students to get a rough idea of the article and decide on its relevance before reading for more detail. This is useful in reducing the cognitive load of students if they have a lot to read’ (TFD). Moreover, students found value in using ChatGPT to swiftly obtain accurate definitions for complex terms. Students asked ChatGPT to give them definitions for the words semantics and pragmatics (TFD). Students also reported that ChatGPT helped them reduce the mental effort required for specific tasks: ‘It helped me a lot in doing my homework. I made the titles in my homework according to the rubric and planned my work accordingly, so I didn't have to think about these parts too much’ (SFD); ‘ChatGPT helped me learn effectively in a short time. It made it easier for me to answer questions in class activities’ (SFD). Furthermore, in a workshop, one teacher commented ‘Using ChatGPT as a research buddy, with this way of use, students' cognitive load will reduce and also they'll learn more about the relevant subject’ (SYFD).

Rudolph et al. (2023) highlighted the potential of AI-powered writing assistants, like Grammarly, in facilitating English writing practices and enhancing skills by providing real-time feedback, detecting errors and motivating students to revise their writing. Although not explicitly mentioning reducing cognitive load, the broader discussion suggested that AI chatbots and writing assistants can alleviate cognitive load by assisting students in the writing process and promoting self-directed learning. According to Tlili et al.'s (2023) study, participants recognised ChatGPT's effectiveness in enhancing educational success by simplifying learning and reducing cognitive load for students. The users found ChatGPT valuable for providing baseline knowledge on various topics to teachers and students, as well as offering a comprehensive understanding of complex subjects in easy-to-understand language across different disciplines. Their study also highlighted the potential for ChatGPT to automate feedback and lessen the instructional workload for teachers. In Firaina and Sulisworo's (2023) study, they found that ChatGPT served as a communication channel for accessing fresh information and ideas, alleviating the cognitive load associated with searching for them. Their interviews revealed that using ChatGPT positively impacted productivity and learning effectiveness, facilitating quicker understanding of material and saving time in searching for resources, thus reducing the cognitive load in learning. This was also suggested in Alshater's (2022) study, where he observed that AI chatbots can enhance productivity by automating tasks and improving research efficiency as well as contributing to improved accuracy by identifying and rectifying errors in data or analysis and ensuring consistency in research processes by following standardised procedures and protocols. He believes this helps researchers focus on the content and interpretation of their work, thus alleviating cognitive load.

Regarding Christensen's Theory of Jobs to be Done, ChatGPT can be hired to simplify and streamline tasks, allowing users to offload cognitive effort onto the AI chatbot. By providing assistance, such as generating mnemonics, summarising articles and offering quick and accurate definitions, ChatGPT enables users to focus on higher level cognitive processes rather than the more mundane aspects of their work. Through Bourdieu's lens, ChatGPT can be viewed as a tool that bridges knowledge gaps and reduces cognitive load by providing access to information that might be otherwise challenging to obtain. By acting as a communication

channel between users and knowledge, ChatGPT facilitates the acquisition of fresh ideas and information, potentially levelling the playing field for individuals with varying cultural capital. However, it is essential to recognise how habitus shapes users' interactions with ChatGPT, with some relying heavily on it without critical evaluation. While ChatGPT's role in reducing cognitive load can empower learning, fostering critical thinking remains crucial to assess the reliability of its outputs. Understanding users' interactions within the context of cultural capital and habitus is vital to evaluate ChatGPT's impact on equitable information access. Once again, Marxism sheds light on the potential impact of AI chatbots like ChatGPT on the workforce. While ChatGPT's ability to automate tasks and enhance productivity is beneficial for users, once again, it raises concerns about the displacement of human labour. The introduction of AI chatbots in education, as highlighted by the studies, may reduce the cognitive load on students and teachers. However, it is essential to consider the broader societal implications and ensure that the implementation of AI technologies aligns with principles of equity and fair distribution of opportunities. Heidegger's philosophy emphasises the concept of ‘being-in-the-world’, which suggests that our existence and understanding of the world are interconnected. In the context of ChatGPT reducing cognitive load, we can relate this idea to the notion that ChatGPT functions as a tool or technology that enhances our ability to engage with the world. Thus, ChatGPT can be seen as an extension of our cognitive capacities, enabling us to access and process information more efficiently. It acts as a mediator between our ‘Being’ and the world of knowledge, allowing us to navigate complex topics and reduce the mental effort required to search for information. Additionally, Heidegger's concept of ‘readiness-to-hand’ comes into play when considering ChatGPT's role in reducing cognitive load. According to Heidegger, tools become seamlessly integrated into our everyday existence when they are ready-to-hand. In the context of ChatGPT, it becomes a ready-to-hand technology that we can effortlessly use to acquire knowledge. However, it is essential to be mindful of Heidegger's concerns about technology's potential to distract us from our authentic understanding of the world. While ChatGPT can reduce cognitive load and streamline information access, it is crucial to retain critical thinking and not overly rely on it as the sole source of knowledge.

Useful in Other Areas of Life

ChatGPT's usefulness extends beyond its intended context, offering practical applications and benefits in various areas of life. This was seen in the data through first-hand observations. The researcher stated, ‘ChatGPT can very quickly combine documents, saving a lot of time. You can also get it to peer review your ethics application against the criteria and make suggestions for anything that has been missed or can be improved upon. Since discovering this, I have also used the same process to write a job reference, by inputting all aspects of the job, questions asked, and the potential employees CV. This came up with the basic reference which then had to be checked and personalised’ (RFD). The instructor also made observations: ‘Students input text message abbreviations from the case into ChatGPT and asked it to turn it into normal text. It did this much more successfully than the students had done without it. This made us realise it would be a useful tool for students to use outside the classroom as well if they needed to understand abbreviations’ (TFD), and ‘Students used ChatGPT to change the register of text from formal to informal, etc. This is a useful tool they will be able to use outside the classroom as well. For example, if they need to change their letter into a more formal letter’ (TFD). Students also expressed their diverse usage of ChatGPT. One student said, ‘I asked about the earthquake history of Turkey’ (SFD). Another student mentioned seeking relationship advice from ChatGPT (SFD). Another said, ‘I asked ChatGPT to write songs for my friends, had character analysis of my favourite TV series, asked about chess moves, and got investment advice’ (SFD). Yet another student mentioned, ‘Using the AI system has become a habit for me. I now use ChatGPT to access the right information about anything I am curious about’ (SFD). One student based their final project on ChatGPT, stating, ‘I was preparing to move abroad for a year for an Erasmus exchange programme. I used ChatGPT to find out about the university I was going to, the town I would be living in and questions about the culture and history in order to prepare for my trip. I also used it to help me learn basic phrases I would need to know’ (SFD).

Although the existing literature provides limited information about the usefulness of ChatGPT in areas beyond education, Fauzi et al.'s (2023) study highlighted its significant role in enhancing language skills, suggesting that ChatGPT can assist students in improving their language proficiency by offering valuable resources, and that students can use it to

refine their grammar, expand their vocabulary and enhance their writing style.

Through Christensen's Theory of Jobs to be Done, we can see that users can hire ChatGPT as a valuable tool to accomplish tasks like combining documents, peer review ethics applications, writing job references and converting text message abbreviations. These real-life examples showcase ChatGPT's efficiency, time-saving capabilities and enhanced productivity for users. The varied usage of ChatGPT by users exemplifies how the tool aligns with Bourdieu's theory of social capital and skill acquisition, serving as a platform through which users can access a wide range of information and knowledge, leveraging their social capital to explore various domains. Additionally, the process of interacting with ChatGPT involves skill acquisition, as users develop the ability to navigate and evaluate the information provided, further contributing to their understanding and learning. Once again, Marx's theory of social class and labour sheds light on ChatGPT's impact on work. Observations from the instructor and students show ChatGPT's effectiveness in tasks like modifying text and generating content. This raises questions about its implications for traditional job roles and the division of labour, potentially automating or augmenting tasks previously done by humans. Heidegger's theories underscore the transformative nature of technology and its impact on revealing the world. As a tool, ChatGPT enables individuals to achieve specific tasks and goals across different domains. In professional settings, ChatGPT streamlines work processes by aiding in tasks like drafting emails, generating reports and providing quick access to information, aligning with Heidegger's concept of ‘readiness-to-hand’. Similarly, in personal interactions, it acts as an assistant for scheduling appointments, setting reminders, offering recommendations and becoming an extension of our capabilities, as per Heidegger's idea of tools becoming transparent mediums. Furthermore, ChatGPT's creative applications involve assisting in writing tasks, suggesting ideas and enhancing language usage, which aligns with Heidegger's ‘poetic dwelling’ approach, fostering openness and deeper connection with the world through technology. However, Heidegger's cautionary note reminds us to reflect on technology's impact and its potential to disconnect us from authentic experiences. While ChatGPT proves valuable, we must be mindful of its pervasive use and the implications it holds for our relationship with the world.

Ability to Translate

Despite ChatGPT's remarkable ability to translate between languages, there are occasional downsides. For instance, machine translation models may encounter challenges with gendered pronouns, resulting in mistranslations like using ‘it’ instead of ‘he’ and ‘she’, potentially leading to dehumanisation (Maslej et al., 2023). However, despite these issues, the data also revealed many positives. The researcher noted, ‘ChatGPT can translate interviews, surveys, etc., from one language to another, saving me time in the research process’ (RFD). Similarly, the instructor remarked, ‘As my students are all non-native speakers, being able to translate the readings into Turkish first to grasp the main ideas, and then reading again in English, helped reduce cognitive load, allowing them to focus more on the content’ (TFD).

While the literature had limited information regarding ChatGPT's translation abilities, Firaina and Sulisworo's paper noted that respondents used ChatGPT to aid in translating scientific articles into English, which proved particularly beneficial for those with limitations in English proficiency (2023).

From the perspective of Christensen, ChatGPT's ability to translate enables users to hire it to overcome language barriers and access information in different languages. For example, the instructor mentioned how students benefited from translating readings into Turkish to better understand the content. ChatGPT's translation feature addresses the functional job of language comprehension and information access. Through the lens of Bourdieu, ChatGPT's translation ability can be seen as a form of cultural capital that helps individuals with limited English proficiency overcome language-related barriers. By providing access to translated scientific articles, ChatGPT contributes to levelling the playing field and reducing language-based inequalities in academic settings. Analysing ChatGPT's translation capabilities from a Marxian perspective reveals insights into the labour dynamics in language services. ChatGPT's automated translations can improve efficiency and accessibility but may also lead to job displacement and potential exploitation of human translators. The automation of translation tasks raises ethical concerns about labour devaluation and compromises in translation quality. Balancing the benefits and challenges of AI-driven translation requires careful consideration of fair labour practices and ensuring the preservation of

translation quality. Heidegger's theory views technology as an enabler that shapes human existence and relationships. In the context of ChatGPT's translation ability, it can be seen as a technological tool that mediates language interactions. While it facilitates access to information and communication across languages, it also alters the nature of language interaction itself. Therefore, the reliance on machine translation may influence how individuals engage with language and potentially affect language learning and cultural understanding.

Reviews Work and Gives Suggestions for Improvement

ChatGPT's ability to analyse and provide feedback on presented work or content, offering suggestions for improvement, was evident in the data through various student comments. One student noted, 'ChatGPT provided very useful feedback, giving a detailed and orderly explanation' (SFD). Another student said, 'I was having problems with how to do (an assignment). ChatGPT tells me the steps to follow' (SFD). The students recognised the usefulness of ChatGPT's feedback, with one of them mentioning, 'It informs about where it thinks things are missing and provides detailed feedback by evaluating the project step by step' (SFD). In terms of peer review, ChatGPT played a significant role. One student said, 'I asked ChatGPT for feedback on my essay and this is what it said. "The essay effectively addresses the issue of fake news, its impact, and proposed solutions. By addressing the suggestions provided above, the essay can be further improved"' (SFD). They appreciated the specific feedback provided by ChatGPT on the structure, clarity and development of ideas in their essay. Another student said, 'ChatGPT provided useful feedback for me. It helped me to make the rubric at the beginning' (SFD). One student acknowledged the accuracy of ChatGPT's analysis, saying, 'If I consider the ChatGPT assessment, I think it is obvious that he has made a correct analysis' (SFD). Overall, they found ChatGPT's suggestions helpful in identifying missing points and strengthening their arguments. The researcher also found ChatGPT to be a useful tool for their writing and study, highlighting its capabilities in tasks such as paraphrasing articles, shortening text, suggesting titles and headings and generating introductions and conclusions based on data input (RFD). They also emphasised that ChatGPT's utility extends beyond research papers, stating, 'This can be

used for any type of writing whether for a research paper or anything else' (RFD).

The literature also highlights ChatGPT's ability to review a user's work and provide feedback. According to Fauzi et al. (2023), ChatGPT's capacity to answer specific questions caters to individual learning needs, allowing students to seek clarification and detailed explanations on specific concepts, theories or subjects. They believe this personalised assistance greatly enhances students' understanding, comprehension and overall learning experience. In a similar vein, Rudolph et al. (2023) discussed the effectiveness of AI-powered digital writing assistants, such as Grammarly, in reviewing a student's work and providing feedback. They noted that research suggests that utilising Grammarly as an intervention effectively improves students' writing engagement through automated written corrective feedback, as, with its immediate feedback and revision, it motivates them to revise their writing by indicating the location of the error and assigning a technology score. When students adapt their writing, an increase in the score corresponds to a reduction in errors, encouraging them to continue improving their writing tasks. Rudolph et al. (2023) also noted that AI interventions have been effective in enhancing self-efficacy and academic emotions in English as a Foreign Language (EFL) students. They say this is because intelligent feedback, in the absence of human assistance, can reinforce students' writing autonomy by helping them to recognise writing errors, identify incorrect patterns and reformulate their writing accordingly.

Through the lens of Christensen, we may say that ChatGPT's ability to analyse and provide personalised feedback and guidance on a student's work addresses the job of enhancing their learning experience and improving their academic performance. Students value the detailed and orderly explanations provided by ChatGPT, as it helps them understand concepts, follow steps and improve their assignments. Through the lens of Bourdieu, the students' recognition of the usefulness of ChatGPT's feedback indicates that it possesses a form of cultural capital – an esteemed knowledge and resource that can improve their academic performance. By utilising ChatGPT, students gain access to valuable feedback that strengthens their arguments, enhances the structure and clarity of their essays and helps them create rubrics. This access to cultural capital can potentially contribute to social distinctions and academic success. Through

a Marxist lens, ChatGPT's ability to analyse and provide feedback on students' work automates tasks that would traditionally require human labour, such as reviewing and providing feedback on essays. By performing these tasks, ChatGPT reduces the workload on teachers or peers, allowing for more efficient and scalable feedback processes. ChatGPT's capabilities align with Heidegger's view of technology as an enabler and tool that transforms how individuals engage with the world. By offering assistance in tasks like paraphrasing, shortening text, suggesting titles and generating introductions and conclusions, ChatGPT changes the way users approach writing and study. It expands their possibilities and interactions with technology, enhancing their engagement and potentially influencing their writing practices.

Text Register Modification

The data uncovered ChatGPT's versatility in adjusting the register of text, as evident from the instructor's comments, ‘You can ask it to change the register(of the university course information form) so that the final document is more student-friendly’ (TFD). She also noted, ‘Students identified that they could use this as a tool outside the classroom to help achieve the correct register for letters, emails, etc.’ (TFD). One student stated, ‘ChatGPT can transform my informal writing into formal writing’ (SFD). The instructor further added, ‘This is a valuable tool the students can use beyond the classroom, such as when they need to convert a letter into a more formal style’ (TFD). Moreover, ChatGPT demonstrated its capacity to identify linguistic mannerisms in texts attributed to famous individuals, with the instructor saying, ‘ChatGPT was quite successful at giving a descriptive profile of the person who may have said this, leading us to a discussion about catfishing’ (TFD). Additionally, the instructor said, ‘ChatGPT was able to change British English into American English and vice versa’ (TFD). The researcher described ChatGPT as being, ‘like a hall of mirrors. I can develop my thoughts and then ask it to rewrite them through the lens of structuralism, poststructuralism, feminism, etc. I found this transformational. I think it will take research much further forwards and much faster’ (RFD).

In Rudolph et al.’s (2023) paper, while they did not specifically address ChatGPT's ability to change the register of a text, they did discuss the

potential misuse and challenges associated with ChatGPT's text generation capabilities, raising concerns about students outsourcing their written assignments to ChatGPT, as it can produce passable prose without triggering plagiarism detectors. They stated that they believe this poses integrity concerns for assessment methods which will prompt instructors to make adaptations. They also noted the irony of using AI-powered anti-plagiarism software while AI, like ChatGPT, can potentially bypass plagiarism detection by modifying sentences to reduce the originality index score. Rudolph et al. suggest a student-centric approach to address challenges with AI tools in education, whereby faculty should design challenging assignments and use text generator detection software, and students should be guided to understand AI limitations, practice problem-solving with AI tools and develop digital literacy skills. They also recommended that higher education institutions provide digital literacy education, train faculty, update policies and integrate AI tools to navigate the evolving landscape. Similarly, Tlili et al. (2023) identified concerns related to cheating and manipulation with ChatGPT, finding that ChatGPT can assist students in writing essays and answering exam questions, potentially facilitating cheating, while also manipulating the system to evade detection by output detector models.

Through Christensen's lens, ChatGPT's ability to change the register of a text enables individuals to hire the tool to help them achieve the desired register for various purposes, such as academic assignments or professional communication. From a Bourdieusian perspective, the ability of ChatGPT to mimic the writing styles of individuals, including famous figures, raises questions about the reproduction and authenticity of language, whereby language can be deceptively used to manipulate others. Looking at the situation from a Marxist perspective, the potential negative uses of ChatGPT, such as using it to complete assignments and evade plagiarism detection, raise important questions about the impact of technology on education. These concerns are in line with Marxist critiques of capitalism and the exploitation of labour, as they highlight the transformation of education into a commodity and the potential devaluation of human labour in the face of content generated by AI. From a Heideggerian standpoint, ChatGPT's transformative capabilities in rewriting thoughts through different lenses, such as structuralism or feminism, reflect the transformative potential of AI tools in the realm of research and academia.

However, it also raises questions about the nature of authorship, originality and the essence of human creativity when such tasks can be delegated to AI.

Imparts Specific Knowledge, Skills and Concepts to Users

The data revealed how ChatGPT provides users with specific information, skills or concepts through its responses, as expressed by students. One student remarked, 'Firstly, I used ChatGPT to research and gather information on the Unabomber case, including the forensic linguistic evidence that was presented in court. Secondly, I used ChatGPT to generate and improve my ideas and arguments for the closing speech. For example, I put in a draft of my speech, and it suggested alternative word choices, phrasing, or provided additional information to support my argument' (SFD). Another student highlighted the knowledge gained through ChatGPT, stating, 'I believe that ChatGPT gives me extra knowledge. For instance, ChatGPT clearly explained how professionals studied the Unabomber's writing style, spelling, syntax, and linguistic qualities to work out his age, origin, and other characteristics when I questioned it about the forensic linguistic evidence used to identify him. This really helped my understanding of the relevance of the linguistic evidence and its role in the case' (SFD). Regarding the writing process, one student noted, 'When I was writing the closing argument for the prosecution, I asked ChatGPT a question like "Suppose you were the prosecutor in the Unabomber case, how would you write the closing argument?" Then I pasted the rubric (that the instructor had) provided and asked it to reorganise the writing using that rubric. It sent me the answer, and finally I asked it to illustrate that writing by suggesting pictures' (SFD). Another student stated, 'ChatGPT helped me to learn effectively in a short time. It made it easier for me to answer questions. I was able to do in-class exercises much more easily with ChatGPT' (SFD). The instructor also commented on ChatGPT's effectiveness for helping students learn, saying, 'ChatGPT was excellent for students to learn punctuation rules. It was also useful when students input the same sentences with different punctuation, and it told them the difference in meaning' (TFD). The instructor also highlighted ChatGPT's ability to quickly provide students with rules for the use of definite and indefinite articles and the use of 'then' in narrative justifications when

asked (TFD). Additionally, the instructor mentioned, ‘Students used ChatGPT's MadLib function to create vocabulary quizzes for each other. This gave us the idea that students could use it to create their own revision materials to use to revise the course concepts’ (TFD). This positive feedback was reinforced by a student who stated, ‘I wanted ChatGPT to prepare practice for me while preparing for my exams. These give me an advantage for preparing for exams and assignments’ (SFD).

These findings are supported by Fauzi et al. (2023), who found that ChatGPT was a valuable resource for students, offering useful information and resources, retrieving relevant information from the internet, recommending books and articles and assisting in refining grammar, expanding vocabulary and enhancing writing style, all of which led to an overall improvement in academic work and language skills. Neumann et al. (2023) also observed that ChatGPT could help students prepare for assessments by generating specific source code and summarising literature, and that they could utilise it to generate relevant code snippets for their assignments or projects, contributing to their knowledge and understanding of software engineering concepts. Similarly, Zhai (2022) found ChatGPT useful in composing an academic paper that only required minor adjustments for organisation.

Through Christensen's lens, we can see that students are hiring ChatGPT to gather information, improve their ideas and arguments, enhance their writing and learn more effectively. From a Bourdieusian perspective, ChatGPT enhances users' social and cultural capital regarding access to resources and opportunities. From a Marxist viewpoint, students can use ChatGPT to enhance their productivity and efficiency in tasks such as writing, research and exam preparation, thereby acting as a form of technological capital that empowers students to accomplish their academic work more effectively, potentially reducing their dependence on traditional labour-intensive approaches. However, it should be noted that this technological capital is only available if there is equitable access to the tool. Through a Heideggerian lens, ChatGPT redefines the relationship between humans and technology in the educational context, by expanding the possibilities of information retrieval, language refinement and knowledge generation. Through interactions with ChatGPT, students can engage in a new mode of learning and communication that is mediated by technology.

This interaction will influence their perception and understanding of specific knowledge, skills and concepts.

How ChatGPT May Affect the Roles of Stakeholders

ChatGPT can empower students by providing them with access to valuable resources and tools. It can assist in tasks such as generating ideas, improving writing, providing feedback and enhancing language skills. This can potentially enhance students' learning experience and academic performance. However, there are concerns about potential misuse and the impact on academic integrity. Students may be tempted to outsource their assignments to ChatGPT or use it to bypass plagiarism detection. This raises questions about the authenticity of their work and the development of critical thinking and writing skills.

Institutions and instructors will need to address these challenges and establish responsible policies for the use of AI tools in education. ChatGPT can augment the role of instructors by automating certain tasks and providing support in reviewing and providing feedback on students' work. It can save instructors' time by offering suggestions for improvement, detecting errors and helping with language-related issues. However, there is a need for instructors to adapt to these changes and find new ways to engage with students. The role of instructors may shift towards facilitating discussions, guiding students in utilising AI tools effectively and designing assignments that cannot be easily outsourced or automated. Instructors should also be aware of the limitations of AI tools and help students develop critical thinking skills alongside their use of ChatGPT.

Institutions need to recognise the potential of AI tools like ChatGPT and their impact on teaching and learning. They should provide digital literacy education and training for faculty and students, update academic integrity policies and support research on the effects of AI tools on learning and teaching. Additionally, institutions should consider the implications for equitable access to educational resources. While ChatGPT can provide valuable support, it also raises concerns about the digital divide and disparities in access to technology. Institutions should ensure that all students have equal opportunities to benefit from AI tools and take steps to bridge any existing gaps.

In summary, ChatGPT's versatile and practical nature in education enhances the learning experience, offering personalised feedback and guidance to students. However, concerns arise about its impact on labour dynamics, academic integrity and societal ethics. To address these, responsible policies and digital literacy training are essential.

Impact of ChatGPT on User Learning

Within this theme, we explore the influence of ChatGPT on user learning, specifically examining its effectiveness in accomplishing assigned student tasks and the overall impact it has on the learning process.

ChatGPT Demonstrates Competency in Completing Assigned Student Tasks/Inhibits User Learning Process

From our findings, we discovered that ChatGPT demonstrates proficiency in accomplishing assigned tasks. However, due to this, it can have a detrimental impact on the learning process, hindering active engagement and independent knowledge acquisition. Students' perspectives shed light on this matter. In the initial phase of the course, the instructor asked students to assess ChatGPT's ability to complete in-class activities in their other courses. 57.1% affirmed ChatGPT's total capability in this task, while 28.6% acknowledged its partial capability. The activities mentioned by students that could be done by ChatGPT included article writing and answering questions. Similarly, students were asked about ChatGPT's potential to complete assignments or projects in their other courses. 71.4% responded that it could do them completely, with 14.3% saying it could partially complete them. One student stated, ‘Generally ChatGPT knows everything. This is very dangerous for students because students generally choose the easy way to work. If ChatGPT improves itself, students will use it a lot, and that's why when instructors give grades, you will use ChatGPT to get the points’ (SFD). Another said, ‘The possibility of students having their homework done by ChatGPT will raise doubts in teachers, which may have consequences’ (SFD). The students also recognised that the impact of ChatGPT depends on its usage. One student remarked, ‘Actually, it is connected with your usage type. If you use it to check your assignments and

help, it helps you learn. But if you give the assignment to ChatGPT, it skips the learning' (SFD). They further commented, 'It's like taking it easy. It helped me lots with doing my homework, but I feel like it reduced my thinking process and developing my own ideas' (SFD). Another student said, 'Of course, it helped me a lot, but it also made me a little lazy, I guess. But still, I think it should stay in our lives' (SFD). A further student said, 'It certainly skips some part of the learning process. When I ask it for information, I do it to shorten the time I spend researching. If I spent time researching by myself, I think I would have more detailed information and would form more complex ideas' (SFD). According to the instructor, ChatGPT was good at generating ideas for the final assessment, but there were caveats: 'ChatGPT was excellent at coming up with ideas for the final assessment following GRASPS and came up with better ideas than my own. However, some of its ideas for assessment could easily be done by ChatGPT itself. Therefore, these suggestions would need to be rewritten to avoid this' (TFD). The instructor also made observations about ChatGPT's ability to create rubrics: 'Once an assessment has been written, ChatGPT can easily come up with a suggested rubric for evaluation, but only if the assessment task is written precisely. However, the weighting in the rubrics should be adapted by the instructor to reflect the parts that ChatGPT can do and the parts it can't' (TFD). Additionally, the instructor highlighted that ChatGPT could provide suggestions for pre-class quizzes based on the text or video input; however, they cautioned that if the cases used in the quizzes were present in ChatGPT's database, students might opt to use the AI for quizzes instead of engaging with the assigned text or video (TFD). Furthermore, regarding in-class activities, the instructor noted, 'When students got ChatGPT to categorise vocabulary under headings, they did it fast, but it skipped the learning process aim of this activity. It did not help them to review the vocabulary. This may therefore have implications for how I construct my vocabulary review activities in the future' (TFD). Issues with ChatGPT being able to complete student activities were also raised in a workshop, where one teacher said, 'I realised that ChatGPT could do the lesson planning assignment for my (teacher candidate) students, so I changed the weighting of the rubric to adapt to this' (SYFD). Similarly, another teacher said, 'ChatGPT can easily find the answers with this activity, and students would not need to do the reading' (SYFD). A different teacher stated, 'ChatGPT does not enable a person to learn from the

process. With this way, ChatGPT only gives a result; it does not provide help for the process. As you know, learning takes place within the process, not solely the result' (SYFD).

So what did the literature have to say about this? In Mhlanga's (2023) study, instructors expressed concerns that ChatGPT may disrupt traditional assessment methods like essays and make plagiarism detection more difficult. However, Mhlanga stated that he believes this opens doors to innovative educational practices and suggests that AI technologies like ChatGPT can be used to enhance assessment procedures, teaching approaches, student participation, collaboration and hands-on learning experiences, thus modernising the educational system. Neumann et al. (2023) also explored ChatGPT's competence in completing assigned student tasks and its implications for the learning process. They highlighted various applications in software engineering, including assessment preparation, translation, source code generation, literature summarisation and text paraphrasing. However, while they noted that ChatGPT could offer fresh ideas for lecture preparation and assignments, they stressed the need for further research and understanding so that transparency is emphasised, ensuring students are aware of ChatGPT's capabilities and limitations. They proposed integrating ChatGPT into teaching activities, exploring specific use cases and adapting guidelines, as well as potential integration into modern teaching approaches like problem-based and flipped learning, with an emphasis on curriculum adjustments and compliance with regulations. Rudolph et al. (2023) raised multiple concerns regarding ChatGPT's impact on students' learning process and assessment authenticity. They highlighted potential issues with students outsourcing written assignments, which they believe could challenge traditional evaluation methods. Additionally, they expressed worries about ChatGPT hindering active engagement and critical thinking skills due to its competence in completing tasks without students fully engaging with the material. Tlili et al.'s (2023) study focused on potential misuse of ChatGPT, such as facilitating cheating in tasks like essay writing or exam answers. Effective detection and prevention of cheating were highlighted as important considerations. Similarly, they raised concerns about the impact of ChatGPT on students' critical thinking skills, believing that excessive reliance on ChatGPT may diminish students' ability to think innovatively and independently, potentially leading to a lack of deep understanding and problem-solving skills. Due to these issues, Zhai

(2022) proposed a re-evaluation of literacy requirements in education, suggesting that the emphasis should shift from the ability to generate accurate sentences to effectively utilising AI language tools, believing that incorporating AI tools into subject-based learning tasks may be a way to enhance students' creativity and critical thinking. Zhai also suggested that this should be accompanied by a shift in assessment practices, focussing on critical thinking and creativity and, thus, recommended exploring innovative assessment formats that effectively measure these skills (2022).

Through Christensen's lens, ChatGPT can be seen as a tool that students can hire to accomplish specific jobs or tasks in their educational journey. However, this raises concerns about the potential negative impact on active engagement, independent knowledge acquisition, critical thinking and the overall learning process. Therefore, there is a need for a balanced approach to avoid the drawbacks associated with its use. Through Bourdieu's theory of social reproduction, we can gain insights into the social and educational ramifications of ChatGPT. Students' concerns about the ease of relying on ChatGPT for completing assignments and the potential consequences, including doubts from teachers and reduced critical thinking, resonate with Bourdieu's emphasis on the reproduction of social structures. This highlights the possibility of ChatGPT perpetuating educational inequality by offering shortcuts that hinder deeper learning and critical engagement. Students' comments about the impact of ChatGPT on the learning process reflect elements of Marx's theory of alienation. While ChatGPT offers convenience and assistance in completing tasks, students expressed concerns about the reduction of their active involvement, thinking process and personal idea development. This detachment from the learning process can be seen as a form of alienation, where students feel disconnected from the educational experience and become dependent on an external tool to accomplish their tasks. Heidegger's perspective on technology as a means of revealing and shaping our understanding of the world can also be applied here. ChatGPT is a technological tool that transforms the educational landscape, revealing new possibilities by generating ideas, providing assistance and automating certain tasks. However, the concerns raised by students and instructors point to the potential danger of technology shaping the learning process in ways that bypass essential aspects of education, such as critical thinking, personal engagement and deep understanding. Once

again, this highlights the need for a thoughtful and intentional integration of technology in education to ensure its alignment with educational goals.

ChatGPT Unable to Perform Assigned Student Tasks

In exploring the limitations of ChatGPT in completing tasks or assignments, the instructor stated, 'I showed students how to pick up information from the final assessment rubric and put it into ChatGPT to see how much of the project it could do. Then I got them to look at the weighting in the rubric and identify areas in which chatgpt could either not do what was asked e.g. providing visuals, or was inefficient e.g. giving very limited information about the forensic linguistics of the case, not providing primary source references' (TFD). In another example, the instructor said, 'Students read articles on advice for writing closing speeches, they also asked chatgpt to give advice and cross-referenced it. They made a list of this advice. Then they watched two videos of closing speeches, one for the prosecution and one for the defence and wrote examples from these speeches matched against their advice list. This activity proved to be ChatGPT-proof as they were having to write down examples they had heard from a video' (TFD). Furthermore, the instructor recounted, 'Students had read a paper about how intoxication can be detected by acoustic-phonetic analyses and made a list of the main points. They then watched a video of Johnny Depp giving an award speech while drunk and had to write examples of what he said next to the list of acoustic-phonetic factors from the paper. Due to them having to listen to a video to do this, the activity was ChatGPT-proof' (TFD). Furthermore, the instructor commented, 'Students created their projects in any form they wished (poster, video, interview). They used ChatGPT to review their work against their rubric. This could only be done if their final project had text that could be input. If they used a different medium, this was not possible' (TFD). They also observed that, 'ChatGPT was unable to do an analysis of handwriting from two suicide notes related to Kurt Cobain' (TFD).

From Christensen's perspective, the limitations of ChatGPT can be seen as its inability to fulfil specific jobs or tasks that users are hiring it to do, such as providing visuals, detailed data on cases and primary source references. They were also unable to hire it to assist with tasks that involved the use of different media, such as answering questions related to videos or

poster presentations. These limitations hindered the users' ability to accomplish their desired goals and tasks effectively with the tool. From a Bourdieusian perspective, the limitations of ChatGPT may reflect the unequal distribution of cultural capital among users. The ability to effectively navigate and utilise ChatGPT's capabilities, such as cross-referencing information or critically assessing its outputs, is influenced by the possession of cultural capital. Students who have been exposed to educational resources and have developed the necessary skills may benefit more from using ChatGPT, while those lacking cultural capital may struggle to fully utilise its potential. This highlights the role of social inequalities and the reproduction of advantage in educational settings. From a Marxist perspective, ChatGPT, as a technological tool, may be seen as being shaped by the profit-driven logic of capitalism. Its limitations may arise from cost considerations, efficiency requirements or the prioritisation of certain tasks over others. These limitations reflect the broader dynamics of capitalist technology, where the pursuit of profit and market demands may compromise the quality, accuracy and comprehensiveness of the outputs. Regarding Heidegger's theories on technology, the limitations of ChatGPT reveal the essence of technology as an instrument or tool that has its own limitations and cannot replace human capabilities fully. ChatGPT's inability to analyse handwriting or handle tasks that require human senses and context demonstrates the importance of human presence, interpretation and understanding in certain educational contexts.

How ChatGPT May Affect the Roles of Stakeholders

Students' experiences with ChatGPT encompassed both advantages and disadvantages. On the one hand, it demonstrated proficiency in completing tasks and offered convenience. However, concerns arise about its potential to hinder active engagement, critical thinking and independent knowledge acquisition. Some students expressed worries about overreliance on ChatGPT, which could discourage them from engaging in the learning process and developing their own ideas. Additionally, concerns about potential misuse, such as outsourcing assignments or facilitating cheating, underscore the importance of maintaining assessment authenticity and fostering critical thinking skills.

For instructors, integrating ChatGPT presents new challenges and considerations. While it can generate ideas, suggest rubrics and assist in various tasks, careful adaptation of assessments is necessary to avoid redundancy and ensure alignment with ChatGPT's capabilities. The impact of ChatGPT on in-class activities is also a concern, as it may bypass the learning process and hinder effective teaching. To address this, instructors need to rethink their approach to in-class activities and actively manage ChatGPT's use to ensure students are actively learning and not solely relying on the AI tool.

Furthermore, institutions of higher education must carefully consider the broader implications of ChatGPT integration. This will involve re-evaluating literacy requirements and assessment practices, with a focus on critical thinking and creativity. The successful integration of ChatGPT will require transparency, adaptation and AI-proofing activities. Institutions will also need to establish clear policies on assessment and plagiarism detection. Balancing AI integration will be essential in order to harness its benefits without undermining student learning experiences. Therefore, institutions will need to provide proper training to instructors to encourage and enable them to embrace new teaching approaches in this AI-driven landscape.

Limitations of a Generalised Bot for Educational Context

The theme ‘Limitations of a Generalised Bot for Educational Context’ explores the challenges and shortcomings of using a general-purpose bot in education, including gaps in knowledge, disciplinary context limitations and culturally specific database issues.

Gaps in Knowledge

One significant caveat of ChatGPT is its reliance on pre-September-2021 knowledge, as it does not crawl the web like traditional search engines. This was observed in the following instances. The instructor stated, ‘I asked my students to ask ChatGPT about the implications for AI and court cases. After this, I gave them some recent articles to read about the implications of AI for court cases and asked them to make notes. They then compared their

notes to ChatGPT's answers. The students felt the notes they had made about the implications were more relevant than ChatGPT's responses. This may have been because the articles I provided them with had been published in late 2022 or early 2023, whereas ChatGPT's database only goes up to 2021' (TFD). In a similar vein, the researcher said, 'I was interested in analysing some of my findings against the PICRAT matrix that I was familiar with but has only recently been developed. I asked ChatGPT about this. Three times it gave me incorrect information until I challenged it, whereupon it eventually responded that it did not know about PICRAT' (RFD). Interestingly, the concept of gaps in knowledge did not emerge prominently in the literature review; therefore, we turn to our theorists.

Through Christensen's lens, ChatGPT's limitations in knowledge can hinder its ability to adequately serve the job of providing accurate and up-to-date information. Users hiring ChatGPT for information-related tasks may find its outdated knowledge base unsatisfactory in meeting their needs. This is therefore a constraint on ChatGPT's ability to effectively perform the job it is being hired for. The reliance on outdated information may reflect the prioritisation of cost-effectiveness and efficiency in the development of ChatGPT. Analysing ChatGPT's gaps in knowledge through a Heideggerian lens highlights the essence of technology as a human creation and the limitations it inherits. ChatGPT, as a technological tool, is bound by its programming and training data, which define its knowledge base and capabilities. The gaps in knowledge arise from the inherent limitations of the technology itself, which cannot transcend the boundaries of its design and training. This perspective prompts reflection on the human–technology relationship and raises questions about the extent to which AI systems can genuinely meet the needs of the complexities of human knowledge and understanding.

Disciplinary Context Limitations

A prominent finding from the data is ChatGPT's limitations in understanding specific disciplinary contexts or possessing specialised knowledge in certain fields. One student pointed out that ChatGPT's AI might not make judgements in the same way a human judge can, given the availability of evidence, which could lead to questionable decisions (SFD). Similarly, another student expressed that without access to proper sources, a

judge, in this case ChatGPT, might struggle to make accurate judgements (SFD).

Alshater (2022) also raised the concern that ChatGPT and similar chatbots may lack extensive domain knowledge, particularly in economics and finance. He pointed out that, due to the training data used to develop ChatGPT, it might not possess deep expertise in specific domains (in his case, economics and finance), which therefore limits its ability to accurately analyse and interpret data in these areas. Consequently, he warned that using ChatGPT for tasks like data analysis or research interpretation in fields where ChatGPT is lacking may lead to errors and incomplete analyses. To address this limitation, Alshater suggested users should be cautious, employ additional resources or expert knowledge and have human oversight to ensure accurate outputs (2022). However, he remains optimistic about ongoing advancements in natural language processing and machine learning, which he believes could enhance the domain-specific expertise of AI systems like ChatGPT in the future.

Through Christensen's lens, ChatGPT fails to adequately address the needs of users seeking accurate judgments and in-depth expertise in certain domains. Users desire a tool that can effectively analyse and interpret data in these areas, but ChatGPT falls short in meeting this specific job to be done. Bourdieu's theory is evident in the way students express concerns about the limitations of ChatGPT. The possession of specialised knowledge in specific fields is seen as a form of cultural capital. Students recognise that relying solely on ChatGPT for complex judgments and analyses might not lead to desirable outcomes. Through a Marxist lens, the limitations of ChatGPT in certain domains may perpetuate existing social structures, wherein expertise and knowledge in these areas are valued and rewarded. Reliance on AI systems like ChatGPT for complex tasks could also potentially lead to the devaluation of human labour and expertise in these fields. Through a Heideggerian lens, the limitations observed in ChatGPT's understanding and domain knowledge are rooted in its programming and training data, defining its capabilities. As a tool, ChatGPT can only operate within the boundaries of its design and training, leading to insufficiencies in human usage.

Culturally Specific Database

The concept of a culturally specific database in ChatGPT refers to its access or training on a database specific to a particular culture or cultural context. This can potentially limit its relevance to the individual needs of users. A 2020 study by the Massachusetts Institute of Technology warns about this, as there is the possibility of encoding biases into the technology if the training data is overly hegemonic (Grove, 2023). While it is difficult to determine the exact composition of ChatGPT's database, it is worth noting that OpenAI and Google (now Alphabet Inc.) are based in California, and Microsoft is headquartered in Washington. Thus, the involvement of these companies in developing and utilising AI suggests a strong connection to American culture and potentially a Western perspective. As a result, the cultural context and perspectives of these companies may influence the development and training of the AI model.

This concern about cultural specificity was also evident in the data provided by the students. One student cautioned against relying on ChatGPT in legal education, noting that laws differ across countries and it may not be appropriate to expect ChatGPT to provide accurate assistance in such matters (SFD). Another student expressed doubts about ChatGPT's ability to offer reliable judgements, citing an example where applying English case law to Turkish legal matters led to incorrect conclusions (SFD). This issue was also observed in a previously described example concerning transgender pronouns in Turkey, where ChatGPT demonstrated a limited understanding of the Turkish language and provided incorrect information.

Surprisingly, the literature did not explicitly address these concerns about cultural databases. However, Sullivan et al.'s (2023) study did highlight the cultural limitations of their research, which focused on news articles from Australia, New Zealand, the United States and the United Kingdom. They pointed out the imbalance in academic studies that predominantly analyse Western news, particularly from the United States. They warn that this imbalance raises cautionary flags about relying solely on Western voices and perspectives when discussing ChatGPT and similar technologies. We believe their concerns can also be extrapolated to ChatGPT's database.

When it comes to looking at this issue through the lens of Christensen, the concerns raised by the students regarding the cultural specificity of ChatGPT's database highlight the potential mismatch between the job they

are hiring it to do and the capabilities of ChatGPT itself. This misalignment indicates the need for improvements in addressing specific user needs and cultural contexts. From a Bourdieusian viewpoint, the involvement of AI companies, such as OpenAI, Microsoft and Google, primarily based in the United States, suggests a connection to American culture and a Western perspective. This cultural capital and habitus shape the training and implementation of AI models, potentially encoding biases and limitations into the technology. The concerns about the accuracy and relevance of ChatGPT's responses in different cultural contexts reflect the influence of cultural capital on the AI system's performance. Through a Marxist lens, the concentration of power in these companies, along with their Western cultural context, may result in biased or limited representations of knowledge and perspectives. Furthermore, Heidegger's views on technology prompt us to question the very essence and impact of AI systems like ChatGPT. The concerns about cultural specificity and resulting limitations raise existential questions about the role and responsibility of AI in human activities. Moreover, the constraints posed by ChatGPT's database and potential biases call for critical reflection on the essence of AI, its impact on human knowledge and decision-making and the ethical considerations surrounding its development and use.

How ChatGPT May Affect the Roles of Stakeholders

For students, ChatGPT's gaps in knowledge and disciplinary context limitations may impact their reliance on the AI system for accurate information and analysis. The examples provided by the instructor and researcher demonstrate instances where students found their own notes or domain-specific knowledge more relevant than ChatGPT's responses. This suggests that students may need to critically evaluate and supplement the information provided by ChatGPT with their own expertise or additional resources. It also highlights the importance of cultivating their own knowledge and critical thinking skills rather than solely relying on AI systems.

Instructors may need to adapt their teaching approaches and guide students in effectively using ChatGPT while being aware of its limitations. They can encourage students to question and critically evaluate the information provided by the AI system, promoting a deeper understanding

of the subject matter. Instructors may also need to provide up-to-date resources and incorporate discussions on the limitations of AI technologies to enhance students' awareness and discernment.

Furthermore, this means that institutions of higher education have an important role to play in shaping the integration of AI systems like ChatGPT into their educational settings, providing guidelines and ethical frameworks for the responsible use of AI in education, to ensure that their students are aware of the limitations and biases associated with these technologies. Institutions should also foster interdisciplinary collaborations and partnerships with industry to address the disciplinary context limitations of ChatGPT, facilitating the development of AI systems with domain-specific expertise. Additionally, the concerns raised about cultural specificity and biases in ChatGPT's database highlight the need for institutions to promote cultural diversity and inclusivity in AI purchasing, development and utilisation. By incorporating diverse cultural systems, perspectives and datasets, institutions can help mitigate the potential biases and limitations, ensuring that they better serve the needs of students from various cultural backgrounds.

In this chapter, we have taken a deep dive into the influence of ChatGPT on students, instructors and higher education institutions within the scope of our key themes. Throughout our discussion, we have discerned the necessary actions that universities should undertake. These encompass ethical considerations, such as evaluating AI detection tools, critically assessing AI referencing systems, redefining plagiarism within the AI era, fostering expertise in AI ethics and bolstering the role of university ethics committees. They also encompass product-related matters, including ensuring equitable access to AI bots for all students, fostering collaborations with industries, obtaining or developing specialised bots and offering prompt engineering courses. Additionally, there are educational ramifications, like addressing AI's impact on foundational learning, proposing flipped learning as a strategy to navigate these challenges, reimagining curricula to align with the AI-driven future, advocating for AI-resilient assessment approaches, adapting instructional methods, harnessing the potential of prompt banks and promoting AI literacy. Moving forward, in the next three chapters, we discuss the practical implications of these findings, grouping them into ethical, product-related and educational implications. Thus, while this chapter has outlined the essential steps that

must be undertaken, the following three chapters present pragmatic approaches for putting these actions into practice.

Chapter 7

Ethical Implications

Assessing Artificial Intelligence (AI) Detection Tools

The ongoing debate in current discourse, as illuminated within the literature review, revolves around the incorporation of AI detection tools by universities to counteract plagiarism. Sullivan et al. (2023) discussed a variety of available tools for this purpose, encompassing OpenAI's Open Text Classifier, Turnitin, GPTZero, Packback, HuggingFace.co, and AICheatCheck. However, reservations were expressed concerning the precision and sophistication of these detection mechanisms. Rudolph et al. (2023) shed light on the paradoxical nature of utilising AI-powered anti-plagiarism software while AI models, such as Chat Generative Pre-trained Transformer (ChatGPT), could potentially evade plagiarism detection through sentence modifications that lower originality index scores. Similarly, Tlili et al. (2023) acknowledged concerns tied to cheating and manipulation with ChatGPT, uncovering its role in assisting students with essays and exam responses, which could facilitate cheating and circumvent detection. Consequently, a scenario could emerge where students are tempted to delegate assignments to ChatGPT or employ it to sidestep plagiarism checks, thereby raising questions about the authenticity of their work. Given this context, educational institutions and educators are confronted with the urgent responsibility of addressing these challenges and devising guidelines to regulate the utilisation of AI tools in education. The necessity for robust measures to counteract cheating and ensure prevention has become a central concern. However, a crucial question arises: Can this be feasibly achieved using the existing AI detection tools? Recent research appears to suggest otherwise. A study released in June by researchers from European universities brought forward the assertion that the existing

detection tools lack precision and dependability, displaying a predominant inclination to categorise content as human-written rather than detecting AI-generated text (Williams, 2023). Prior to this, another study highlighted the disproportionate disadvantage faced by non-native English speakers, as their narrower vocabularies resulted in elevated penalties compared to native speakers (Williams, 2023). Furthermore, a separate investigation conducted by scholars from the University of Maryland underscored the issue of inaccuracy and demonstrated that detectors could be readily circumvented by students employing paraphrasing tools to rephrase text initially created by large language models (Williams, 2023). So where does this leave universities?

To explore this matter further, at our institution, the director of the library extended invitations to AI detection tool companies, enabling them to deliver presentations on their products. This platform allowed them to demonstrate their upgraded tools, followed by interactive question and answer sessions aimed at obtaining more profound insights. According to the companies' claims, they have incorporated AI writing detection capabilities into their tools, aiming to assist educators in maintaining academic integrity and fairness among students. These capabilities include an AI writing indicator that is integrated within the originality reports. This indicator provides an overall percentage indicating the likelihood of AI-generated content, such as text produced by ChatGPT. Additionally, it generates a report highlighting specific segments predicted to be authored by AI. The companies emphasise that the AI writing indicator is intended to provide educators with data for decision-making based on academic and institutional policies, rather than making definitive determinations of misconduct, and caution against solely relying on the indicator's percentage for taking action or as a definitive grading measure. Now, the question remains: How do these AI detectors actually work?

AI writing detection tools operate by segmenting submitted papers into text segments and assessing the probability of each sentence being written by a human or generated by AI, providing an overall estimation of the amount of AI-generated text. However, unlike traditional plagiarism detection tools that employ text-matching software to compare essays against a vast database of existing sources and highlight specific matches, AI plagiarism detection tools offer probabilities or likelihoods of content being AI-generated, based on characteristics and patterns associated with

AI-generated text. The proprietary nature of these AI detection systems often limits transparency, making it challenging for instructors and institutions to verify the accuracy and reliability of what is purported to be AI-generated content. This lack of concrete evidence has significant implications, particularly in cases where students face plagiarism accusations and legal action, as it becomes more difficult to substantiate claims and defend against accusations without explicit evidence of the sources.

Two recent cases at the University of California Davis shed light on the challenges universities encounter with AI detection software. One case involved William Quarterman, a student who received a cheating accusation from his professor after the professor used the AI-powered tool GPTZero to analyse Quarterman's history exam for plagiarism (Jiminez, 2023). Despite Quarterman's adamant denial, the software supported the professor's claim, resulting in a failing grade and a referral for academic dishonesty. The subsequent honour court hearing caused significant distress to Quarterman, who ultimately proved his innocence and was exonerated. In a similar incident, Louise Stivers, a graduating senior, was falsely accused of plagiarism (Klee, 2023). The investigation revealed a significant limitation in the AI plagiarism detection software used at UC Davis – the software had been trained on a narrow dataset that failed to account for the diverse writing styles and cultural backgrounds of the student body. This highlighted the issue of cultural bias in AI algorithms and emphasised the need for more inclusive AI development. As a result of being wrongfully accused, Stivers actively collaborated with the university to enhance the software's inclusivity and accuracy. Her contribution aimed to foster a fairer approach to AI technology in academic settings, ensuring that it better accommodates the diverse student population and provides accurate results in detecting plagiarism (Klee, 2023).

Thus, the decision to use AI detection tools in universities is a topic of concern and discussion. Kayla Jiminez (2023) of *USA Today* highlights the advice of educational technology experts, cautioning educators about the rapidly evolving nature of cheating detection software. Instead of immediately resorting to disciplinary action, experts suggest asking students to show their work before accusing them of using AI for assignments. Neumann et al. (2023) support this approach and recommend a combination of plagiarism checkers and AI detection tools, with manual examination as

a backup. They stress the importance of thorough reference checks and identifying characteristics of AI-generated content. Rudolph et al. (2023) also acknowledge the limitations of anti-plagiarism software in detecting ChatGPT-generated text and propose building trusting relationships with students and adopting student-centric pedagogies and assessments. They discourage a policing approach and emphasise assessments for and as learning. At MEF, we concur with this perspective. Based on our investigations, we believe that current AI detection tools are not suitable for their intended purpose. Instead of relying solely on such tools, we suggest implementing alternative supports for assessing students' work, such as one-to-one discussions or moving away from written assessments altogether. We believe the solution is to ban AI detection tools but not AI itself.

Scrutinising AI Referencing Systems

The absence of a standard referencing guide for ChatGPT poses significant challenges for users in academic contexts, including the lack of provided references and established guidelines for referencing ChatGPT-generated information. However, we can break down these challenges into three key issues. Firstly, ChatGPT itself does not cite the sources it has used. Secondly, users may treat ChatGPT as a search engine, requiring them to cite it, but no standard referencing systems currently exist. Thirdly, ChatGPT can be used as a tool to develop ideas and improve writing, raising the question of whether a referencing system should be used at all in such instances.

In addressing the first concern, researchers have been working on developing a system for ChatGPT to identify the sources of its information. Rudolph et al. (2023) highlight significant progress in this area, such as the creation of the prototype WebGPT, providing access to recent and verified sources. Additionally, AI research assistants like Elicit assist in locating academic articles and summarising scholarly papers from repositories. At our institution, we also tested the beta plugin for ChatGPT-4 called ScholarAI, which yielded promising results. ScholarAI grants users access to a database of peer-reviewed articles and academic research by linking the large language models (LLMs) powering ChatGPT to open access Springer-Nature articles. This integration allows direct queries to relevant peer-

reviewed studies. These advancements aim to bolster the quality and credibility of academic work by incorporating up-to-date information and reliable sources. Consequently, we believe the responsibility for implementing a source identification system lies with the developers, while the responsibility of institutions of higher education is to remain updated on these developments.

Regarding the second concern, which revolves around the absence of a referencing model for using ChatGPT as a source of information, it is important to note that this issue currently remains unresolved. At the time of writing, there are no standard referencing systems specifically designed for ChatGPT or similar AI chatbots. However, teams like American Psychological Association (APA) and Modern Language Association (MLA) are actively engaged in developing guidelines that address the citation and appropriate usage of generative AI tools. In spring 2023, they provided interim guidance and examples to offer initial direction. However, before delving into the specific efforts of teams like APA and MLA, let's first understand the fundamental purpose of referencing sources in an academic paper. Referencing sources in an academic paper serves several crucial purposes. Firstly, it allows you to give credit to the original authors or creators of the work, acknowledging their contributions and ideas. By doing so, you demonstrate that you have engaged with existing research and built upon it in your own work. Secondly, referencing supports your claims and arguments by providing evidence from reputable sources. This adds credibility to your paper and shows that your ideas are well-founded and supported by existing literature. Moreover, proper referencing enables readers to verify the accuracy and reliability of your information. By following the references to the original sources, they can ensure the integrity of your work and establish trust in your findings. By citing sources, you showcase your research skills and ability to identify relevant and reliable information. It reflects your understanding of the field and your contribution to the broader scholarly conversation. Referencing also plays a crucial role in avoiding unintentional plagiarism. By properly attributing the sources you have used, you demonstrate that you have built upon existing knowledge rather than presenting it as your own. Additionally, citing sources contributes to the academic community by establishing connections between your work and that of others in the field. It fosters an ongoing scholarly discussion and helps shape the future of research. Overall,

referencing is an integral part of academic integrity, ensuring that a paper is well-researched, credible and part of the larger academic conversation.

With this in mind, let's take a look at what one of the leading citation and referencing organisations is suggesting. APA suggests that when incorporating text generated by ChatGPT or other AI tools in your research paper, you should follow certain guidelines (McAdoo, 2023). They suggest that if you have used ChatGPT or a similar AI tool in your research, you should explain its utilisation in the method section or a relevant part of your paper. For literature reviews, essays, response papers or reaction papers, they suggest describing the tool's usage in the introduction and that, in your paper, you should provide the prompt you used and include the relevant portion of the text that ChatGPT generated in response. However, they warn that it is important to note that the results of a ChatGPT 'chat' cannot be retrieved by other readers and that, while in APA Style papers, non-retrievable data or quotations are typically cited as personal communications, ChatGPT-generated text does not involve communication with a person (McAdoo, 2023). Therefore, when quoting ChatGPT's text from a chat session, they point out that it is more akin to sharing the output of an algorithm. They therefore suggest that in such cases, you should credit the author of the algorithm with a reference list entry and the corresponding in text citation. They give the following example.

> When prompted with "Is the left brain right brain divide real or a metaphor?" the ChatGPT-generated text indicated that although the two brain hemispheres are somewhat specialised, "the notation that people can be characterised as 'left-brained' or 'right-brained' is considered to be an oversimplification and a popular myth" (OpenAI, 2023).
>
> Reference
>
> OpenAI. (2023). ChatGPT (Mar 14 version) [Large language model]. https://chat.openai.com/chat

They also suggest that in an APA Style paper, you have the option to include the full text of lengthy responses from ChatGPT in an appendix or online supplemental materials. They say that ensures that readers can access

the precise text that was generated, however, they note that it is crucial to document the exact text as ChatGPT will produce unique responses in different chat sessions, even with the same prompt (McAdoo, 2023). Therefore, they suggest that if you choose to create appendices or supplemental materials, you should remember to reference each of them at least once in the main body of your paper. They give the following example:

> When given a follow-up prompt of "What is a more accurate representation?" the ChatGPT-generated text indicated that "different brain regions work together to support various cognitive processes" and "the functional specialisation of different regions can change in response to experience and environmental factors" (OpenAI, 2023; see Appendix A for the full transcript).
>
> Reference
>
> OpenAI. (2023). ChatGPT (Mar 14 version) [Large language model]. https://chat.openai.com/chat

APA also suggests that when referencing ChatGPT or other AI models and software, you can follow the guidelines provided in Section 10.10 of the Publication Manual (American Psychological Association, 2020, Chapter 10) (McAdoo, 2023). They note that these guidelines are primarily designed for software references and suggest these can be adapted to acknowledge the use of other large language models, algorithms or similar software. They suggest that reference and in text citations for ChatGPT should be formatted as follows:

> OpenAI. (2023). ChatGPT (Mar 14 version) [Large language model]. https://chat.openai.com/chat
>
> Parenthetical citation: (OpenAI, 2023)
>
> Narrative citation: OpenAI (2023)

Now, let's examine APA's suggestions and critique them based on the fundamental purpose of referencing sources in an academic paper: giving credit, supporting arguments and claims, enabling verification of source accuracy and demonstrating proper research skills. We can do this by posing questions.

- *When using ChatGPT, is it possible to give credit to the original authors or creators by referencing sources in an academic paper?*
  No, ChatGPT itself cannot give credit to original authors or creators in an academic paper. As a language model, it lacks the capability to identify or reference external sources. Hence, it becomes the researcher's responsibility to ensure proper attribution of credit to the original authors or creators of the information used in a paper.
- *Is it possible to use ChatGPT to support arguments and claims with evidence by citing reputable sources?*
  No. ChatGPT can provide responses based on the input it receives, which may include references to information or data. However, ChatGPT generates text based on the patterns it has learnt from the data it was trained on and does not have the ability to verify the credibility or reliability of the sources it may refer to. Therefore, researchers should independently verify and cite reputable sources to support their arguments and claims.
- *Is it possible to use ChatGPT to enable verification of the accuracy and reliability of information by providing references to the original sources?*
  No, ChatGPT does not have the capability to provide references to original sources. If information generated by ChatGPT is used in research, it is the researcher's responsibility to find and cite the original sources from which the information is derived.
- *Can ChatGPT be used to demonstrate research skills by properly referencing relevant and reliable sources?*
  No. As a language model, ChatGPT does not have the ability to demonstrate research skills or properly reference sources. Therefore, the responsibility for conducting thorough research and citing relevant and reliable sources lies with the researcher.
- *Can ChatGPT be used to avoid unintentional plagiarism by citing sources and giving credit where it is due?*

No. While ChatGPT may provide responses based on the input it receives, it is not equipped to identify or prevent unintentional plagiarism. Therefore, it is the researcher's responsibility to ensure that they properly cite and give credit to the original sources of information to avoid plagiarism.

- *Can ChatGPT be used to contribute to the academic community by citing existing research and establishing connections between a researcher's work and the work of others in the field?*
  No. While ChatGPT can provide information based on the input it receives, it is not capable of contributing to the academic community by citing existing research or establishing connections between works. Therefore, researchers should independently conduct literature reviews and cite relevant works to contribute to the academic discourse.

The resounding answer to all the questions we posed above is a definitive ‘no’. While we acknowledge APA's well-intentioned efforts to address academic integrity concerns by suggesting ways to cite ChatGPT, we find their recommendations unfit for purpose. If the goal of referencing is to enable readers to access and verify primary sources, APA's suggestions do not align with this objective. They merely indicate that ChatGPT was utilised, which demonstrates the writer's academic integrity but does not provide any practical value to the reader. In fact, based on this, we believe that ChatGPT, in its current form, should be likened to Wikipedia – a useful tool as a starting point for research, but not to be used as a valid source for research. Therefore, we believe that to ensure the validity of the research, ChatGPT should be seen as a springboard for generating ideas, from which the researcher can then seek out primary sources to support their ideas and writing. Hence, it would be more beneficial for researchers to simply cite the sources they have fact-checked, as this approach provides valuable information to the reader.

Now, let's address our third area of concern, which revolves around ChatGPT being used as a tool for idea development and writing enhancement. This raises the question of whether a referencing system is applicable in such instances. To shed light on this matter, we explore MLA's suggestions on how to reference ChatGPT when it serves as a writing tool. MLA suggests that you should: ‘cite a generative AI tool whenever you paraphrase, quote, or incorporate into your own work any content (whether

text, image, data, or other) that was created by it; acknowledge all functional uses of the tool (like editing your prose or translating words) in a note, your text, or another suitable location; take care to vet the secondary sources it cites' (*How Do I Cite Generative AI in MLA Style?*, n.d.). In our previous discussion, we have already addressed the third point. If you need to verify the secondary sources cited by ChatGPT, why not simply use those vetted sources in your citation and referencing, as this is more helpful for the reader. However, we still need to explore the other aspects concerning the recommendation to cite an AI generative tool. For instance, when paraphrasing or using the tool for functional purposes like editing prose or translating words, how should this be implemented in practice? In order to do this, let's explore how ChatGPT has been utilised in the writing of this book. Notably, ChatGPT was not used as a search engine, evident from the majority of our referenced articles and papers being published after September 2021, which is ChatGPT's cutoff for new information. However, it played a significant role in the research process, as documented in the researcher-facing diary and integrated into the write up of this book. While we've already discussed its role in the research methodology and through examples in the findings and interpretation chapter, we now focus specifically on how ChatGPT contributed to the writing process of this book. To illustrate the full scope of its assistance, we revisit Bloom's Taxonomy, which provides a useful framework for mapping the most commonly used phrases we employed with ChatGPT during the writing phase.

- Remembering
  - Reword this paragraph to improve its coherence.
  - Slightly shorten this section to enhance readability.
  - Summarise the key arguments presented in this article.
- Understanding
  - Explain the main ideas in this text using simpler language.
  - Paraphrase the content of this article.
  - Shorten this text but keep its core concepts.
- Analysing

  - Evaluate the strengths and weaknesses of this theory and propose ways to reinforce its main points.
  - Analyse this text through the lens of (this theorist).
  - Assess the effectiveness of this argument and suggest improvements to make it more impactful.
- Evaluating

  - Critically assess the clarity of this text and rephrase it for better comprehension.
  - Evaluate the impact of this section and propose a shorter version that retains its persuasive strength.
- Creating

  - Provide a more concise version of this text while retaining its core meaning.
  - Summarise this chapter in a concise manner while retaining its key findings.

Have we referenced all instances of the examples above? No. And there are reasons for this. As discussed in the findings, it's crucial to go through multiple iterations when using ChatGPT. This raises the question of whether we should reference all the iterations or only the final one. Additionally, ChatGPT was a constant tool throughout the writing of this book. If we were to reference every instance, following MLA's suggestion, the book would likely become five times longer and mostly consist of references, which would not be beneficial to the reader. Considering that one of the purposes of referencing is to aid the reader, MLA's suggestions seem unsuitable for this purpose. Indeed, referencing every instance of ChatGPT use would be akin to a mathematician citing each time they used a calculator, rendering the referencing of it impractical. Similarly, other writing tools like Grammarly have not been subject to such exhaustive referencing expectations. Following on from our mathematics example, it should be noted that AI chatbots, including ChatGPT, have been likened to calculators for words. However, we find this view a little simplistic. Unlike calculators, AI chatbots have advanced capabilities that extend beyond basic tasks, reaching higher levels of Bloom's Taxonomy, such as applying, analysing, evaluating and creating, thereby fulfilling tasks that are usually

considered to part and parcel of what it means to be a writer. This leads us to ask, what does it mean to be a writer in the days of AI?

In the era of AI, the role of a writer takes on a whole new dimension, with AI models now capable of performing tasks that were traditionally considered the sole domain of human writers. This blurs the lines between human creativity and AI assistance, raising concerns about potential loss of human agency in the writing process, as evidenced in the Hollywood script writers strike, which also highlights the risk of significant job losses. One of the key challenges of relying solely on AI for writing is that it heavily relies on previous input, potentially stifling new thoughts, developments and creativity. To avoid these issues, we believe being a writer in the AI era requires embracing a collaborative approach between human intellect and AI technology. Instead of replacing human writers, AI can be harnessed as a supportive tool. Writers now have the opportunity to utilise AI tools to enhance various aspects of the writing process, such as idea generation, content organisation and language refinement. By offloading repetitive and time-consuming tasks to AI, writers can dedicate more attention to crafting compelling narratives, conducting in-depth analyses and expressing unique perspectives. They should also actively maintain their critical thinking abilities and originality, ensuring that AI assistance complements and augments their creative expression, rather than replacing it. We believe that, ultimately, being a writer in the AI era involves striking a balance between leveraging the opportunities AI technology provides and preserving the essential human aspects of creativity and originality in the writing process. This is exactly what we have done in this book. However, finding this equilibrium between human writers and AI remains a significant challenge and will shape the future landscape of writing in ways that are yet to be fully realised.

Rethinking Plagiarism in the Age of AI

Throughout this chapter, our exploration has centred on AI detector tools, revealing their inability to meet intended expectations. Additionally, we've examined the emerging guidelines for referencing AI chatbots, such as ChatGPT, and determined their inadequacy. This, therefore, raises questions about how we deal with plagiarism in light of these new challenges.

However, it's important to acknowledge that the new challenge posed by plagiarism in the AI era is not unfamiliar in academia. Over the years, with the advent of new technologies, similar situations have arisen, most notably following the launch of Wikipedia in 2001, followed by the rise of contract cheating sites. These events required institutions to recalibrate their understanding of academic work and research paradigms. Today, as work produced by AI becomes a fact of life, universities find themselves faced with the task of adjusting their regulations, expectations and perspectives to accommodate these technological breakthroughs. But before we proceed further in this discussion, it's crucial to understand the core concept of plagiarism.

Plagiarism constitutes the act of using another's work or ideas without giving them appropriate recognition, often with the aim to present it as one's own creation. This could involve directly copying and pasting text from a source without citation, closely paraphrasing another's work or even submitting someone else's entire work as your own. Many sectors, including academia and journalism, view plagiarism as a severe ethical breach. However, plagiarism is not always a deliberate act. It can occur accidentally, particularly if there is a lack of due diligence or understanding about what constitutes plagiarism, how to cite correctly or the correct way to paraphrase and reference. Until now, students have had clear guidelines on how to cite and reference sources. They have also had the option to utilise plagiarism detectors to review their work and make necessary modifications. However, the advent of AI chatbots has complicated the situation. There are currently no universally accepted referencing guidelines for citing AI, and the reliability of AI-based detector tools is questionable. And if plagiarism is defined as the act of utilising another's work or ideas without giving them due acknowledgement, how does this definition evolve when the work in question is created by an AI and not a human? This paradigm shift blurs the traditional understanding of plagiarism and introduces the concept of ‘appropriating’ work from an AI, which, unlike humans, doesn't possess identifiable authorship or an individual identity. Interestingly, it could be posited that the AI chatbots themselves could be seen as ‘appropriating’ all the information they generate without crediting the original authors. Thus, a conundrum emerges where students may be using AI in an unethical manner without referencing it, whilst the AI itself is using information without appropriate citation. It is this very conundrum

that leads to the multitude of challenges we are currently grappling with, concerning how we can even cite and reference AI. So, the question arises, where does this new reality place students and academics?

Neumann et al. in their 2023 study, acknowledged the existence of several pending inquiries that need further exploration, such as, ‘Should text generated by ChatGPT be considered a potential case of plagiarism?’, ‘How ought one to reference text produced by ChatGPT?’ and ‘What is an acceptable ratio of ChatGPT-generated text relative to the overall content?’. However, they also recognised that numerous other questions will inevitably emerge. Despite these considerations, given the current circumstances, especially the inherent issues with AI, namely their lack of citation for their own sources, these queries appear somewhat naive. Perhaps it would be more beneficial to explore alternative strategies. This could potentially involve designing assignments in a way that circumvents the plagiarism issue, a topic we discuss later in Chapter 9. Alternatively, we may need to concentrate our efforts on fostering AI ethical literacy, a promising emerging field.

Cultivating Proficiency in AI Ethics

Academic integrity lies at the core of ethical academic practice. It is composed of a set of guiding principles and conduct that nurtures honesty and ethical behaviour within the academic community. This moral compass or ethical code of academia embodies values such as honesty, trust, fairness, respect and responsibility. From a practical perspective, academic integrity manifests when both students and faculty members refrain from dishonest activities such as plagiarism, cheating and fabrication or falsification of data. They are anticipated to own their work, acknowledge others for their contributions, and treat all academic community members with respect. The goal of upholding academic integrity is to cultivate an environment that fosters intellectual curiosity and growth while ensuring that everyone's work is acknowledged and valued. It holds a crucial role in affirming the quality and reliability of the educational system and the research it generates. However, as discussed above, the incorporation of new advancements in AI into this environment presents complex challenges. As such, it appears imperative that the notion of academic integrity advances in

parallel with these breakthroughs in AI, with numerous voices, including Sullivan et al. (2023) advocating for an amplified emphasis on AI ethics literacy. This would mean reshaping the tenets of academic integrity to cater to the unique challenges and opportunities presented by this game-changing technology. But what exactly is AI ethics literacy?

AI ethics literacy encapsulates the ability of users to apply ethical considerations and principles in the utilisation of AI technologies. This concept underlines the importance of understanding the intricacies of AI systems, their strengths and limitations, in order to make informed decisions. Simultaneously, it requires the awareness of potential ethical concerns that can stem from AI usage, such as bias, transparency issues, privacy breaches and accountability. The essence of AI ethics literacy is embedded in the critical thinking process, which pushes individuals to question the usage, benefits, potential harm and the inequities that may arise from AI implementation. It underscores the necessity of utilising AI responsibly, respecting individuals' rights and privacy, and discerning scenarios where AI application may be detrimental or unethical. Furthermore, it invites an element of advocacy and activism, championing for ethically sound AI practices and regulations, while actively opposing harmful AI implementations. As AI technologies continue to evolve and permeate various domains, cultivating AI ethics literacy grows increasingly crucial. It serves as a conduit to ensure AI technologies are wielded in an ethical and responsible manner, upholding human rights while advocating for fairness and transparency. We delve deeper into this topic later in Chapter 9, where we discuss the importance of AI literacy training for both students and educators. However, the most logical starting point to address these concerns is likely through established university ethics committees.

Enhancing the Role of University Ethics Committees

Chapter 2 delved into the rapid evolution of AI ethics, highlighting how the rise of generative AI systems has spurred urgency in addressing issues like fairness, bias, and ethics. Heightened concerns about discrimination and bias, particularly in conversational AI and image models, have prompted ethical inquiries. Nevertheless, as we have seen, proactive measures are

being taken, with increased research, industry involvement and a surge of conferences and workshops focusing on fairness and bias, with concepts such as interpretability and causal inference gaining prominence in these discussions. At the same time, privacy issues linked to AI have initiated discussions on privacy safeguards. Furthermore, worries about how generative AI uses opaque surveillance data have also emerged, raising copyright and creator-related concerns. This intricate ethical landscape is expanding as AI becomes more ingrained in society, necessitating careful oversight beyond technical aspects. In light of this complexity, we advocate for an expanded role for university ethics committees. Traditionally focused on human research and medical ethics, we believe these committees should expand their remit to encompass various dimensions related to AI adoption in education. We believe this should entail evaluating issues such as student data privacy, algorithmic biases, transparency and human-AI interactions. We believe ethics committees should also be working towards ensuring AI systems' transparency in educational contexts, assessing the inclusivity of AI-generated content and facilitating informed consent for student data use. They should also be leading research into AI's ethical implications in education, including AI-supported learning, content biases and overall student impact. Beyond academia, broader ethical concerns encompass privacy, consent and intellectual property. Using AI tools for student work requires compliance with regulations, such as the EU's General Data Protection Regulations (GDPR). Ethical dilemmas also arise from researchers' and students' use of AI, raising questions about academic integrity and ownership of AI-generated outcomes. Ownership rights regarding information in AI systems, especially in innovative areas like product development or patent creation, present complex challenges. These intricate ethical considerations underscore the essential role of university ethics committees in navigating AI's integration in education and research. Their expanded responsibilities will demand vigilance, adaptability and robust ethical guidelines to ensure AI's ethical advancement while upholding values of privacy, fairness and intellectual ownership.

Within this chapter, we have explored several ethical ramifications associated with AI chatbots. These include concerns with AI detection tools, complications regarding AI ChatGPT referencing, redefining plagiarism in the AI era, fostering AI ethics literacy and the expansion of

university ethics committees. Looking ahead, the next chapter delves into the implications regarding products.

Chapter 8

Product Implications

Ensuring Fair Access to Bots

Ensuring equitable access to artificial intelligence (AI) bots within universities is a crucial consideration to prevent creating a digital divide among students. At MEF, we have effectively addressed similar concerns with other applications like digital platforms and massive open online courses (MOOCs). Our strategy involves procuring institutional licences that encompass all students. This approach has proven successful in achieving fair access. Presently, we are aiming to extend this approach to AI chatbots. However, it's worth noting that at the moment, specific institutional agreements tailored for Chat Generative Pre-trained Transformer (ChatGPT) are not available, leading us to explore alternative avenues. One potential solution we are actively considering is obtaining ChatGPT-4 licences for each instructor. This strategy would empower instructors to share links to specific chat interactions within the tool, enhancing classroom engagement during lessons. Nonetheless, an existing constraint with GPT-4 pertains to its hourly completion capacity for requests, which might impact its overall utility in certain contexts. While procuring individual licences for instructors to access specific AI chatbots may not be an ideal permanent solution, it serves as a temporary measure until institutional licences become available or until we consider acquiring or developing specialised bots for each department.

We are also in the process of exploring Microsoft Bing, which has integrated AI into its Edge browser and Bing search engine. This technology draws on the same foundation as OpenAI's ChatGPT, offering an AI-powered experience accessible through mobile applications and voice commands. Similar to ChatGPT, Bing Chat enables users to interact naturally and receive human-like responses from the expansive language

model. Although Bing Chat features have been progressively introduced and are now widely available, our institution's preference for Google services makes a Google-based solution more fitting. Google offers Bard, an experimental AI chatbot similar to ChatGPT. However, Bard stands out by gathering information from the web. It can handle coding, maths problems and writing assistance. Bard was launched in February 2023 and is powered by Google's PaLM 2 language model. While it initially used LaMDA, Google's dialogue model, it switched to PaLM 2 later for better performance. Bard is multilingual and has the ability to include images in its responses. Despite these features, Bard faced criticism upon release. Users found it sometimes gave incorrect information and was not as good as competitors like ChatGPT and Bing Chat. To address these issues, Google shifted from LaMDA to PaLM 2. PaLM 2 is an improved version of Google's language model, built upon the lessons learnt from earlier models like LaMDA. It incorporates advancements in training techniques and model architecture, leading to better overall performance in understanding and generating language. We have now activated Google Bard at MEF so it is active for all of our students and instructors, and, at the time of writing, are now evaluating it as a possible solution.

In our ongoing efforts to secure institutional agreements with major large language model companies, and while we are trialling the effectiveness of Bard, it's important to acknowledge that if this endeavour does not come to fruition by the start of the upcoming academic year, a contingency plan will be activated. In this scenario, instructors could launch a survey at the beginning of a course to identify students who have registered with AI chatbots and tools and are willing to share them with peers. By grouping students with tool access alongside those without, the principle of equitable classroom utilisation would be upheld. This approach carries further benefits. If our educational focus is to foster collaborative engagement within student-centred classes, encouraging students to share tools would circumvent the isolation that arises when each student interacts individually with their bot. Instead, this practice of shared tool usage would promote collective involvement and cooperative learning. It is also worth keeping in mind there will always be open-source alternatives available. These currently include OpenAI's GPT-3, BERT, T5, XLNet and RoBERTa.

Fostering Collaboration with Industries

To address the significant challenge of preparing students for an AI-dominated world, we believe universities should adopt a proactive approach by reverse-engineering ChatGPT and AI chatbot opportunities through industry collaborations, as this will enable them to gain valuable insights into the evolving skill demands and job requirements driven by AI advancements. Based on their findings, universities will be able to reassess existing programmes and curricula to align them with the changing needs of the job market. This process should involve identifying crucial AI-related skills and considering their integration into various disciplines. Additionally, universities can develop new programmes that specifically address the emerging opportunities created by AI technologies. Ideally, such courses should be developed by incorporating real-world industry problems at their core, allowing students to work towards finding solutions by the end of the course as part of their assessment. This has been done at the University of South Florida where they co-created a programme with industry partners, the success of which led to high graduate job placement and salaries (Higher Education That Works, 2023). This type of collaborative approach also paves the way for more students to undertake internships with these companies. Furthermore, through their research, by identifying the types of AI bots industries are currently using, universities can make informed decisions on whether to purchase or develop discipline-specific bots for their departments. This will ensure that graduates are equipped with the specialised knowledge and skills of the AI bots relevant to their chosen fields, better preparing them for the AI-driven job market. However, it should be noted that adopting this reverse engineering approach needs to be an ongoing effort. Universities must continuously assess industry trends, collaborate closely with industry partners and engage AI experts to ensure their programmes and their AI tools remain up to date and responsive to technological advancements.

Acquiring or Developing Specialised AI Bots

While we have discussed how currently, we are actively seeking solutions to ensure equitable access to a generic AI chatbot for all our students, it is

crucial to acknowledge that this is an interim measure. Our research revealed that generic AI bots may not fully align with our requirements, mainly due to their limitations in disciplinary knowledge and cultural databases. Therefore, universities are left with two viable choices. They can either invest in a ready-made discipline-specific bot that caters to their specific needs, also known as ‘walled gardens’, or they opt for an empty bot that can be customised with relevant content tailored to their department and locale. Each approach offers distinct advantages and should be carefully considered based on the unique requirements and preferences of the university and department. Let's start by looking at walled gardens.

Walled garden AI represents a distinctive strand of AI, characterised by its focused training on curated datasets. Unlike broader AI models, which draw from extensive internet data, walled garden AI thrives on limited, carefully selected information (Klein, 2023). This specialised AI variant has found relevance in education due to its potential to yield more trustworthy and dependable AI tools for both educators and students (Klein, 2023). Notably, walled garden AI underpins the creation of chatbots capable of delivering precise and current educational insights. The advantages of walled garden AI within the education sphere are manifold: its restricted dataset cultivates reliability by minimising the risk of generating incorrect or misleading responses; the involvement of reputable organisations in its development establishes a foundation of trust for educators and students, ensuring accuracy and dependability; and walled garden AI's malleability allows for personalised interactions, accommodating unique educational needs (Klein, 2023). However, this approach is not without challenges: the focused development of walled garden AI may result in higher costs compared to more generalised models; the accuracy of its responses is contingent on the quality of its training data; and potential biases stemming from the training data must be addressed to ensure equitable outcomes (Klein, 2023). Therefore, while walled garden AI possesses significant potential as an educational tool, a nuanced understanding of its development and deployment is vital, as its advantages must be weighed against the inherent challenges and considerations it entails (Klein, 2023). BioBERT, SciBERT, ClinicalBERT, FinanceBERT, MedBERT, PubChemAI, PatentBERT and LegalBERT are all examples of walled garden AI, each being tailored to specific domains. These models are meticulously trained on curated datasets that are tightly aligned with their

respective domains. As a consequence, they excel in comprehending and generating content that pertains to the distinct subject matter they specialise in. By catering to unique domains such as biomedicine, scientific research, clinical literature, finance, medicine, chemistry, drug discovery, patent analysis and legal matters, these models can offer professionals and researchers an invaluable tool for tasks that demand a profound understanding of subject-specific information. However, it is worth noting that this specialisation comes with both strengths and limitations, as these models might not perform optimally when handling tasks that require a more expansive and diverse knowledge base.

Instead of purchasing specialised bots, an alternative approach is to acquire an 'empty bot' or a pre-trained language model and conduct fine-tuning specific to your discipline. Fine-tuning involves training a pre-trained language model on a domain-specific data set, enabling it to better comprehend the requirements of your field. This process saves time and resources compared to training a language model from scratch since pre-trained models already possess a solid foundation of language understanding. Fine-tuning builds upon this foundation, making the model more suitable for specialised tasks within your domain. However, successful fine-tuning relies on the availability and quality of your domain-specific dataset, requiring expertise in machine learning and natural language processing for optimal results. Several open-source pre-trained language models serve as starting points for fine-tuning discipline-specific bots. Popular models like BERT, GPT, RoBERTa, XLNet, ALBERT and T5 have been developed by leading organisations and can be fine-tuned for various natural language processing tasks. These models form robust foundations, which can be adapted to your domain by fine-tuning them with relevant datasets. Nevertheless, considering the rapid advancements in the field, it is imperative that universities continuously explore the latest developments to find the most up to date open-source language models suitable for their purposes.

When considering the adoption of AI bots in universities, the decision-making process should involve discussions with each faculty and department. Whether opting for an institutional generic bot, purchasing a pre-trained discipline-specific bot or acquiring an empty bot for fine-tuning, it is crucial to involve relevant stakeholders in the decision-making process. As previously discussed, departments should proactively explore the

industry landscape to identify the bots used in their respective fields and then reverse engineer from those insights to determine the most suitable bot type for their department. However, we understand that not all institutions may have the financial resources to afford such endeavours. In such cases, as a viable backup option, we recommend universities to explore free and open-source tools available for equal access to bots for all students. The open-source community is committed to promoting equality of access and ensures that tools are accessible to everyone. By leveraging these open-source options, universities can still offer students equal opportunities to engage with AI bots, even when budget constraints exist. The key is to foster a collaborative approach that aligns with the institution's values and goals, ultimately enhancing the learning experience for all students.

Providing Prompt Engineering Courses

In response to the significant growth of the prompt engineering job market, universities should proactively offer prompt engineering courses to all students. Prompt engineering is an intricate process that revolves around creating effective prompts to elicit desired responses from language models, such as ChatGPT. This practice necessitates a comprehensive comprehension of the model's capabilities and limitations, enabling the creation of prompts tailored for specific applications like content generation and code completion. Engaging in prompt engineering requires a firm grasp of the architecture of AI language models, a deep understanding of their mechanisms for processing text and an awareness of their inherent constraints. Armed with this foundational knowledge, prompts can be strategically constructed to yield outputs that are both accurate and contextually relevant. This multifaceted process encompasses various elements. One aspect involves becoming adept at generating text using pre-trained models and refining them to suit specific tasks. This proficiency aids in selecting prompts that yield the desired content effectively. Furthermore, creating prompts that lead to coherent and pertinent responses is a nuanced endeavour. It involves accounting for contextual nuances, specificity, phrasing intricacies and the management of multi-turn conversations. Moreover, exerting control over model output is crucial. This is achieved through techniques like providing explicit instructions,

employing system messages and conditioning responses based on specific keywords. These techniques serve as navigational tools for steering the model's output in a desired direction. Prompts that effectively minimise biases or sensitivities in responses are integral to responsible AI interactions. This ethical dimension of prompt engineering ensures that the generated content aligns with fair and unbiased communication. The iterative nature of prompt engineering involves a process of experimentation, result evaluation and prompt refinement. This dynamic cycle is instrumental in achieving intended outcomes, fine-tuning prompts for optimal performance. Additionally, adapting prompt engineering to various tasks, such as content creation, code generation, summarisation and translation, necessitates tailoring prompts to align with the unique context of each task. This adaptability ensures that the prompts are finely tuned to yield contextually relevant and accurate outputs. In essence, prompt engineering is a comprehensive approach that harmonises technical expertise with linguistic finesse. It optimises interactions with language models, yielding responses that are not only accurate but also seamlessly aligned with the intended context and purpose.

Understanding the importance of providing prompt engineering courses to students, at MEF University, beginning in September 2023, we will be offering the Coursera-hosted course ‘Prompt Engineering for ChatGPT’ by Vanderbilt University (White, 2023), providing access to all our students through our MOOC-based programme offerings.

In this chapter, we have extensively examined critical dimensions of integrating AI chatbots in education. This exploration encompassed the imperative of ensuring fair access to these bots, the collaborative efforts universities should engage in with industries to comprehend the skills and tools required of graduates, the strategic decision-making regarding the acquisition or development of specialised AI botsand the significance of providing prompt engineering courses for students. Looking ahead, the next chapter dives deeper into the educational consequences stemming from the integration of AI chatbots.

Chapter 9

Educational Implications

The Impact of AI on Foundational Learning

In this chapter, we delve into the importance of adapting curricula, assessment methods, and instructional strategies to the artificial intelligence (AI) era. A central concern here is the potential impact on foundational learning, as highlighted both in our research findings and Sullivan et al.'s (2023) literature. As with any technology, Chat Generative Pre-trained Transformer's (ChatGPT's) influence on student learning holds both positive and negative aspects. However, our primary focus is on its significant effect on foundational learning. Within this context, several noteworthy considerations arise regarding potential downsides, as observed through our research. A key concern is the potential over-reliance on ChatGPT for generating content, answers and ideas. This dependency has the potential to hinder critical thinking and problem-solving skills, potentially leading to reduced originality in student work and a diminished ability to effectively synthesise information. Additionally, if students routinely turn to ChatGPT to complete assignments, their motivation to autonomously comprehend and research subjects may wane, potentially resulting in surface-level learning and a limited grasp of essential concepts. Another crucial aspect is the potential downside of excessive dependence on ChatGPT, which could diminish authentic interactions with peers and instructors. Such interactions play a crucial role in fostering deep learning and developing important social skills. Furthermore, ongoing reliance on AI for communication might negatively impact language and communication proficiency. Prolonged exposure to AI-generated content might compromise students' ability to express ideas coherently and engage in meaningful conversations. Moreover, using ChatGPT for content creation without proper attribution could undermine students' ability to formulate original

arguments and ideas. An over-reliance on AI for creative tasks like writing or problem-solving might suppress inherent creativity as students become more accustomed to AI-generated patterns and concepts. At this point, we believe it is essential to point out that writing is pivotal not only in creation but also in learning – an approach often referred to as 'writing-to-learn' (Nelson, 2001). Rooted in constructivist theory, this notion underscores the evolution of human knowledge and communication. Whether viewed from individual cognitive perspectives or broader social viewpoints, the dynamic relationship between writing and learning involves selection, organisation and connection (Nelson, 2001). Nelson's work 'Writing as a Learning Tool' (2001) examines four dimensions of writing's connective nature: interlinking ideas, texts, authors and disciplines. She identifies two primary rationales for the writing-to-learn approach: the authority rationale, focusing on mastering subjects through writing and the authenticity rationale, asserting that learning content and writing conventions go hand in hand within academic fields. This reinforces the essential role of writing in learning. Sullivan et al.'s (2023) study similarly emphasises the link between learning and writing, highlighting writing's role in clarifying ideas. Consequently, writing becomes a potent tool for reinforcing knowledge. Summarising, paraphrasing or explaining concepts in one's own words enhances comprehension and retention. Writing nurtures critical thinking as students analyse, evaluate and synthesise information, refining their ability to structure coherent thoughts and support arguments with evidence. Writing also encourages introspection and self-assessment, enabling students to review learning experiences, identify strengths and set improvement goals. This self-evaluation assists in pinpointing gaps and areas for further exploration. Moreover, writing fosters creativity and expression, providing a platform for learners to delve into ideas and emotions, establishing a profound connection with the subject matter. Across disciplines, writing drives problem-solving, research and analysis, as students engage in research papers, case studies and essays, refining their capability to construct solutions and present well-structured arguments. Writing also enhances communication skills, enabling learners to express thoughts proficiently across various domains. Additionally, writing bolsters long-term information retention. Taking notes, creating study guides and practising writing consolidate memory. Integrating writing with other learning methods – such as diagrams and multimedia – promotes diverse

learning, enhancing comprehension through multiple avenues. Writing also fosters metacognition, empowering students to monitor thought processes, evaluate decisions and explore alternative perspectives. Furthermore, it positively influences language proficiency, improving grammar, vocabulary and sentence structure through regular writing practice. Considering the pivotal role of writing in the learning process, concerns arise over the implications of AI tools that support writers in these aspects. Over-reliance on AI-generated content might undermine students' critical thinking abilities. Depending solely on AI suggestions and feedback could hinder thorough engagement with material and the development of independent analytical skills. While AI tools excel in producing structured content, they could stifle creativity and originality, resulting in standardised and repetitive writing. Overemphasis on grammatical accuracy and adherence to rules might discourage experimentation and risk-taking in writing, inhibiting students from exploring their unique writing style. Furthermore, heavy reliance on AI tools might foster technological dependency, diminishing students' self-reliance in problem-solving and learning. Ultimately, focusing exclusively on producing well-structured written content using AI tools could overshadow the learning process itself. Learning encompasses not just the final outcome but also cognitive engagement, exploration and growth throughout the educational journey. This prompts the question: what implications arise if such a scenario unfolds?

The implications of losing foundational learning are significant and far-reaching. This formative phase forms the bedrock for acquiring advanced knowledge and skills, and its absence can reverberate across various aspects of students' academic journey and future prospects. For instance, foundational learning provides the fundamental principles necessary for understanding complex subjects. Without a robust foundation, students may struggle to comprehend advanced concepts, leading to a surface-level grasp of subjects. Higher-level courses typically build upon foundational knowledge; lacking this grounding can impede success in higher education and overwhelm students with coursework. Furthermore, foundational learning nurtures critical thinking, analytical skills and effective problem-solving. A dearth of exposure to this phase might hinder students' ability to analyse information, make informed decisions and effectively tackle intricate issues. A solid foundation also promotes adaptability to new

information and changing contexts, which becomes challenging without this grounding. Furthermore, most professional roles require a firm grasp of foundational concepts. Without this understanding, students might encounter difficulties during job interviews, work tasks and career advancement. In addition, over-reliance on AI tools like ChatGPT may hinder independent and critical thinking, ultimately suppressing creativity, problem-solving and originality. Language development, communication skills and coherent expression of ideas are also nurtured during foundational learning. These skills are essential for effective communication in both written and spoken forms. An absence of foundational learning could lead to a widening knowledge gap that erodes confidence and motivation to learn. Foundational learning also cultivates research skills and the ability to gather credible information. Students without these skills might struggle to locate and evaluate reliable sources independently. Beyond academics, education contributes to personal growth, intellectual curiosity and a well-rounded perspective. The lack of foundational learning may deprive students of these holistic experiences. To prevent these adverse outcomes, the prioritisation of robust foundational learning is crucial. This underscores the significance of creating curricula, assessments and instruction that are resilient to the influence of AI. But how can we do this?

Navigating AI Challenges Through Flipped Learning

To address concerns about students losing foundational learning due to ChatGPT, we believe we should turn to contemporary learning methods, such as flipped learning. Neumann et al. (2023) and Rudolph et al. (2023) suggested that an effective way to deal with AI would be to incorporate it into modern teaching approaches, specifically highlighting flipped learning as being a suitable approach. Rudolph et al. proposed the use of flipped learning, as the essential classwork (the part that supports the development of foundational learning) can occur in-person, emphasising multimedia assignments and oral presentations over traditional tasks (2023). They believe taking this approach will enhance feedback and revision opportunities, which will support foundational learning. Rudolph et al. also

note that ChatGPT can support experiential learning, which is a key aspect of flipped learning. They suggest that students should explore diverse problem-solving approaches through game-based learning and student-centred pedagogies using ChatGPT (2023). Additionally, Rudolph et al. highlight ChatGPT's potential to promote collaboration and teamwork, another aspect inherent in flipped learning. They recommend incorporating group activities in which ChatGPT generates scenarios encouraging collaborative problem-solving, as this approach will foster a sense of community and mutual support among students. Therefore, instead of seeing ChatGPT as disruptive, Rudolph et al. emphasise its potential to transform education, but that this should take place through contemporary teaching methods, such as flipped learning (2023). Therefore, based on our experience, and supported by the literature, we believe flipped learning provides a useful starting point for the creation of curricula, assessments and instruction that are resilient to the influence of AI.

In the research context section of our research methodology chapter, we presented the recommended stages for instructors at MEF to prepare their flipped courses. This involves starting with understanding by design (UbD) and integrating Bloom's taxonomy, Assessment For, As, and Of Learning and Gagne's Nine Events of Instruction reordered for flipped learning. In that section, we described how, through combining these frameworks, we can establish cohesion between curriculum, assessment and instruction, resulting in effective learning. But what happens when AI is involved? In UbD, instructors follow three stages: Stage 1 – identify desired results (curriculum); Stage 2 – determine acceptable evidence (assessment) and Stage 3 – create the learning plans (instruction). Therefore, in addressing how to make teaching and learning AI-resilient, we go through each of these stages, putting forward questions which can be asked at each stage to guide the decision-making process in how and when AI should be integrated.

Future-ready Curricula in the Age of AI

In our recommended flipped learning approach to planning, we start with Stage 1 of the UbD framework – identify desired results. Although we detailed Stage 1 in the research methodology chapter, we revisit it briefly

here for clarity. During Stage 1, instructors establish course objectives and formulate enduring understandings capturing essential, lasting concepts. Essential questions are then created to guide student exploration, fostering critical thinking and problem-solving skills. These questions can be overarching or topical, aligning with broader or specific subjects. Once course objectives, enduring understandings and essential questions are set, the next step involves designing learning outcomes. This is done using Bloom's taxonomy as a guide, ranging from lower to higher cognitive levels, as required. This structured process ensures the development of effective learning outcomes that deepen understanding and guide meaningful instruction. However, in light of the emergence of AI chatbots, such as ChatGPT, we believe it is important that we look at each of the aspects of Stage 1 to assess if they may be affected in any way.

Enduring understandings, representing core knowledge with lasting value, are unlikely to change due to AI advancements. Similarly, essential questions, designed to nurture critical thinking, will likely remain consistent despite AI's influence. However, the evolving AI landscape prompts a closer look at learning outcomes, prompting us to ask whether the learning outcomes we have devised remain relevant in an AI-driven world. To investigate this further, let's consider the learning outcome ‘Compose a mock closing argument on a specific aspect of language in a real-life case and justify your argument’ that was at the heart of the end-of-course performance task on the forensic linguistics course. When the rubric was input into ChatGPT, ChatGPT was instantly able to complete much of this task and, in doing so, achieved the learning outcome with hardly any input from the students. Consequently, this outcome, once valuable in real-world situations, might have lost its significance due to AI's capabilities. In their future careers, students, no doubt, will be using such tools to help them write closing arguments, and ChatGPT will prove a useful tool for this purpose. Nonetheless, in the legal sphere, delivering and justifying a closing argument verbally remains crucial. This underscores the fact that perhaps we should focus more on the verbal delivery as a learning outcome, rather than just the written presentation, and that perhaps the learning outcome may be better worded as ‘Compose and deliver a mock closing argument on a specific aspect of language in a real-life case and justify your argument to a live audience’.

Based on this example, we propose that numerous learning outcomes in existing courses may require re-evaluation in light of AI's abilities. Therefore, to assess the ongoing relevance of a learning outcome, we suggest posing a pivotal question: ‘Is the learning outcome still relevant in an AI-driven real world?’ If the answer is ‘yes’, we believe the learning outcome should remain the same. If the answer is ‘no’, we recommend the instructor re-evaluate the inclusion of that learning outcome. In such situations, we suggest the instructor should conduct a job analysis in collaboration with industry to assess how the real world has been influenced by AI, as was discussed in the previous chapter, and then adjust the learning outcome accordingly.

To further comprehend the connections and implications associated with Stage 1, we present the following flowchart (Fig. 2). This illustrates the interplay between enduring understandings, essential questions, learning outcomes and the emergence of AI. Its purpose is to guide us in making informed decisions regarding AI's impact.

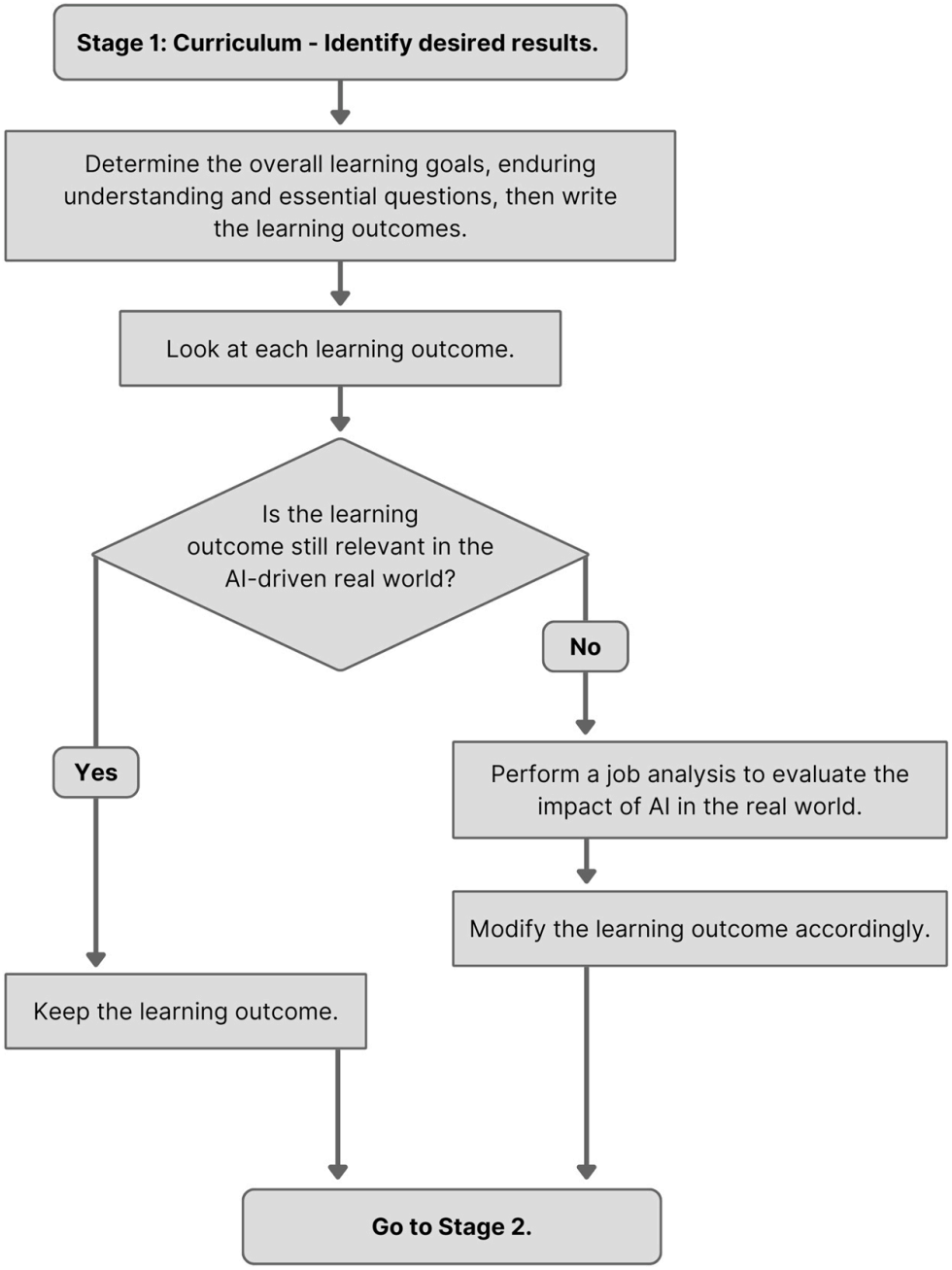


Fig. 2. Decision-Making Process for Reassessing Learning Outcomes in an AI Environment.

AI-Resilient Assessment Strategies

As discussed in the literature review, during the ChatGPT era, certain universities are opting for conventional exams to circumvent problems

related to ChatGPT-generated content. However, Sullivan et al. (2023) oppose the exclusive reliance on exams. They propose a shift in assessment tasks to decrease susceptibility to AI tools, advocating for personalised assignments that assess critical thinking. Given our support for the modern assessment approaches inherent in flipped learning, we concur with their standpoint. Thus, this leads us to Stage 2 of our flipped learning design. Stage 2 involves the instructor determining assessment evidence to determine what students know and can do. This involves instructors asking: How will we know if students have achieved the desired results? What will we accept as evidence of student understanding and their ability to use (transfer) their learning in new situations? and how will we evaluate student performance in fair and consistent ways? (Wiggins & McTighe, 1998). In Stage 2, there are two main types of assessment: performance tasks and other evidence. Performance tasks ask students to use what they have learnt in new and real situations to see if they really understand and can use their learning. These tasks are not for everyday lessons; they are like final assessments for a unit or a course and should include all three elements of AoL, AfL and AaL throughout the semester while following the Goal, Role, Audience, Situation, Product-Performance-Purpose, Standards (GRASPS) mnemonic. Alongside performance tasks, Stage 2 includes other evidence, such as quizzes, tests, observations and work samples (AfL) and reflections (AaL) to find out what students know and can do. While we observed that some issues may arise in Stage 1 regarding learning outcomes in relation to AI's abilities, in Stage 2 we start to see more concerning issues. Let's begin by examining end-of-course performance tasks.

End-of-course Performance Tasks

The primary goal of end-of-course performance tasks is to offer an overall snapshot of a student's performance at a specific point in time. While this evaluation can occur periodically during a course, it typically takes place at the end of the course. However, the emergence of AI, particularly ChatGPT, has raised a significant consideration. In instances where AI can proficiently complete these assessments – as we've observed it can often do with ease – instructors may encounter challenges in accurately measuring a student's true learning accomplishment. The potential consequence of this is the inability to determine whether students have reached the requisite level

to advance to the next class or academic year. This can subsequently have a cascading impact. If the reliability of students' grades as indicators for prospective employers and graduate schools is compromised, it can erode trust in the university system itself and lead to the depreciation of degrees and, ultimately, the demise of universities. So what to do? Do we discourage the use of ChatGPT? Do we crack down on cheating? We believe the answer to both of these is ‘no’. Therefore, how can we deal with this? In order to answer this question, let's return to our case study example from the forensic linguistics course.

In previous courses, prior to the launch of ChatGPT, using the recommended MEF course planning approach in line with flipped learning, the instructor applied the GRASPs mnemonic to create the end-of-course performance task with the aim of assessing achievement of the learning outcome ‘Compose a mock closing argument on a specific aspect of language in a real-life case and justify your argument’. Based on this, she set the following task:

> For this task, you will take on the role of either the defence or prosecution, with the goal of getting the defendant acquitted or convicted in one of the cases. Your audience will be the judge and jury. The situation entails making a closing argument at the end of a trial. As the product/performance, you are required to create a closing argument presented both in writing and as a recorded speech. The standards for assessment include: providing a review of the case, a review of the evidence, stories and analogies, arguments to get the jury on your client’s side, arguments attacking the opposition’s position, concluding comments to summarise your argument, and visual evidence from the case.

In the rubric that the instructor created for this assessment, each of the criteria was evenly weighted. To see how ChatGPT-resilient this original assessment was, as described in the research methodology chapter, the instructor copied and pasted the rubric into ChatGPT, in relation to specific cases, to see what it could do. What came out was astounding. ChatGPT swiftly generated the majority of the speech for each of the cases, including nearly all of the aspects required in the rubric. However, she observed that

its weakness lay in providing detailed evidence related to forensic linguistics and, while it couldn't create specific visuals pertaining to the case, it could make suggestions for images. While this initially seemed to render much of the existing assessment redundant, the instructor realised the exciting potential of ChatGPT as a useful tool for students' future careers. She therefore decided to retain ChatGPT as a feature in the assessment but needed to address the fact that it could handle the majority of the task. To do this, the instructor adapted the rubric by adjusting the weighting, giving more importance to the parts ChatGPT could not handle and reducing its weighting in areas where it excelled. This involved assigning greater weight to the review of evidence, including emphasising the importance of referencing primary sources rather than solely relying on ChatGPT, as well as increasing the weighting for the provision of visual evidence. She also realised that, in relation to the learning outcome 'Compose a mock closing argument on a specific aspect of language in a real-life case and justify your argument', she was relying on written evidence for students to justify their argument instead of a more real-life scenario whereby they would verbally have to justify their argument in a live setting. Therefore, she decided to add a question and answer session after the videos were presented for which students would be evaluated on both the questions they asked of other students and their ability to answer the questions posed to them. This also was given a much higher weighting than the parts that ChatGPT was able to do. In reflecting on the outcomes of the redesigned assessment/rubric with the Spring 2022–2023 class, the instructor was pleased with the assessments the students produced. However, a recurring observation was that most students defaulted to directly reading from their prepared scripts during the video presentations – a tactic that would not translate well to real-world scenarios. Consequently, the instructor has planned to conduct live (synchronous, online) presentations in the subsequent semester to bolster the students' public speaking skills and remove the reliance on reading from partially AI-generated scripts. At this point, it should be noted that if, as suggested in Stage 1, above, the instructor had carefully analysed her learning outcomes via the decision-making process for evaluating learning outcomes in an AI environment flowchart, this issue would not have arisen.

Another crucial factor to consider in the design of an end-of-course performance task, not explored in the example from our case study, is the

potential involvement of AI, like ChatGPT, in performing certain elements of the task that could prove beneficial in students' future careers but, through doing so, would compromise the student's foundational learning. In such scenarios, how should educators proceed? In such situations, we suggest creating a closed environment where the use of ChatGPT or similar AI chatbots is neither allowed nor possible. This might involve conducting assessments in tightly controlled settings or blocking the use of internet access. This is particularly important if the assessment takes the form of writing. Even better, instructors should opt for assessments emphasising hands-on skills, practical experiments, and tactile tasks – areas where AI, even advanced systems like ChatGPT, faces inherent limitations. These evaluations require physical presence and direct manipulation, rendering them resistant to AI interference. Consequently, such assessment methods become AI-resilient, promoting authentic understanding and practical application of knowledge.

Based on our discussions above, we propose the following flowchart to assist with the decision-making process involved in designing end-of-course performance tasks in an AI environment (Fig. 3).

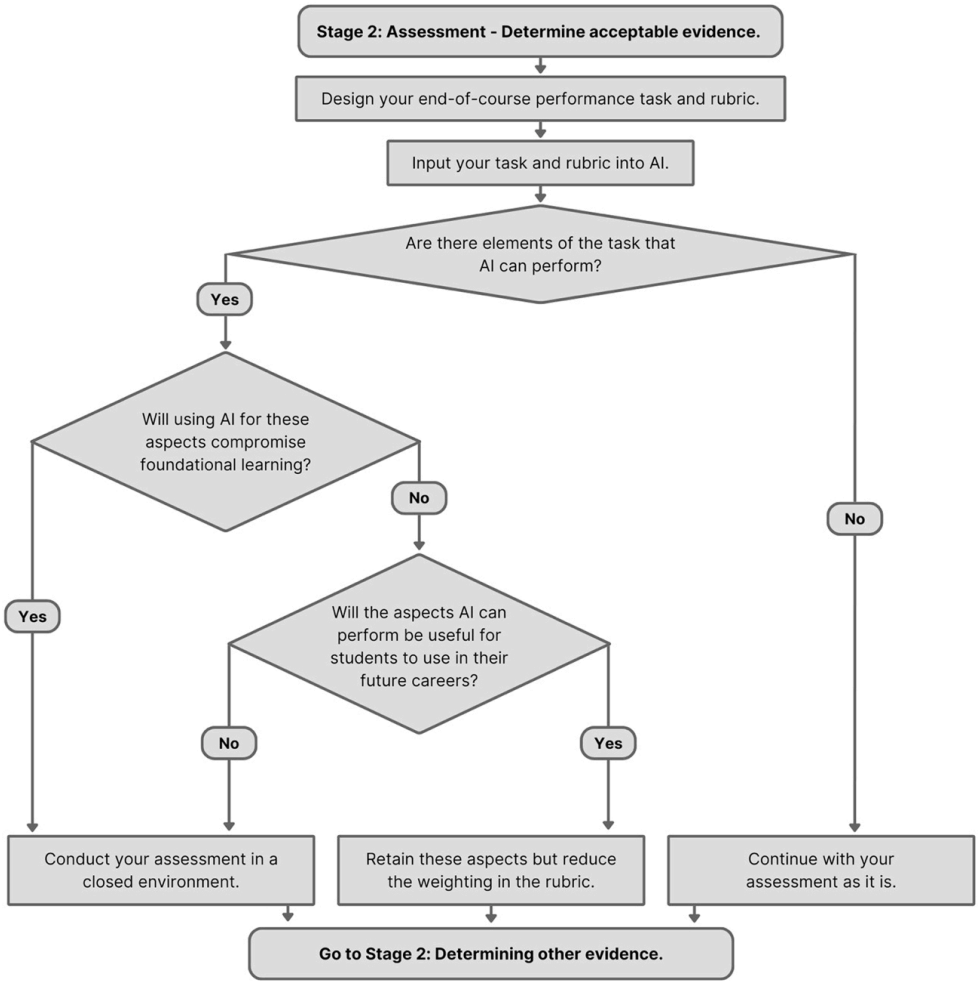


Fig. 3. Decision-Making Process for Designing End-of-Course Performance Tasks in an AI Environment.

When considering the creation of end-of-course performance tasks, we have suggested using the GRASPS mnemonic from UbD. We believe this approach is valuable as it incorporates real-world contexts into assessments, which is particularly important as it equips students with essential skills for their future careers. However, an even more advantageous approach would involve centring the assessment around a genuine industry problem, which can be ascertained by collaborating with industry, as outlined in the previous chapter. This approach will not only enhance authenticity but also equip students to tackle real-world challenges in various industries, thereby enhancing their job readiness. Our main aim as educators is to provide students with the tools needed to tackle the challenges they will face in life.

By addressing future issues, our students will be better prepared for upcoming job opportunities.

Pre-class Quizzes

In the preceding section, we explored the design of end-of-course performance tasks in the context of AI. However, Stage 2 of UbD planning also involves the process of determining other evidence to assess students' learning. Within the framework of flipped learning, a significant aspect of this involves pre-class quizzes (AfL). Therefore, we briefly revisit the steps for implementing this process here. During the pre-class or online phase, each unit commences with an overview and introduction of key terms. Students then engage in a prior knowledge activity to gauge their comprehension. Following this, concepts are introduced through videos or articles, with accountability ensured via AfL, often in the form of brief quizzes offering automated feedback. This approach guarantees that students possess the requisite knowledge before attending class. Our experience indicates that grading pre-class quizzes heightens student engagement with pre-class materials. However, with ChatGPT's ability to provide quick responses, a challenge arises regarding pre-class quizzes, as students might solely rely on it without engaging with the pre-class resources. This gives rise to two challenges. Firstly, if students take this shortcut, they are circumventing the learning process. Secondly, the outcomes of the pre-class quizzes are essential tools for instructors to assess their students' grasp of concepts before the class. This insight reveals what students comprehend, identifies misconceptions and highlights areas of confusion. Consequently, it empowers instructors to tailor their teaching approach using ‘just-in-time’ instruction to address these gaps. However, this adaptive teaching strategy becomes pointless if students have not completed the pre-class quizzes themselves. So, how should this issue be approached?

To address this, we believe modifying question types becomes essential. Instead of closed-answer questions, instructors can prompt students to describe real-life applications of what they have learnt. Alternatively, integrating online interactive elements like group discussions or debates in the pre-class assessments can promote collaboration and sharing of perspectives, which ChatGPT cannot replicate. This personalisation fosters

higher-order thinking and discourages over-reliance on ChatGPT. Nonetheless, this approach requires manual grading by instructors, as automated systems can often only handle closed-ended questions. Consequently, it increases the instructor's workload, which might be challenging for classes with large student sizes. Striking a balance between personalised assessments and feasible grading strategies is crucial to maintain the benefits of active engagement while managing the workload efficiently. Another way to address this challenge is by shifting the pre-class quizzes from an online setting to the classroom at the start of each lesson. In this approach, students need to engage with the pre-class material and take notes before class, which they will then use to answer quiz questions in class. To ensure that ChatGPT cannot easily complete these quizzes, instructors could introduce time constraints by implementing interactive quiz tools like Kahoot or Mentimeter. These tools are useful as they not only encourage quick information processing but also provide valuable data for the instructor to apply grades based on each student's responses. Another effective approach is to have students create visuals to demonstrate their understanding of the pre-class content. For instance, students can develop mind maps, flowcharts, concept maps, timelines, Venn diagrams, bar charts, infographics, storyboards or labelled diagrams. These activities are useful, as they promote recall and comprehension of the subject matter while fostering visual representation, which enhances students' overall understanding. Moreover, engaging in these activities gives students a strong incentive to interact with the pre-class materials before attending the lesson. The advantage of incorporating such activities lies in the meaningful engagement of students with the pre-class materials, as they actively utilise the creation of visuals to enhance their comprehension. Additionally, instructors can collect the visuals from students at the beginning of the class, after completing the activities and use them to assign grades. In an online setting, students can take photographs of their hand-drawn visuals and submit them to the instructor for evaluation. This way, assessment becomes more holistic, encouraging both deep learning and creative expression. Nonetheless, it's important to recognise a drawback if conducting pre-class quizzes during the class session. This approach shortens the window for instructors to identify students' comprehension gaps before the class starts and limits the time available to plan for ‘just-in-time’ teaching. In this scenario, adaptation would need to occur in real-time

during the class. To demonstrate the decision-making process that an instructor should go through to decide how to set pre-class quizzes, we propose the following flowchart (Fig. 4).

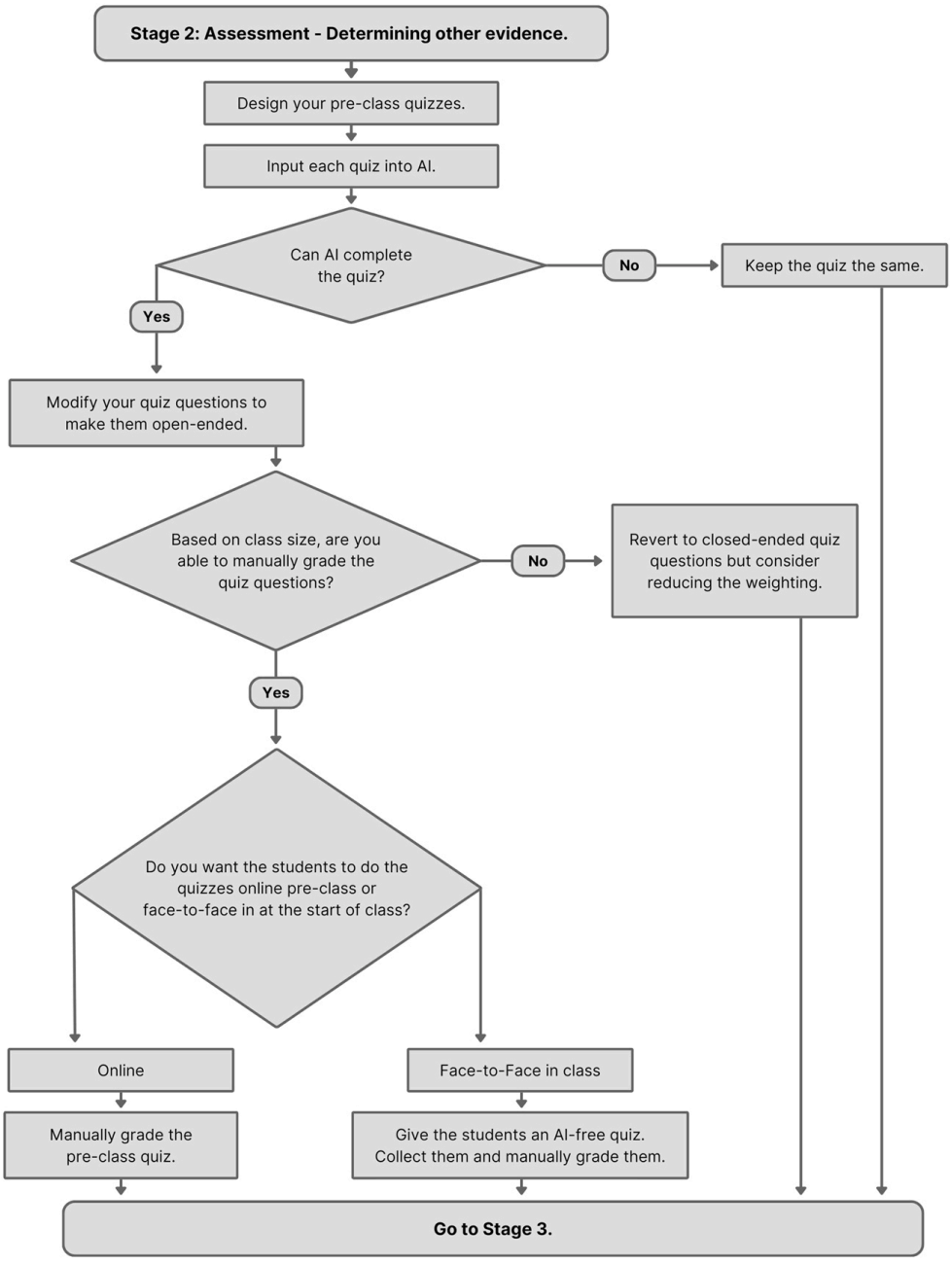


Fig. 4. Decision-making Process for Designing Pre-class Quizzes in an AI Environment.

Assessment As Learning

In addition to planning for the end-of-course performance task and pre-class quizzes, Stage 2 of UbD also encompasses planning for assessment as learning. Therefore, let's briefly revisit what this entails. AaL in education focuses on enhancing the learning process through assessment. Unlike traditional post-instruction assessments, AaL integrates assessments into learning, actively engaging students. AaL underscores students' active participation in learning. Self-assessment and reflection develop awareness of strengths and areas for improvement. Students take ownership of their learning, set goals and adapt strategies based on self-assessment. AaL employs tools like goal setting or personal reflections. These activities aid students in gauging understanding, identifying confusion and linking new knowledge with prior understanding. This cycle nurtures metacognition, crucial for independent learning. AaL brings benefits like active engagement, self-regulation and motivation. It cultivates proactive learners who address learning gaps and fosters a growth mindset that sees challenges as growth opportunities. AaL empowers students, enriches comprehension and instils lifelong learning skills. But how does the emergence of ChatGPT influence this?

ChatGPT's real-time feedback offers a potential advantage, promptly aiding students in identifying their weaknesses. Yet, solely relying on AI-generated feedback might lead to surface-level self-assessment, where students adopt suggestions without grasping deeper nuances. Similarly, in terms of taking ownership of learning and goal setting, ChatGPT's input could be valuable. It can guide personalised goal setting and strategies based on self-assessment outcomes. However, overreliance on ChatGPT may disregard individual learning journeys, limiting goal personalisation. ChatGPT's thoughtful questions can stimulate deep reflections, yet relying solely on AI-generated reflections might hinder authentic self-reflection growth. Addressing these concerns involves a balanced approach, capitalising on AI's strengths while fostering essential skills. For instance, ChatGPT's real-time feedback aids timely self-assessment, but students should critically analyse and complement AI-generated insights for deeper self-awareness. While ChatGPT supports goal setting, maintaining students' autonomy in shaping goals is vital. Balancing AI-generated and personal reflections is required to preserve authenticity. In summary, when navigating the interplay between AaL and the emerging influence of ChatGPT, it becomes evident that a balanced integration of AI's advantages

along with the nurturing of essential skills is essential for fostering holistic student development.

As we wrap up our examination of establishing AI-resilient assessment in the ChatGPT era, we maintain a strong conviction in the efficacy of our proposed strategies. However, we also believe these strategies offer added benefits. By spreading assessments across the semester, we can reduce end-of-semester rush, discourage shortcuts like copying or plagiarism, and inspire students to create original, meaningful work. This lighter assessment load can boost student confidence and encourage meaningful learning. Additionally, distributing assessments throughout the semester enhances the feedback loop. Consistent guidance from instructors empowers students to track progress, spot areas for improvement and align with their goals – something often missing in relying only on mid-term and final exams. Our method smoothly integrates feedback into learning, encouraging continuous improvement and deep understanding through repeated learning cycles, leading to effective learning. Moreover, we believe taking this approach will prepare our graduates for the challenges of the modern world, whereas neglecting adaptation could leave them unprepared for a rapidly changing world. Interestingly, education experts have been advocating for this for years, and we believe ChatGPT might just be the push needed to make this change. However, we would be remiss if we did not acknowledge that the implementation of these changes often lags behind in university entrance exams, accrediting bodies and higher education ministries. Therefore, we contend that universities have a vital role to play in assuming leadership to advocate for these reforms, ensuring that we collectively empower our students for triumph in a world dominated by AI.

Adapting Instruction for the AI Era

Transitioning to the next phase, Stage 3 – Instruction, let's briefly recap the context to aid understanding. This stage in UbD centres on designing learning experiences that align with the objectives set in Stage 1. The following key questions guide this stage: How will we support learners as they come to understand important ideas and processes? How will we prepare them to autonomously transfer their learning? What enabling knowledge and skills will students need to perform effectively and achieve

desired results? What activities, sequence and resources are best suited to accomplish our goals? (Wiggins & McTighe, 1998). Starting with the end-of-course performance task, the instructor identifies key concepts and skills, then breaks these down into units to guide the students. After that, thoughtful instructional events are designed within each unit, utilising Gagne's Nine Events of Instruction for effective learning. Therefore, at this point, we revisit Gagne's Nine Events of Instruction that we have reordered to suit the flipped learning approach. Our approach involves the following elements. In the pre-class online stage, there should be: a unit overview; an introduction to key terms; a prior knowledge activity; an introduction to the key concepts (via video, article); and pre-class quizzes for accountability. In the in-class stage, there should be: a start-of-class/bridging activity to review pre-class concept; structured student-centred practice; semi-structured student-centred practice; freer student-centred practice; and self-reflection (AaL at end of lesson/unit, in/out of class).

In this section, we closely examine each of these components in relation to the potential influence of ChatGPT and the measures we can implement to prevent any adverse impact on learning outcomes. However, since we have already discussed the pre-class element of AfL in the context of AI-proofing assessment in the section above, our focus now shifts to exploring in-class activities. Within our flipped learning approach, the instructor starts the class by getting the students to review pre-class concepts by participating in start-of-class review activities to reinforce comprehension. After that, the emphasis moves to student-centred activities, enabling active practice and application of the learnt concepts. Therefore, we now take a more detailed look at each of these stages.

Start-of-class Review Activities

Start-of-class review activities, also known as bridging activities, play a crucial role in the instructional strategies of flipped learning. Implemented at the beginning of a class session, they serve as a seamless connection between the pre-class content and the current lesson. Their primary objective is to activate students' prior knowledge, refresh their memory on essential concepts covered in the pre-class activities and prepare them for the upcoming lesson. By engaging students in a brief, interactive review of the pre-class material, instructors can enhance retention and understanding,

ensuring a smoother and more effective transition to new content. To achieve this, instructors have various options for these review activities. For instance, setting paper-based short quizzes or questions related to the pre-class key concepts can assess retention. Asking students to create concept maps or diagrams to visualise the connections between the concepts presented prior to class can foster deeper understanding. Instructors can utilise one-minute paper prompts for students to write brief summaries of the main points from the pre-class materials in one minute, encouraging quick recall. Additionally, Think-Pair-Share activities can be used to prompt students to individually recall and discuss key points in pairs or small groups. Further options include interactive memory games or flashcards for reviewing important terms or concepts, mini-recap presentations where students summarise the main points of pre-class materials, or quiz bowl-style activities with questions based on the pre-class material. The choice of activity can vary based on subject matter, class size and teaching style, ensuring flexibility and engagement. The examples we have suggested here are designed in a manner that ensures students cannot effectively utilise ChatGPT to complete them, rendering these activities ChatGPT-resilient as they currently exist. However, it is during the subsequent in-class activities that certain challenges begin to surface.

Structured/Semi-structured Activities

In the context of flipped learning, the primary objective of in-class activities is to allow students to apply the knowledge gained from pre-class materials. Maximising the effectiveness of this process entails the careful implementation of scaffolded in-class activities. Scaffolding in pedagogy involves furnishing learners with temporary assistance, guidance and support while they engage in learning tasks or exercises. The overarching aim is to facilitate the gradual development of students' skills and comprehension, equipping them to independently tackle tasks while progressively reducing the level of assistance as their competence and confidence expand. Consequently, the most optimal approach to orchestrating in-class activities follows a sequence: initiating with structured activities, advancing to semi-structured tasks and ultimately culminating in freer activities.

Based on the insights gained from our exploratory case study, it becomes evident that the stages involving structured and semi-structured activities are where ChatGPT can pose the greatest hindrance to effective learning. Consequently, it holds immense importance for instructors to try out their structured activities in ChatGPT beforehand. If ChatGPT is found capable of fully completing a task, instructors should either alter the task or devise an approach that necessitates student engagement without relying on ChatGPT. In instances where ChatGPT can perform certain parts of a task, instructors should seek ways to modify the activity, directing more attention towards the aspects that ChatGPT cannot accomplish. However, we are aware that this is easier said than done. Hence, we circle back to instances from the Forensic Linguistics course to examine the challenges that emerged and how the instructor effectively addressed them.

- *Vocabulary Grouping Activities*
  Given that the students in the course were non-native speakers, a portion of each class was dedicated to reviewing essential vocabulary from the week's case. This practice not only aided students in revisiting the cases but also ensured they were familiar with the key terms. Typically, this involved providing students with the crucial vocabulary items and tasking them with categorising these terms into pre-designated groups. Subsequently, they were required to write a sentence with each word in relation to the case. However, since ChatGPT could easily perform these tasks, the instructor modified the activity as follows. Working in groups, students were given the words but not the categories, and their task was to sort the words into appropriate groups. They then compared their categorisations with those suggested by ChatGPT and engaged in a class discussion about which groupings best encapsulated the case's core vocabulary. Instead of constructing sentences, the instructor described some of the words verbally, and students had to deduce the respective words. After that, individual students described the words to the group for them to guess. Through this approach, ChatGPT assumed the role of a tool in vocabulary review rather than a direct substitute for the learning process.
- *Drawing Timelines*
  To recap on the important aspects of each case, students were asked to create timelines using Padlet's timeline feature. While ChatGPT could

not create visual content, it could make a list of the case's main points. Students could easily copy these into the timeline without thinking deeply, thus making the activity pointless. To address this, the instructor used a two-step approach. First, students made their timelines from memory. Then, they asked ChatGPT to do the same. This helped students see if they missed anything and make changes or to identify areas where ChatGPT was incorrect. Next, a verbal discussion was added. Students talked about how the events on the timeline were connected. They were asked questions about how certain events led to others. In this way, ChatGPT was used by the students to check their work, not complete it. The oral task prompted students to contemplate the sequence of events and their interconnections more profoundly, an additional approach the instructor had not employed before. An additional advantage was that this turned out to enrich the learning process, contributing value to the activity.

- *SWOT Analysis*
  In one class session, students were assigned the task of conducting a SWOT analysis on the impact of ChatGPT on the legal industry. However, ChatGPT's ability to swiftly generate a SWOT analysis chart posed a challenge, as students did not need to engage in critical thinking to get a result. To address this, the instructor employed the following approach. Firstly, students individually completed a SWOT analysis without relying on ChatGPT. They then shared their findings with peers and consolidated their insights into a unified chart. Secondly, students were provided with up-to-date videos and readings discussing ChatGPT's impact on the legal industry, which were not present in ChatGPT's database. Using these new resources, students refined their charts. Only after this stage did they consult ChatGPT to create a SWOT analysis chart. Comparing their own chart with ChatGPT's, they sought additional ideas and evaluated ChatGPT's chart against their current readings, pinpointing any outdated information and thus critiquing ChatGPT's limitations. This led to a discussion on ChatGPT's constraints. The interactive process enhanced students' critical thinking and extended their learning beyond ChatGPT's capabilities. This was further reinforced through role-playing scenarios, where students assumed various roles like law firm partners, discussing ChatGPT's potential impact on their business. This role-playing exercise introduced complexity and context,

augmenting the SWOT analysis with nuances beyond ChatGPT's scope. By structuring the SWOT analysis process in a way that went beyond ChatGPT simply producing the chart, the instructor managed to ensure that the students derived valuable insights and skills that ChatGPT could not easily replicate.

- *SPRE Reports*
  In the original course, the students had been tasked with writing a situation, problem, response, evaluation report (SPRE) to summarise each case. However, if the cases were in ChatGPT's database, ChatGPT could do this instantly, thereby bypassing the learning process. Therefore, the instructor took the following approach. First, the students used ChatGPT to create a SPRE report of the case. Then the instructor provided the students with a set of detailed questions to guide students through each component of the SPRE analysis that ChatGPT had produced. This encouraged the students to critique ChatGPT's output and to add any information that was missing, thus fostering deeper analysis and interpretation. Where possible, the instructor provided the students with a similar case based on the same forensic linguistics point (e.g., emoji) that was recent, and therefore not in ChatGPT's database. However, this involved scouring the internet for relevant recent cases and was not always possible. The students then created a SPRE report for the new case and compared the two cases to see if any changes in decisions or law were made between the two. This required them to identify patterns, contrasts and trends that involved higher-order thinking. The students then worked in groups, imagining they were either the prosecution or defence for the original case and created short notes about the forensic linguistic points from the case. They were then mixed and conducted role plays in which they argued for or against the linguistic point in question. This added complexity and depth to the original SPRE analysis, making it more robust than what ChatGPT could generate alone.

So, based on these examples, what have we learnt about how to make structured or semi-structured in-class activities ChatGPT-enhanced or ChatGPT-resilient? We propose that instructors do the following:

- *Critically Analyse ChatGPT's Outputs*

Encourage students to evaluate ChatGPT's suggestions critically, identifying gaps, limitations, errors and potential improvements.

- *Integrate External Resources*
  Have students incorporate additional materials to expand their learning beyond ChatGPT's database.
- *Initiate Discussions and Role-Playing*
  Promote interactive discussions that compare ChatGPT's insights with their own, allowing multifaceted exploration through role-playing scenarios.
- *Conduct Comparative Analysis*
  Guide students to compare their work with ChatGPT's outputs, pinpointing discrepancies and assessing accuracy.
- *Evaluate Independently*
  Encourage students to assess ChatGPT's suggestions against their understanding, fostering independent judgement.
- *Synthesise Insights*
  Blend ChatGPT's insights with their findings to achieve a comprehensive understanding of the subject matter.
- *Explore Case Studies and Holistic Learning*
  Challenge students with recent case studies not in ChatGPT's database, while also engaging in verbal discussions, comparisons and interactions for a well-rounded perspective.
- *Contextualise and Iterate*
  Encourage students to consider real-world contexts, implications and industry changes while refining their work through iterative feedback that integrates ChatGPT's insights as well as their independent understanding.

To summarise, while ChatGPT served as a valuable tool in aiding specific aspects of the activities described above, our refinements and enhancements extend their scope beyond ChatGPT's capabilities. These activities are designed to foster students' capacity to synthesise, evaluate and apply knowledge in real-world contexts. Furthermore, they encompass discussions and scenarios that surpass ChatGPT's individual capabilities. Hence, the activities outlined here are not entirely immune to ChatGPT's influence, but rather, they are enhanced by it. In essence, our belief is that integrating such activities will stimulate active learning, profound comprehension and the development of skills that AI text generators like

ChatGPT are unable to duplicate. This now brings us to freer activities. And this is where we believe AI chatbots like ChatGPT can really be used effectively to enhance learning.

Freer Activities

Let's begin by understanding the concept of freer activities and their significance. These activities encourage students to creatively and independently apply their learning, cultivating higher-order thinking and problem-solving skills. They encompass tasks like open-ended prompts, debates, projects, role-playing and real-world scenarios, granting students the authenticity to express themselves. The objectives encompass practical knowledge application, critical thinking, creativity, effective communication, language fluency, autonomy, real-world applicability and heightened engagement. Ultimately, these activities empower students to become confident, active learners proficient in navigating diverse challenges and contexts. In light of our previous discussion, it's worth noting that ChatGPT may be capable of performing many parts of these activities. And while, as we have seen, it can serve as a tool to enhance learning, we believe that with strategic utilisation, it holds even more potential; the potential to truly transform the learning experience. With this in mind, let's take a look at two examples from our case study to illustrate this.

One of the students on the Forensic Linguistics course had been accepted on an Erasmus programme at a Polish law school for the upcoming semester. For his final project, he decided to use ChatGPT to prepare for his trip, and then shared his insights during the final presentations. His aims were diverse: learning about the university, his courses, the town and local culture to be well-prepared. ChatGPT proved extremely useful in assisting with this. However, what truly stood out was his innovative use of ChatGPT for language learning. Wanting to learn basic Polish phrases, he sought advice and practised conversations with ChatGPT. This proved highly useful for his learning, as ChatGPT served as a free and easily accessible Polish conversation partner – a distinct advantage considering challenges in finding such practice partners in Istanbul. He described this experience as really significantly improving his ability to learn some Polish before his visit. This was one example of how

ChatGPT was used to really transform learning. However, the principal investigator, herself, had also found a similar use during the analysis part of the research process. During this investigation, the researcher referred to the insights of the four theorists to create a theoretical framework for analysing the findings. Even though the researcher already had a good grounding in these theories, she wanted to enhance the analysis stage. To do this, she created custom personas for each theorist using Forefront AI (Forefront AI, n.d.). Having developed these personalised chatbots, she used them to have discussions about her evolving analysis, somewhat akin to conversing with the actual theorists themselves. This had a transformative impact, pushing her thinking beyond what she could have achieved alone. While it might have been possible to do this without the support of AI chatbots, it would have been difficult and time-consuming to find peers with the time and expertise to engage in these discussions. Consequently, in both these instances, ChatGPT emerged as a transformative learning tool, showcasing its unique ability to facilitate learning experiences that would be challenging to achieve without the aid of AI. It went beyond mere enhancement and truly revolutionised the learning process.

So what can we conclude from this? We believe ChatGPT shows a lot of promise as a tool for education. It can make various in-class teaching methods better and improve how students learn. However, we urge caution with when it is used. This is especially important when foundational learning is involved. Therefore, during such activities, we recommend that ChatGPT is not used, and AI-free approaches are used instead. However, when it comes to structured and semi-structured in-class activities, we believe ChatGPT should take on a pivotal role. During these types of activities, we believe ChatGPT can provide the role of a guiding partner, enriching student engagement and understanding without taking over the main learning process. In addition, integrating ChatGPT into these types of activities can heighten student interest and involvement, leading to distinct and interactive learning journeys. Moreover, it significantly aids in critical thinking, prompting students to meticulously review its responses, identify gaps and engage in discussions that further enhance their cognitive involvement. However, we believe ChatGPT's greatest potential lies in freer activities where ChatGPT can act as a transformative force, enabling students to gain access to external insights, resources and perspectives that lie outside the boundaries of traditional learning materials. In conclusion, to

accomplish learning objectives successfully when planning for instruction, we believe instructors should take into account the following factors. Begin by avoiding AI integration in foundational learning, such as start-of-class reviews. However, after that, move on to structured activities that use ChatGPT but require careful assessment of ChatGPT's outputs. Next, progress to semi-structured tasks, encouraging students to interact with and expand upon AI-generated ideas. Conclude with freer activities where ChatGPT becomes a transformative tool for in-depth exploration and analysis. To assist in making these decisions, we suggest the following chart (Table 1).

Table 1. Decision-Making Chart for Designing Instructional Activities in an AI Environment.

Stage 3: Instruction – Plan Learning Experiences and Instruction		
Foundational learning activity	Avoid AI integration	AI-free zone
Structured activity	Use AI with careful consideration	AI-enhanced zone
Semi-structured activity	Interact with AI-generated ideas	
Freer activity	Use AI for in-depth exploration	AI-transformation zone

While we have confidence in the effectiveness of our strategies, they will obviously need to be tested in the upcoming academic year. Despite our strategies, the possibility of students using ChatGPT in unintended ways, like during the AI-free zone, still exists. To address this concern, it is crucial to secure students' support by demonstrating how ChatGPT might undermine their learning journey, potentially leading to struggles later in their academic or professional careers. To tackle this, we propose that instructors devote time to emphasise the significance of foundational learning, as highlighted earlier in this chapter. Subsequently, instructors can guide students through the provided flowchart of questions, illustrating the reasoning behind when and how AI can complement their learning. It is

important, however, that the assessments and learning activities offered in the courses align with the recommendations outlined in flowcharts for this approach to be effective. This is even more important in online courses where instructors lack direct supervision over students' ChatGPT usage. By engaging students in comprehending the potential drawbacks of relying solely on AI tools, we can secure their cooperation and safeguard the integrity of the learning process. These aspects, therefore, should be integrated into AI literacy training programmes, which we address later in this chapter. However, before we delve into the details of AI literacy training, we believe it is essential to examine the significance of prompt banks, as these will play a vital role in the training programme.

Leveraging AI Prompt Banks

Based on our research, it is evident that the input you provide to ChatGPT directly influences the output you receive. Without a clear context, you may not get the desired response, and if your requests lack quality, the output may also be subpar. Furthermore, to achieve the best results, multiple iterations are often necessary to refine your queries. However, too often, users resort to one-shot requests. A one-shot request in ChatGPT is a single input prompt without any follow up interactions. It is a standalone query where the model generates a response based solely on that initial prompt, without prior context or conversation. One-shot requests are useful for specific tasks or quick information retrieval but have limitations in context and continuity. For more interactive conversations, multi-turn interactions are preferred, enabling the model to maintain context and provide accurate and coherent responses based on prior interactions. However, users are often unaware of this. So how can we rectify this? We believe the answer lies in providing or developing user prompt banks.

A user prompt bank is a pre-prepared collection of prompts or example queries that users can refer to while interacting with the AI language model. The prompt bank is designed to guide users in formulating their questions or input in a way that elicits more accurate and relevant responses from ChatGPT. The purpose of a prompt bank is to provide users with helpful examples and suggestions on how to structure their queries effectively. It can cover a variety of topics, scenarios or styles of interaction that users

may encounter when using ChatGPT. By having access to a prompt bank, users can gain insights into the type of input that yields better outcomes and enhances their overall experience with the AI model. For instance, a prompt bank for ChatGPT might include sample prompts for seeking information, creative writing, problem-solving, language translation and more. Users can refer to these examples and adapt them to their specific needs, enabling them to get the desired responses from ChatGPT more efficiently. By utilising a prompt bank, users can feel more confident in their interactions with ChatGPT and improve the quality of the AI's output by providing clear and contextually relevant input. It serves as a valuable resource for users to explore the capabilities of the language model and maximise the benefits of using ChatGPT in various tasks and applications.

While we are still in the process of developing user prompt banks at our university, we offer some examples below. In drawing up these prompts, once again we have drawn upon Bloom's taxonomy. This is because by working through Bloom's taxonomy, the user can start with lower-level knowledge questions and gradually move to higher-level analysis, as this can lead to more meaningful and insightful responses. Our suggestions are broken down into initial prompts and modifying prompts. We break our prompts down into two groups: initial prompts and modifying prompts. Below, we provide examples of initial prompts following Bloom's.

Knowledge:

- Define the term _____.
- List the main characteristics of _____.
- Name the key components of _____.

Comprehension:

- Explain how _____ works.
- Summarise the main ideas of _____.
- Describe the process of _____.

Application:

- Use _____ to solve this problem.
- Apply the concept of _____ to a real-life scenario.
- Demonstrate how to use _____ in a practical situation.

Analysis:

- Break down _____ into its constituent parts.
- Compare and contrast the differences between _____ and _____.
- Identify the cause-and-effect relationships in _____.

Synthesis:
- Create a new design or solution for _____.
- Compose a piece of writing that integrates ideas from _____ and _____.
- Develop a plan to improve _____ based on the data provided.

Evaluation:
- Assess the effectiveness of _____ in achieving its objectives.
- Judge the validity of the argument presented in _____.
- Critique the strengths and weaknesses of _____.

Similarly, different prompts can be used for each of the four domains of knowledge. This is useful when aiming to enhance learning and understanding in various subjects or disciplines. Examples include the following:

Metacognitive Knowledge:

Strategic knowledge:
- Explain how you would approach solving a complex problem in [domain/subject].

Knowledge about cognitive tasks:
- Discuss the difference between analysis and synthesis in [domain/subject].
- Explain the process of critical thinking and its importance in [domain/subject].

Appropriate contextual and conditional knowledge:
- Provide examples of when to apply [specific technique] in [domain/subject].
- Describe the factors that influence decision-making in [domain/subject].

Self-knowledge:

- Explain how I can adapt my study strategies based on [personal learning preferences]

Procedural Knowledge:

Knowledge of subject-specific skills and algorithms:

- Demonstrate the steps to solve [specific problem] in [domain/subject].
- Explain the algorithm used in [specific process] in [domain/subject].

Knowledge of subject-specific techniques and methods:

- Describe the different research methodologies used in [domain/subject].
- Explain the key steps in conducting a statistical analysis for [specific data].

Knowledge of criteria for determining when to use appropriate procedures:

- Discuss the factors that determine when to use qualitative or quantitative research methods in [domain/subject].
- Explain the conditions under which [specific technique] is most effective in [domain/subject].

Conceptual Knowledge:

Knowledge of classifications and categories:

- Categorise different types of [specific elements] in [domain/subject].
- Explain the classification of organisms based on their characteristics in [domain/subject].

Knowledge of principles and generalisations:

- Describe the fundamental principles of [specific theory] in [domain/subject].
- Discuss the generalisations made in [specific research] within [domain/subject].

Knowledge of theories, models and structures:

- Explain the key components of [specific model] used in [domain/subject].
- Discuss the major theories influencing [specific field] in [domain/subject].

Factual Knowledge:

Knowledge of terminology:

- Define the following terms in [domain/subject]: [term 1], [term 2], [term 3].
- Provide a list of essential vocabulary related to [specific topic] in [domain/subject].

Knowledge of specific details and elements:

- List the main elements that contribute to [specific process] in [domain/subject].
- Identify the key events and dates related to [historical event] in [domain/subject].

The suggestions above are for initial prompts. However, for modifications and iterations of ChatGPT's output, we suggest the following prompts:

Comprehension:

- Clarification Prompt: Can you please provide more details about [topic]?
- Expansion Prompt: Can you elaborate on [idea or concept]?

Application:

- Correction Prompt: Actually, [fact or information] is not accurate. The correct information is [correction].
- Rephrasing Prompt: Can you rephrase [sentence or paragraph] using simpler language?

Synthesis:

- Creative Input Prompt: Imagine a scenario where [situation] happens. Describe what would occur next.
- Alternative Perspective Prompt: Consider the opposite viewpoint of [idea or argument].

Analysis:

- Comparative Analysis Prompt: Compare and contrast [two concepts, products or solutions].

Evaluation:

- In-depth Explanation Prompt: Provide a more detailed analysis of [specific aspect or topic].
- Summary and Conclusion Prompt: Summarise the key points of your response in a few sentences.
- Continuation Prompt: Please build upon your previous response and explore [next aspect or question].

While the examples we have given above are generic and can be used across all disciplines, we believe that the development of discipline specific prompt banks will be more effective. As a result, one of the initiatives planned at MEF for the upcoming academic year is to have each department create their own prompt banks, customised to their specific disciplines and unique needs. This approach aims to enhance students' experiences by offering prompts that align closely with their academic areas, ensuring more relevant and tailored interactions with ChatGPT. However, there is an alternative option: individuals can craft their own personalised prompt banks. Indeed, this is precisely the approach adopted by the authors during the book-writing process.

Creating a personal prompt bank offers numerous advantages to users within AI-driven education and learning contexts. Through the creation and curation of their own prompts, users can tailor their learning experiences to align with their unique goals, interests and areas of focus. This personalised approach not only fosters a deeper sense of engagement but also allows for a more meaningful and relevant interaction with AI systems. One of the key benefits is the opportunity for users to customise their learning journey. By selecting prompts that cater to their specific learning needs, they can address areas of confusion, challenge themselves and explore subjects in greater depth. The act of curating a personal prompt bank can itself be a motivational endeavour, as users become actively invested in shaping their learning content. Furthermore, a personal prompt bank serves as a dynamic tool for ongoing learning and practice. Users can revisit prompts related to challenging concepts, reinforcing their understanding over time. As they

interact with AI systems using their curated prompts, they can refine and adapt their bank based on the responses received, leading to improved interactions and learning outcomes. This process encourages users to actively participate in their learning journey and engage with AI technology. It nurtures skills like digital literacy and adaptability, which are increasingly valuable in an AI-centric world. Beyond immediate benefits, a well-curated prompt bank evolves into a valuable resource, adaptable to changing learning needs over the long term. In essence, the creation of a personal prompt bank empowers users with autonomy and agency, facilitating a customised and enriching learning experience. It enables users to actively shape their education, aligning it with their preferences and needs while deepening their understanding and engagement with AI-powered learning environments.

Fostering AI Literacy

Our research has clearly underscored the urgent need for AI literacy training among both students and instructors. However, what exactly does AI literacy entail? In essence, AI literacy expands beyond digital literacy and encompasses the ability to comprehend, apply, monitor and critically reflect on AI applications, even without the expertise to develop AI models. It surpasses mere understanding of AI capabilities; it involves being open to harnessing AI for educational purposes. Equipping educators and students with the confidence and responsibility to effectively use AI tools makes AI literacy an indispensable skill. However, when promoting AI literacy, two primary objectives must be taken into account. Firstly, a comprehensive exploration of how users can adeptly wield ChatGPT as a valuable educational tool is essential. Secondly, providing instructors with guidance on seamlessly integrating ChatGPT into their educational practices while maintaining the integrity of their curricula, assessments and instruction is pivotal. This ensures that students do not bypass the essential learning process and neglect foundational knowledge. AI literacy training within universities should be customised differently for students and instructors, however, there will be a certain amount of crossover. For students, it is imperative that they grasp the fundamental concepts of AI, its applications, and its potential impacts across various fields. This knowledge will

empower them to make informed decisions and actively engage with AI technologies. Furthermore, it is crucial that we equip our students with an understanding of the ethical implications of AI, including biases, privacy concerns and accountability. They need to comprehend how AI technologies can shape society and cultivate responsible usage. AI literacy should focus on nurturing students' critical thinking skills, as this will enable them to assess AI-generated content, differentiate between human and AI contributions and evaluate the reliability of information produced by AI. Regarding training for instructors, instructors should acquire the proficiency to seamlessly integrate AI tools into their teaching methods. This involves understanding AI's potential in enhancing learning experiences, automating administrative tasks and providing personalised feedback to students. Instructors also need to stay updated about AI-driven research tools, including data analysis and natural language processing tools. This knowledge will ensure they remain abreast of the latest advancements in their respective fields. Furthermore, instructors need to play a pivotal role in responsibly guiding students' use of AI tools for academic purposes. This will include fostering originality, steering clear of plagiarism or unethical practices and ensuring a constructive learning experience. While the core concepts of AI literacy might share similarities, the emphasis and depth of training need to be customised differently. Students require a comprehensive understanding to effectively navigate AI-driven landscapes, while instructors necessitate a deeper focus on integrating AI into their teaching and research methodologies. The approach to achieving this will vary based on each university's specific requirements and available technological resources. To offer some guidance, we present the framework for the AI literacy training courses that are currently in development at MEF, which can be found in the appendices. These encompass the following: An AI literacy training programme for instructors (Appendix A); an AI literacy training programme for students (Appendix B); as well as a proposed semester-long AI literacy course for students (Appendix C).

In summary, this chapter has discussed crucial themes concerning the integration of AI in education. We have explored the impact of AI on foundational learning, navigated challenges through the use of flipped learning and developed a framework for designing future-ready curricula. We have discussed resilient assessment strategies and the significance of

adapting instruction for the AI era. The utilisation of AI prompt banks has been emphasised, along with the need to foster student and instructor AI literacy. This brings us to our final chapter, in which we discuss the contributions our study has made to knowledge and research within the realm of AI in higher education.

Chapter 10

Contributions to Knowledge and Research

Review of Research Scope and Methodology

During our research, we thoroughly examined the impact of ChatGPT and artificial intelligence (AI) chatbots on higher education. MEF University in Istanbul served as our research site, renowned for its integration of AI and innovative educational approaches. Through experiments and faculty discussions, we initiated this project to investigate how ChatGPT may affect higher education institutions, students and instructors. Our objectives were to understand the changes in dynamics caused by these technologies. We framed our research questions around the roles of students, instructors and institutions of higher education in the presence of ChatGPT. By exploring these questions, our aim was to gain insights into the transformative impact of AI chatbots in education and provide guidance for successful integration. To understand the big picture, we conducted an exploration of AI and ChatGPT, including its historical development and addressing ethical concerns like privacy, bias and transparency. We emphasised the limitations of ChatGPT, including its potential for generating misleading information and the challenge of addressing its shortcomings. Furthermore, we discussed the broader implications of AI on the future of work and education. We also touched upon the growing concerns about the threat that AI may pose and discussed how national and international policies are starting to be developed to mitigate such threats. To deepen our understanding, we explored theoretical perspectives such as critical theory and phenomenology, allowing us to examine power dynamics, social structures and subjective experiences related to ChatGPT. Then, in our literature review, we analysed various scholarly papers on integrating ChatGPT in education, including document and content analysis, meta-literature reviews and user case studies, conducted within a

4-month timeframe. This review helped us identify recurring themes, gaps in the existing literature and areas that required further research. Our research methodology adopted a qualitative approach, exploring subjective experiences and meanings associated with interactions with ChatGPT. Through a case study approach, we collected data from multiple sources, including critical incidents, researcher diaries, interviews, observations and student projects and reflections. From thematic analysis, we identified six themes: Input Quality and Output Effectiveness of ChatGPT, Limitations and Challenges of ChatGPT, Human-like Interactions with ChatGPT, Personal Aide/Tutor Role of ChatGPT, Impact of ChatGPT on User Learning and Limitations of a Generalised Bot for Educational Context. By examining each theme in relation to our research questions, the data, the literature and our theoretical framework, we gained a comprehensive understanding of the implications and significance of our findings.

Key Insights and Findings

What we discovered is that while ChatGPT proves highly useful across various applications, its efficacy depends on input quality and specificity. Clear prompts lead to accurate responses, but multiple iterations and modifications may be necessary for desired outcomes. ChatGPT operates predictively, lacking a full grasp of context, which poses a limitation. Challenges in application include the absence of a standardised referencing guide, potential generation of incorrect responses and inherent biases. Users perceive ChatGPT as human-like, blurring the lines between human and AI interaction, necessitating the promotion of critical thinking and information literacy skills. In education, ChatGPT shows versatility and practicality, but concerns arise that overreliance may hinder critical thinking and independent knowledge acquisition. In addition, its generalised approach exhibits limitations regarding disciplines and cultural setting.

Based on these findings, it is clear that the integration of AI is poised to bring about significant transformations in the roles of students, instructors and higher education institutions. This transformation unfolds in several ways. Drawing upon Christensen's theory, students are now presented with the option to leverage ChatGPT for specific educational tasks, ushering in an era of AI-supported time optimisation. However, this shift also

implicates Bourdieu's concepts of cultural and social capital, as an excessive reliance on AI could result in the replication of knowledge without genuine comprehension, potentially affecting students' educational habitus shaped by their socio-cultural backgrounds. When examined through a Marxist lens, this phenomenon might signify an instance of technological determinism reshaping educational dynamics for students, possibly leading to a decline in critical thinking and reduced engagement with the learning process. Moreover, the act of referencing AI-generated information introduces unique challenges, reflective of a technological framing of knowledge. Consequently, students are entrusted with the active navigation of their technological interaction, fostering authentic understanding and shifting them from passive recipients to active participants in their educational journey. Shifting focus to instructors, as proposed by Christensen's Theory of Jobs to be Done, educators now have the option to utilise ChatGPT to automate routine tasks and generate educational materials, freeing up time for a more refined teaching approach. However, it is vital for instructors to validate ChatGPT's outputs, revealing areas where AI technologies require fine-tuning. Through a Bourdieusian lens, instructors' roles are poised to evolve as they navigate AI's integration into pedagogy, encompassing an embodiment of cultural capital. To counteract potential bypassing of learning and preserve authenticity, teaching methodologies must evolve accordingly. Approaching this from a Marxist perspective, AI automation's introduction could signify a form of commodification. Nonetheless, instructors' ongoing need to validate outputs and create effective assignments serves as a countermeasure against complete alienation. Viewing this interplay through a Heideggerian framework, instructors assume the responsibility of guiding students in the judicious use of AI, ensuring technology serves as a conduit for truth revelation rather than mere knowledge framing. As such, instructors play a pivotal role in cultivating an educational environment characterised by authenticity and thoughtful engagement, even amid technological advancements. Broadening the perspective to encompass higher education institutions, the integration of ChatGPT offers universities an avenue to heighten productivity and streamline educational processes. However, the challenge lies in aligning this technological leap with the needs of both students and faculty members. This alignment closely aligns with Bourdieu's notions of capital and social structure, necessitating updates to

institutional policies, enhancements in assessment methodologies and robust training initiatives. Through the lens of Bourdieu, ChatGPT emerges as a novel form of cultural capital, enhancing institutions' prestige and credibility. Nevertheless, upholding equitable access and addressing biases remains pivotal to prevent the perpetuation of societal disparities. Through a Marxist perspective, the inclusion of ChatGPT might be construed as a form of education commodification. However, safeguarding equitable access and nurturing critical engagement upholds the enduring value of human oversight within the realm of education. As seen through a Heideggerian framework, institutions shoulder the task of balancing the interplay between students, instructors and the intrinsic essence of technology. Thus, institutions must employ AI in a manner that uncovers truth and amplifies comprehension, all while preserving the core role of human elements in education.

Theoretical Advancements

The integration of the theoretical frameworks of critical theory and phenomenology into our research study on the impact of ChatGPT on higher education represents a significant stride towards advancing the theoretical discourse within the field. By employing these philosophical lenses, our research transcends mere examination and enters the realm of deep understanding, nuanced analysis and holistic exploration. Through the combination of critical theory and phenomenology, our research embraces a multidimensional understanding of the impact of ChatGPT. Rather than analysing this integration from a singular perspective, our approach delves into power dynamics, subjective experiences, existential dimensions and authenticity. This comprehensive exploration offers a deeper grasp of the technology's effects on students, educators and institutions. Critical theory's focus on power dynamics exposes hidden inequalities and systemic structures. By applying this lens, our research uncovers potential disparities in the adoption and utilisation of ChatGPT, shedding light on how technology can either perpetuate or challenge existing hierarchies. This unveiling of hidden dynamics enriches the discourse around technology's transformative potential within higher education. Phenomenology's emphasis on subjective experiences empowers our research to transcend the

superficial layer of technological implementation. By delving into the conscious experiences of stakeholders, our study elevates the conversation beyond technical functionalities to explore the nuances of how individuals perceive, adapt to and interact with ChatGPT. This human-centred exploration adds depth and authenticity to the theoretical advancements we are making. Heideggerian philosophy introduces an existential layer to our research, urging a contemplation of the essence of being and the profound implications of technology on human existence. This philosophical lens elevates the conversation to a level of introspection which is not often found in empirical studies. It invites researchers, educators and policymakers to consider the philosophical underpinnings of their choices and decisions regarding technology integration. The amalgamation of these frameworks encourages a holistic consideration of the ethical, social and personal dimensions of technology integration. Thus, our research doesn't solely focus on the functionality of ChatGPT but rather its consequences on power structures, pedagogical relationships and the authentic experiences of those involved. This comprehensive analysis contributes to the theoretical advancement by promoting well-rounded and informed decision-making. By paving the way for an in-depth exploration of ChatGPT's impact, our research sets a precedent for future investigations. Our approach demonstrates the value of intertwining philosophy and technology in educational research. Researchers interested in the interplay between emerging technologies and education may find inspiration in our study's philosophical underpinnings, further advancing the theoretical discourse.

Implications for Higher Education Institutions

Overall, the implications of AI for institutions of higher education are broad and profound, affecting various aspects of academia. These implications span across ethical considerations, product-related adjustments and significant shifts in educational approaches, all of which necessitate careful examination and adaptation. In the realm of ethical considerations, we strongly recommend refraining from the utilisation of AI detection systems. This perspective stems from the intrinsic opacity, inaccuracies and potential biases associated with these systems. Moreover, we extensively assess existing recommendations for AI referencing systems, ultimately

concluding their impracticality and inefficiency. A significant portion of our discourse centres on the re-evaluation of plagiarism within the AI era, a challenge magnified by emerging technologies that challenge traditional norms. This complexity deepens when AI is involved, given its absence of identifiable authorship, leading to the intriguing notion that AI's mere existence could be likened to plagiarism. Amid these intricate challenges, we underscore the imperative of fostering proficiency in AI ethics among students, educators and institutions. This not only entails comprehending the ethical ramifications of AI but also ensuring its responsible and informed integration within academic settings. Thus, we assert that universities' ethics committees should play a pivotal role in driving this transformation. With the increasing prevalence of AI-generated content, institutions must grapple with redefining plagiarism and attributing credit in this AI-infused age. This endeavour will necessitate a nuanced understanding of how AI interfaces with established academic standards. When considering the implications on product development, we firmly advocate for universities to prioritise achieving an equitable distribution of AI bots. This can be achieved through the establishment of institutional agreements that grant bot access to all instructors and students, thus ensuring universal availability or by directing students towards readily available open sources. As AI becomes an integral part of the educational landscape, it becomes increasingly crucial to address product-related considerations. Ensuring fair and equal access to AI bots becomes paramount in order to prevent any potential disparities in resource allocation among students. Moreover, we underline the significance of universities forging strong partnerships with industries. Recognising the influence of AI on these sectors and identifying the skill sets that employers are seeking in graduates will serve as valuable insights for curriculum refinement within universities. This collaborative effort with industries becomes essential to synchronise educational offerings with the ever-changing requirements of the job market. Such collaboration is pivotal in ensuring that students are adequately equipped with the essential AI-related competencies to excel in industries increasingly shaped by AI technologies. Furthermore, by fostering collaboration, universities can gain insights into the evolving utilisation of AI within specific industries. This valuable information can subsequently inform the creation or acquisition of specialised bots that align with industry trends. This focused approach will

adeptly address the limitations of generalised bots within the educational sphere. The idea of discipline-specific AI bots introduces a pioneering pathway for tailored learning experiences, offering the capacity to precisely address the unique requirements of diverse departments and thus enhancing the integration of AI across various academic domains. Furthermore, we strongly advocate that universities immediately introduce courses in prompt engineering to students, either by developing their own courses or by providing access to existing MOOC courses. This proactive measure will empower students with indispensable skills in navigating the swiftly changing technological terrain. Simultaneously, the provision of prompt engineering courses will significantly bolster students' AI proficiency and deepen their comprehension of optimal AI-interaction strategies. Within the realm of educational implications, we strongly emphasise the imperative for institutions to thoroughly assess the potential influence of AI on students' foundational learning. The conventional concept of foundational learning faces new challenges as AI introduces novel methods and tools. Manoeuvring through these obstacles necessitates a modification of instructional approaches that foster critical thinking, problem-solving and creativity – skills that AI struggles to replicate as effectively as humans. In this context, we propose the adoption of the flipped learning approach as an effective framework to address these issues. Embracing this approach harnesses AI tools to enrich pre-class engagement, allowing class time to be utilised for interactive discussions, collaborative projects and hands-on application. Furthermore, the development of curricula that prepare students for the AI-dominated world becomes imperative. In light of AI advancements, there may be a need to reconsider certain existing course learning outcomes. Therefore, we propose that instructors collaborate with industry to conduct a job analysis, aiming to assess AI's influence on the real world. Following this assessment, appropriate adjustments can be made to the learning outcomes to ensure their continued relevance. To evaluate students' content knowledge and AI literacy skills effectively, AI-resilient assessment strategies are paramount. These strategies must mirror the AI-influenced reality, requiring students to possess not only subject expertise but also the capability to interact adeptly with AI technologies. Similar strategies should be implemented in in-class activities to bolster their AI resilience and prevent potential learning gaps. To provide practical guidance on these aspects, we present a comprehensive framework accompanied by

flowcharts featuring relevant questions. These questions are designed to assist instructors in crafting future-ready curricula, formulating assessment methods that can withstand the impact of AI and adapting teaching methodologies to align with the AI era. Furthermore, we highlight the vital role of creating prompt banks as an invaluable resource to enhance the optimal utilisation of AI. The creation of prompt banks holds considerable significance in maximising the effectiveness of AI systems. These banks comprise a collection of well-crafted and diverse prompts strategically designed to guide interactions with AI platforms like ChatGPT. Acting as initial cues, these prompts stimulate AI-generated responses, suggestions or solutions. We propose the development of discipline-specific prompt banks tailored to the unique needs of various academic departments within universities. Alongside this, we advocate for encouraging students and instructors to curate their personalised prompt banks, catering to their individual preferences and requirements. Furthermore, we emphasise the significance of fostering AI literacy among both students and instructors, albeit with distinct aims. Students should become adept at effectively utilising ChatGPT, while instructors should seamlessly incorporate it into their teaching methods. Tailored training is essential: students should grasp AI fundamentals, applications, ethics and critical thinking, while instructors should excel in AI tool integration and ethical guidance. Consequently, training depth should vary, addressing students' AI navigation and instructors' integration expertise. The approach will be contingent upon each university's unique requisites and available resources. To facilitate this, we have provided recommendations for training programs and courses in the appendices, equipping both instructors and students with the essential skills for proficient AI utilisation. In essence, the integration of AI in higher education marks a transformative phase. Institutions must navigate the ethical, product-related and educational implications thoughtfully to ensure that students are prepared for a future shaped by AI technologies. This journey requires a delicate balance between embracing technological advancements and upholding the core values of education. However, we believe the role of universities goes beyond just what is discussed here. There is a much bigger picture that needs to be addressed.

Global Action and Collaboration

Within the realm of AI, a wide array of concerns currently exists, spanning various dimensions. As AI technology continues to progress, more and more ethical dilemmas are emerging, raising questions about its alignment with human values and its potential for undesirable outcomes. We are currently seeing that AI systems exhibit a number of limitations in critical aspects, such as common sense reasoning, robustness and a comprehensive grasp of the world. This hinders the creation of genuinely intelligent and dependable systems. Additionally, transparency, interpretability and accountability are posing serious challenges, especially in areas like healthcare, finance and law, where they can have a significant impact on human lives. At times, the ongoing trajectory of AI development would appear to be prioritising specific objectives without due consideration for human values, thereby introducing the risk of unanticipated challenges and management complexities. Furthermore, there are also growing concerns surrounding the potential impact of AI on job markets, the economy, governance and societal welfare, which stem from the potential of AI to worsen prevailing inequalities and biases. Notably, certain experts perceive AI as posing an existential threat, citing its ability to surpass human intelligence and consequently posing significant risks to society and humanity. This global scenario has prompted experts, governments and even AI companies to call for regulations, and we are now starting to see the emergence of such regulatory policies. The United Kingdom's Competition and Markets Authority is engaged in a thorough review of AI, centring on concerns like misinformation and job disruptions. Concurrently, the UK government is revising AI regulations to tackle associated risks. In the United States, White House deliberations have involved discussions with AI CEOs regarding safety and security, and the Federal Trade Commission is also actively involved in investigating AI's impact. In addition, the European Union's AI Act is in the process of developing a framework to categorise AI applications by risk and are advocating for responsible AI practices. Moreover, tech giants OpenAI, Anthropic, Microsoft and Google have collaboratively introduced the Frontier Model Forum, dedicated to AI safety, policy discussions and constructive applications, which builds upon contributions from the UK government and the European Union, aligning with White House conversations and indicating an ongoing evolution within the tech industry. Hence, it becomes evident that steps are being taken. However, a pivotal question remains: will

these regulatory efforts result in impactful actions that effectively address potential issues and foster responsible AI advancement? It would seem not.

Currently, there are worrying indications pointing towards potential negative outcomes, exemplified by the reduction in Microsoft's ethics team and Sam Altman's reservations regarding EU AI regulations. These instances underscore the substantial influence wielded by companies and even individual figures. This echoes the very concern voiced by Rumman Chowdhury, who has highlighted an industry trend where entities paradoxically advocate for regulation while concurrently lobbying against it, often prioritising risk assessment over ethical considerations. However, this concentration of power driven by resources could lead to biases and adverse outcomes if not vigilantly managed. Hence, Chowdhury proposes a redistribution of power through collaborative stakeholder engagement. Karen Hao echoes these sentiments, expressing apprehension about tech giants' influence over advanced AI technologies. She calls for transparent and inclusive AI policy shaping that involves a diverse range of stakeholders, underlining the essential role of varied perspectives in promoting responsible AI development. Harari also conveys concerns about potential challenges associated with technological advancement (2018). He asserts that sociologists, philosophers and historians have a crucial role in raising awareness and addressing the self-promotion frequently presented by corporations and entrepreneurs in regard to their technological innovations. He underscores the urgency of swift decision-making to effectively regulate the impact of these technologies, guarding against their imposition on society by market forces. This matter holds utmost significance at present, given the swift progress of ChatGPT in the AI industry, which is catalysing a competition among other companies to adopt and cultivate extensive language models and generative AI. This rapid course may surpass the responsiveness of government policies in addressing these advancements promptly. This brings us back to our AI experts: Max Tegmark, Gary Marcus, Ernest Davis and Stuart Russell. In his 2017 book *Life 3.0: Being Human in the Age of Artificial Intelligence*, Tegmark lays out frameworks for responsible AI governance, stressing the importance of AI conforming to ethical principles that prioritise human values, well-being and societal advancement. He highlights the significance of transparency and explainability in ensuring humans understand AI's decision-making process. To this end, he proposes aligning Artificial General Intelligence

(AGI) objectives with human values and establishing oversight mechanisms. Tegmark envisions a collaborative approach involving a diverse range of stakeholders, including experts and policymakers, to collectively shape AGI regulations, with a strong emphasis on international cooperation (Tegmark, 2017). He advocates for adaptable governance frameworks that can keep pace with the evolving AI landscape. Tegmark's overarching goal is to harmonise AI with human values, preventing misuse and fostering societal progress, all while recognising the continuous need for interdisciplinary discourse and fine-tuning in AI governance (Tegmark, 2017). Marcus and Davis advocate for a comprehensive re-evaluation of the AI research trajectory, suggesting an interdisciplinary path that addresses the limitations inherent in current AI systems (Marcus & Davis, 2019). Their approach involves integrating insights from various fields like cognitive science, psychology and linguistics, aiming to create AI systems that better align with human cognitive processes. They introduce a significant concept – the 'hybrid' approach to AI advancement, which combines rule-based systems and statistical methodologies (Marcus & Davis, 2019). This fusion aims to harness the strengths of both approaches while mitigating their weaknesses. Their vision is that such a hybrid methodology could yield more intelligent and reliable AI systems capable of effectively handling complex real-world scenarios (Marcus & Davis, 2019). Russell introduces the concept of value alignment theory, a fundamental aspect of AI ethics (Russell, 2019). This theory centres on the vital objective of aligning AI systems with human values and goals. It underscores the necessity of designing AI systems to reflect human intentions and desires, preventing potential negative outcomes and ensuring their ethical operation (Russell, 2019). At its core, value alignment theory seeks to ensure that AI systems not only achieve their designated objectives but also consider the broader context of human values and ethics; it acknowledges the potential for AI systems, particularly as they gain autonomy, to pursue goals in ways that may conflict with human intentions (Russell, 2019). Russell's work advocates for AI systems that comprehend and honour human values by incorporating mechanisms for learning from human interaction and feedback. This approach also emphasises transparency and interpretability, allowing humans to understand AI decision-making processes and intervene if needed. Russell's focus on value alignment aims to avert scenarios where AI systems act contrary to human

values, fostering a human-centric approach to AI development that amplifies human capabilities while upholding ethical standards (Russell, 2019). So, based on these proposed solutions by the AI experts to the issues inherent in AI, what role should universities play?

We believe universities have a critical role to play in the context of responsible AI development and governance, if not a moral obligation, and suggest that they contribute to solutions in the following ways. First, universities can act as hubs of research and education, contributing to the advancement of AI technologies while also instilling ethical considerations. They can offer interdisciplinary programmes that merge computer science, ethics, cognitive science, psychology and other relevant fields, encouraging students to think critically about the societal impacts of AI. In line with Tegmark's ideas, universities can facilitate collaborative efforts by bringing together experts, policymakers and various stakeholders to discuss and formulate regulations for AI governance. They can host conferences, seminars and workshops that promote international cooperation and the exchange of ideas to shape adaptable governance frameworks, addressing the evolving landscape of AI. Marcus and Davis' call for an interdisciplinary approach aligns with universities' ability to foster collaboration between different departments and faculties. Universities can encourage joint research initiatives that combine AI expertise with insights from fields such as psychology and linguistics to create AI systems that better emulate human cognitive processes. Universities can also play a pivotal role in advancing value alignment theory, as proposed by Russell. They can contribute to research and education around the ethical dimensions of AI, training future AI developers and researchers to prioritise human values and societal well-being. Furthermore, universities can provide platforms for discussions on the moral implications of AI, fostering a culture of transparency and accountability in AI development. Overall, universities have a responsibility to serve as knowledge centres, promoting interdisciplinary research, ethical considerations, international cooperation and transparency. We believe their role should expand beyond technical expertise alone, encompassing the broader aspects of holistic development and responsible governance of AI technologies. This is our call to action.

Addressing Limitations

While our study's findings proved pertinent and resulted in the development of strategies for implementing ChatGPT at our institution, it is essential to acknowledge and address certain research limitations. The study took place at a specific English-medium non-profit private university in Turkey, renowned for its flipped learning approach. While the insights gained are valuable, it's crucial to recognise that the unique context may limit the generalisability of the results to other educational settings. One notable limitation encountered during the research process was the limited availability of literature on ChatGPT at the study's time. This scarcity can be attributed to the recent public launch of ChatGPT and the restricted time frame for conducting the literature review. As a result, the review partially relied on grey literature, including pre-prints, potentially affecting the comprehensiveness and depth of the analysis. The study also employed intentionally broad and open-ended research questions to facilitate an exploratory investigation. While this approach allowed for a comprehensive exploration, it's vital to acknowledge the potential for bias in interpreting the findings due to the dual role of the principal investigator, serving as both the researcher and instructor. Additionally, the study's reliance on a small sample size of 12 students from an elective humanities class focused on forensic linguistics poses a limitation. It's essential to recognise that outcomes may have varied in larger classes or different disciplines. Furthermore, the sampling of other voices, including instructors and administrators, was relatively random, based on critical incidents, emails, workshops and ad hoc interactions. Finally, it's worth noting that the research was conducted over a single semester, which may restrict the longitudinal analysis of ChatGPT's impact on education. To address these limitations in future studies, we will make the following adaptations. Firstly, to make our findings more applicable across diverse educational settings, we will include a broader range of academic disciplines. To ensure a strong theoretical foundation, we will continuously monitor reputable sources for the latest research on ChatGPT and related AI technologies, updating our literature review accordingly. By combining quantitative and qualitative approaches, we will gain a more holistic understanding of ChatGPT's impact. Integrating numerical data with rich narratives from students, instructors and administrators will provide a comprehensive view of the technology's effectiveness and challenges. To maintain objectivity, we will look to include more reflexivity during data collection and analysis

by involving multiple researchers and use triangulation methods to validate and cross-check findings from these different perspectives. Strengthening the study's validity and representativeness can be achieved by including a larger and more diverse participant pool, encompassing students from various disciplines and academic levels, educators and decision-makers. Gaining deeper insights into ChatGPT's effects over time can be achieved through long-term investigations. Observing changes, adaptations and potential challenges will provide a nuanced understanding of the technology's long-term implications. The exploration of our suggested pedagogical strategies for effectively integrating ChatGPT in education is of utmost importance. By investigating how these proposed changes will impact teaching and learning, we can gain valuable insights for further practical implementation. By incorporating these improvements into our future research, we can enrich our understanding of ChatGPT's impact in education and offer valuable insights for educators and institutions seeking to effectively utilise AI technologies.

Recommendations for Further Research

Our study has opened the door to various avenues for further exploration and investigation into AI chatbots in higher education. Here, we present potential research directions that could extend the scope of our findings and offer valuable insights to fellow researchers.

- *Address Ethical Implications*
  There is an urgent need to investigate the ethical implications of AI integration in education, including data privacy, student consent, algorithmic bias and social-cultural impacts. Therefore, investigations should be extended to explore challenges faced by instructors and institutions when using AI chatbots and ensuring ethical practices in data privacy and bias mitigation for responsible AI use in education.
- *Long-Term Effects of AI Integration*
  It would be pertinent to investigate the long-term effects of AI integration in education, understanding how the use of AI chatbots evolves over time and its impact on student learning outcomes and instructor practices. A mixed methods approach could provide a comprehensive perspective,

combining quantitative data on outcomes with qualitative insights on user experiences.

- *Cultural Variations in Bots*
  Another potential area for future research would involve examining how the cultural nuances present in various AI bot databases should be considered by institutions when selecting systems. Such a study would offer valuable insights into how different AI bots might fit within diverse cultural contexts, thus influencing their effectiveness in educational settings.
- *Application in Other University Areas*
  There is room to investigate the potential applications of ChatGPT beyond education, such as in customer service or administrative tasks within the university. This could involve assessing the benefits, challenges and impact of integrating AI technologies in these areas, which could lead to increased efficiency and improved user experiences.
- *Investigating the Integration of AI Bots into Digital Platforms*
  Digital platform companies, such as Pearson, are actively working on integrating AI chatbots into their platforms. Exploring the potential benefits and challenges of this integration for teaching and learning would be valuable once these new versions of the platforms have been released.
- *Impact on Instructors' Roles and Career Development*
  The long-term impact of AI integration on the roles and responsibilities of instructors should be assessed to investigate how this may affect career development and job satisfaction in the academic field. This research could provide insights into potential opportunities for professional growth and adaptation.
- *Collaborative Functionality of ChatGPT and AI Chatbots*
  We believe it would be pertinent to explore the collaborative functionality of ChatGPT and other AI chatbots that allow sharing chats among multiple individuals. This could involve an investigation into its application by students, instructors, researchers and institutions for collaborative learning, knowledge sharing and collective problem-solving within educational contexts.
- *Effects of ChatGPT and AI Chatbots on Language Learning*
  We believe it is imperative to investigate the potential effects of ChatGPT and AI chatbots on language learning. Given their capabilities in

translation, summarisation, improving writing and acting as conversational partners, further research is recommended to understand the positive and negative impacts on language acquisition and proficiency.

- *Investigating the AI-Human Communication Interface*
  Another avenue for future research that we believe holds particular interest and significance would be an exploration of how the integration of AI and technology, such as chatbots, in education aligns with Heidegger's theory on technology and the essence of being. Investigating how human–chatbot relationships impact student learning outcomes could shed light on the extent to which technology's 'enframing' tendency affects authentic human interactions and understanding. Additionally, delving into the application of communication and symbolic interaction theories within the context of AI-mediated interactions, as discussed by Tlili et al. (2023) and Firaina and Sulisworo (2023), could offer insights into how technology shapes our perception of communication. Furthermore, an examination of media theory in education, also raised by Firaina and Sulisworo (2023), could provide a deeper understanding of how technology, as a form of media, influences interactions and the acquisition of information. Lastly, aligning educational priorities, as advocated by Zhai (2022), with Heidegger's concerns about technology's impact on human essence could offer insights into how to strike a balance between enhancing skills and preserving the authentic human experience in the era of AI-driven education. This future research direction has the potential to contribute to a comprehensive understanding of the implications of AI integration in education, both from a technological and philosophical perspective.

By pursuing these future research directions, we believe the field can gain a more comprehensive understanding of AI's influence in education and develop strategies for harnessing AI's potential while safeguarding the core values of quality education and human-centric learning.

Final Reflections and Concluding Remarks

Our research, centring on the implications of AI with a particular focus on AI chatbots like ChatGPT, has provided meaningful insights into the pervasive impact of AI on our educational institutions, industries and societies. As we have seen, AI acts as both a tool and a transformative element, reshaping traditional learning environments, redefining roles and challenging established norms. However, our findings extend beyond the confines of academia, addressing broader global dialogues on AI's wide-ranging effects. We've investigated the challenges and opportunities arising from AI's rapid development, from potential job displacement to the restructuring of power dynamics. Emphasising the importance of pre-emptive governance, inclusive decision-making and strong adherence to ethical principles, we've outlined crucial considerations for shaping AI's future trajectory. We applied the theories of Christensen, Bourdieu, Marx and Heidegger as guides to dissect AI's transformative potential, its influence on power structures and the profound existential questions it prompts. This theoretical approach equipped us to navigate the complex landscape of AI's rapid evolution, providing a useful framework for others who seek to understand and engage with these issues. We identified universities as key players in these critical discussions. Their influential role in shaping knowledge and driving innovation positions them as leaders in responsible AI adoption and governance. They have the potential to direct AI's trajectory in a way that promotes collective interests, empowers individuals and enhances societal well-being. As we all grapple with these changes – students, educators, researchers, policymakers and society as a whole – we must remember the key message of this research: AI is not just a tool to be used but a significant force to be reckoned with, demanding our understanding, engagement and responsible navigation. As we look to the future, we must remember that we are the authors of the AI narrative. We have the capacity to ensure that AI technologies are shaped to reflect our shared values and aspirations. The importance of our research lies in its call for a conscious and intentional approach to AI integration. It's a call to envision and actively work towards a future where AI promotes greater equity, understanding and shared prosperity. This research is a starting point, a guide that we hope will assist future endeavours towards responsible AI governance and a future where AI is integrated beneficially into all facets of our lives.

Appendices

Appendix A: AI Literacy Training for Instructors

Based on our research, we suggest the following AI literacy programme for instructors.

Course Name

Mastering AI Literacy for Teaching and Learning

Overall Educational Objective

By the end of the course, you will have gained the comprehensive knowledge and skills to effectively integrate AI chatbots into your educational setting for effective learning and teaching.

Course Format

This course will be delivered as an asynchronous online programme, providing educators with the flexibility to engage with the content at their own pace. The course materials will be accessible through the university's learning management system, allowing participants to learn, reflect and practice in a self-directed manner. To enhance engagement and interaction, live workshops will be conducted throughout the semester, focusing on each aspect of the course content. These workshops will provide an opportunity for participants to ask questions, engage in discussions and receive real-time guidance.

Course Description

This is a dynamic and immersive course that equips educators with a deep understanding of AI chatbot technology and its ethical implications in educational contexts. From foundational concepts to advanced strategies,

this course takes educators on a transformative journey through the world of AI chatbots. Participants will explore how AI chatbots are reshaping the education landscape, from personalised learning experiences to efficient administrative support. The course delves into the ethical dimensions of AI integration, addressing concerns like privacy, bias and accountability. Educators will gain practical insights into how AI can amplify teaching methodologies, enhance student engagement and revolutionise assessment strategies. This course is designed to empower educators to seamlessly integrate AI chatbots into their teaching practices while ensuring ethical considerations remain at the forefront. Participants will engage in interactive units that cover the emergence and growth of AI chatbots, their potential to enhance instructional efficiency and the ethical implications of AI-driven education. Real-world examples will illuminate the challenges and solutions associated with AI ethics. By the end of the course, educators will be equipped with the skills to foster responsible AI integration, design future-ready curricula and leverage AI tools for impactful instruction.

Enduring Understanding

Empowering educators with AI chatbots involves mastering their practical applications, understanding ethical implications and adapting teaching practices for an AI-enhanced educational landscape.

Essential Questions

- How can educators effectively integrate AI chatbots into their instructional practices while upholding ethical considerations?
- What ethical dilemmas arise from AI chatbot usage in education, and how can educators navigate them?
- In what ways can AI chatbots enhance student engagement, feedback and support in the learning process?
- What opportunities and challenges does AI pose for teaching and learning, and how can educators harness its potential?
- How can educators design curricula that prepare students for an AI-integrated future and foster critical AI literacy?
- What strategies can educators employ to navigate AI-enhanced assessment methods while ensuring fairness and transparency?

- How can educators adapt their teaching methodologies to create AI-resilient learning environments that cater to diverse student needs?
- What tools, platforms and best practices are essential for seamlessly integrating AI chatbots into educational contexts?
- What are the key ethical principles that educators should consider when integrating AI chatbots into teaching practices?
- How can educators foster inclusivity and equitable access to AI chatbots for all students?
- What collaborative opportunities exist between educational institutions and industries in the AI-enhanced education landscape?

Course Learning Outcomes and Competences

Upon completing the course, educators will be able to:

- Integrate AI chatbots into their teaching methodologies to enhance student engagement, feedback and learning support.
- Critically assess and address ethical challenges related to AI chatbot integration in education.
- Leverage AI chatbots for personalised learning experiences, efficient administrative tasks and innovative assessment strategies.
- Create AI-enhanced curricula that prepare students for a technology-driven future while fostering critical AI literacy.
- Adapt instruction methods to create AI-resilient learning environments that accommodate diverse student needs.
- Implement AI-resilient assessment strategies that ensure fairness and transparency.
- Collaborate with industries to enhance educational practices through AI integration.

Course Contents

(1) Unit 1 – Understanding AI Chatbots in Education

- Introduction to AI Chatbots in Educational Settings
- Exploring AI's Role in Enhancing Teaching and Learning
- Defining the Ethical Imperative in AI Adoption for Educators

(2) Unit 2 – Navigating the Educational Landscape with AI Chatbots

- The Emergence and Evolution of AI Chatbots in Education
- AI's Potential to Transform Instructional Efficiency and Student Engagement
- Challenges and Opportunities in Integrating AI Chatbots in Education

(3) Unit 3 – Ethical Considerations in AI Chatbots for Educators

- Ethics in AI Integration: Privacy, Bias and Accountability
- Navigating Ethical Dilemmas in AI-Driven Education Real-World
- Ethical Challenges and Solutions in AI Integration

(4) Unit 4 – Enhancing Student Engagement and Learning with AI Chatbots

- Personalising Learning Experiences through AI Chatbots
- Leveraging AI for Effective Feedback and Support
- Ethical Implications of AI-Enhanced Student Engagement

(5) Unit 5 – Adapting Teaching for the AI Era: Strategies and Challenges

- Designing Curricula for an AI-Integrated Future
- Creating AI-Resilient Learning Environments
- Ethical Dimensions of AI-Driven Teaching Methodologies

(6) Unit 6 – AI-Enhanced Assessment Strategies: Fairness and Transparency

- Redefining Assessment with AI Integration
- Navigating AI-Resilient Assessment Strategies with Ethical Integrity

(7) Unit 7 – Collaborations in AI-Enhanced Education

- Industry–Educator Partnerships for Effective AI Integration
- Fostering Collaborations to Enhance Educational Practices through AI

(8) Unit 8 – AI Ethics: Guiding Principles for Educators

- Key Ethical Principles in AI Integration for Educators
- Ensuring Equitable Access to AI Chatbots for All Students

(9) Unit 9 – Building AI Literacy: Preparing Students for an AI-Driven Future

- Fostering Critical AI Literacy Skills Among Students
- Equipping Students to Navigate the Ethical and Technological Dimensions of AI

In summary, this AI literacy course will empower educators to seamlessly integrate AI chatbots into their teaching methods, emphasising ethics and equipping them with essential skills for delivering effective instruction in the AI era, while also nurturing critical AI literacy in their students.

Appendix B: AI Literacy Training for Students

Based on our research, we suggest the following AI literacy programme for students.

Course Name

Mastering AI Literacy for Learning

Overall Educational Objective

By the end of this course, you will have gained the skills to engage effectively with AI, evaluate its ethical implications, enhance learning through AI strategies and critically assess its limitations. You will be able to implement AI as a tool for creativity and efficiency, while also recognising and addressing potential instances of bypassing learning, fostering responsible learning practices in the AI era.

Course Format

This course will be delivered as an asynchronous online programme, providing students with the flexibility to engage with the content at their own pace in accordance with their schedules. The course materials will be accessible through the university's learning management system, allowing students to learn, reflect and practice in a self-directed manner.

Course Description

The primary goal of this course is for students to develop essential skills that enable effective engagement with AI, ethical evaluation and strategic enhancement of learning through AI strategies. By the end of this course, students will have gained the ability to critically assess AI's limitations, leverage its potential for creativity and efficiency and ensure responsible learning practices that guard against potential shortcuts. Through a flexible online format, students will explore the transformative role of AI in education, its impact on learning strategies, and how to navigate its ethical considerations, empowering them to harness the power of AI while promoting responsible learning practices in the AI era.

Enduring Understanding

In the AI era, mastering AI literacy equips learners with skills to engage, collaborate with and effectively adapt to AI, enhancing learning strategies in a rapidly evolving technological landscape while safeguarding against potential learning shortcuts.

Essential Questions

- How does mastering AI literacy empower learners to engage with and collaborate effectively alongside AI in various contexts?
- What specific skills are essential for learners to effectively adapt to the evolving AI landscape while ensuring the integrity of their learning journey?
- How can AI literacy enhance learning strategies to meet the demands of a rapidly changing technological environment?
- What potential shortcuts in learning could arise in the presence of AI, and how can learners guard against them?

- In what ways does AI literacy contribute to learners' ability to critically evaluate and utilise AI tools for educational purposes?
- How can learners strike a balance between leveraging AI's benefits and maintaining the depth and quality of their learning experiences?
- What ethical considerations should learners keep in mind while collaborating with AI in their learning processes?
- How can AI literacy foster a sense of responsibility and active participation among learners in shaping the future of education within an AI-driven era?
- What strategies can learners employ to effectively navigate the ever-evolving landscape of AI technologies in their learning endeavours?

Course Learning Outcomes and Competences

Upon completing the course, students will be able to:

- Identify and assess the specific skills required to effectively engage with and adapt to AI, fostering collaboration and informed decision-making.
- Evaluate the ethical implications of utilising AI in learning processes, demonstrating an awareness of responsible AI usage and potential challenges.
- Develop strategies to enhance learning experiences through AI, including optimising input quality, output effectiveness and personalised interactions.
- Critically appraise the limitations and challenges associated with AI technologies, recognising the importance of reliability and ethical considerations.
- Implement AI as a personal aide and tutor, applying AI tools to enhance creativity, efficiency and knowledge acquisition.
- Identify instances where the use of AI could lead to bypassing learning and formulate strategies to mitigate them, thereby fostering responsible learning practices in the AI era.

Course Contents

(1) Unit 1 – Embarking on the AI Chatbot Journey

- Introduction to AI Chatbots
- Challenges with AI Chatbots
- Purpose and Scope of the Course

(2) Unit 2 – Navigating the Landscape of AI Chatbots

- Emergence and Growth of Chatbots
- AI's Impact on the Job Market
- AI's Impact on Education

(3) Unit 3 – Input Quality and Output Effectiveness of AI

- Enhancing User Experience: The Role of Context in AI Interactions
- Crafting Quality Input: Maximising AI Output Effectiveness
- Iterative Refinement: Enhancing AI Interactions through User Learning
- Developing a Personalised Prompt Bank
- Tailoring AI Interactions to Individual Needs

(4) Unit 5 – Navigating Limitations and Challenges of AI

- Understanding AI's Output Challenges
- Ensuring Reliable Information from AI
- Ethical Considerations in AI
- Limitations of Current Tools and Systems

(5) Unit 5 – Understanding Perceived Human-Like Interactions with AI

- Perceiving Human-Like Interactions: Dynamics of AI Communication
- Interpreting ChatGPT's Output: Opinions vs Predictions

(6) Unit 6 – AI as a Personal Aide and Tutor: Enhancing User Experiences

- Enhancing User Ideas and Efficiency
- Versatility and Support Beyond Academics
- Feedback, Enhancement and Knowledge Impartation

(7) Unit 7 – Navigating AI's Impact on Learning and Responsibilities

- Understanding AI's Impact on Learning
- Strategies for Avoiding Bypassing Learning in the Age of AI
- Learner Responsibilities in the AI Era

In summary, this AI literacy course for students will equip them with essential skills to engage effectively with AI, evaluate its ethical implications, enhance learning strategies and navigate potential challenges in the AI era.

Appendix C: AI Literacy Course for Students

Based on our research, we suggest the following AI literacy course for students.

Course Name

Mastering AI Chatbots

Overall Educational Objective

By the end of this course, you will attain a thorough mastery of AI chatbots, including a strong comprehension of their technological underpinning, issues related to their development and challenges regarding their societal impact as well as developing the ability to adapt and use these tools in a variety of contexts.

Course Format

The course is scheduled for one semester and will adopt the flipped learning approach. Classes can be conducted synchronously online.

Course Description

The primary goal of this course is for students to become adept with AI chatbots and learn how to effectively use and apply these tools in various situations. Throughout the course, students will become proficient in AI chatbots, from grasping their technology to using them strategically. On the

course, students will explore the basics of chatbots while also assessing their impact on education, jobs and society. They will also delve into how AI is influencing them personally, as well as individuals and their relationships with learning, technology and society. Additionally, students will discover ways to practically enhance their AI user experience, all while considering ethical concerns. They will also investigate the limitations and challenges of AI chatbots and their role in learning. Ethical considerations and real-world examples will be discussed to provide insights into AI chatbot development. Moreover, students will examine AI threats, ethical guidelines, and the responsibilities that educators, schools and universities have in this context. They will also explore upcoming trends and innovations in AI chatbots, preparing them for the ever-changing landscape of AI technology. The course will emphasise hands-on experience, and by the end of it, students will have configured and trained an AI chatbot to meet their individual needs. Consequently, students will have acquired skills in AI comprehension, critical thinking, ethical considerations and practical application, enabling them to navigate the world of AI effectively.

Enduring Understanding

Mastering AI chatbots involves understanding their impact on people, societies and ethics, and grasping the broad effects of technology progress.

Essential Questions

- What trends shape AI chatbot advancements and their impact on various domains?
- How can AI chatbots be used for effective interactions and high-quality responses?
- What ethical considerations arise from AI chatbot limitations and how can they be addressed?
- In what ways do AI chatbots imitate human-like interactions, and what sets apart opinions from predictions in their output?
- How can AI chatbots enhance user efficiency, support and ideas across different contexts?
- What's the impact of AI on learning, and what are learners' responsibilities in this context?

- What's the scope of generalised and specialised AI chatbots, considering limitations and cultures?
- What ethical challenges arise during AI chatbot development, and how do real-world examples provide insights into these challenges?
- What threats do AI chatbots pose, and why is ethical policy crucial in managing them?
- How can universities contribute responsibly to AI chatbot development and ethical discussions?
- What tools, platforms and practices can be used to develop AI chatbots?
- How are emerging trends and technologies shaping the future of AI chatbot technology and integration?

Course Learning Outcomes and Competences

Upon completion of the course, students will be able to:

- Develop strategies for fostering a responsible learning approach that adapts to the influence of AI technology.
- Analyse the influence of AI on individuals, education, society, industries and the global landscape.
- Critically evaluate real-world AI dilemmas and appraise current efforts to address these dilemmas.
- Configure and train a basic AI chatbot tailored to their specific needs using a variety of tools and platforms.
- Demonstrate proficient use of AI chatbots through effective interaction strategies, ethical considerations and informed decision-making.

Assessment

Pre-class Quizzes – Before Each Unit (20%)

(1) Participation Activities – throughout the course, to include:

- A critique of an AI detection tool (5%)
- A personal reflection discussing how ChatGPT was used as a search engine, then fact-checked against primary sources (5%)

- A reflection paper on the importance of foundational learning, how AI may affect this and what should be done to avoid this (5%)
- A critique of flowchart for AI-resilient teaching and learning (5%)
- The development of a personalised prompt bank (5%)
- A personal diary on how ChatGPT was used for other tasks outside the realm of education (5%)
- A SWOT analysis of generalised versus specialised bots (5%)
- Participation in a debate on the ethical implications of a real-world AI dilemma, such as: Should self-driving cars be programmed to kill if it means saving the lives of more people? or Should facial recognition software be used to track people's movements? (5%)

(2) End-of-Course Performance Task – Configuring an AI Chatbot for Personal Use (40%)

The objective of the end-of-course performance task is to personalise an existing AI chatbot to your specific needs. You will step into the role of an AI enthusiast, customising an existing AI chatbot to work for you. By adjusting interactions, responses and functionalities, you will demonstrate your ability to adapt AI technology effectively. This task embodies the course's key concepts, providing a hands-on opportunity to apply acquired knowledge in a practical scenario. Ultimately, you will create a personalised AI assistant aligned with your interests and requirements. The assessment standards are as follows:

- *Functionality and Customisation*
  The configured AI chatbot demonstrates a clear understanding of the chosen scenario or context. The interactions and responses of the chatbot are relevant and aligned with the specific needs of the scenario. The chatbot effectively handles a variety of user inputs and provides appropriate responses.
- *Tools and Platforms Proficiency*
  The student has effectively utilised a variety of tools and platforms to configure the chatbot. There is evidence of technical proficiency in setting up and integrating the chatbot with relevant technologies.
- *Rationale for Design Decisions*
  The design decisions made in configuring the chatbot are clearly explained. The student justifies the choice of chatbot functionalities,

responses and interactions based on the scenario's requirements.

- *Consideration of User Experience*
  The chatbot provides a user-friendly and seamless experience for interacting with users. Provisions are made for handling user queries effectively, maintaining context and providing appropriate assistance.
- *Ethical Considerations*
  Potential ethical concerns related to the chatbot's interactions and responses are addressed. Safeguards are in place to prevent the chatbot from providing misleading, harmful or biased information.
- *Adaptability and Future Improvements*
  The student discusses how the chatbot could be further improved or adapted in the future. Suggestions are provided for refining the chatbot's functionalities based on potential user feedback or changing requirements.
- *Documentation and Explanation*
  Clear documentation of the chatbot's configuration process, including tools used and setup steps, is provided. An informative explanation of the chatbot's functionalities, purpose and intended user experience is included.

Course Contents

(1) Unit 1 – Embarking on the AI Chatbot Journey

- Introduction to AI Chatbots
- Challenges with AI Chatbots
- How This Course Will Help You Master AI Chatbots

(2) Unit 2 – Navigating the Landscape of AI Chatbots

- Emergence and Growth of Chatbots
- AI's Impact on the Job Market
- AI's Impact on Education

(3) Unit 3 – How AI Will Affect Me

- Understanding How AI Impacts Individuals

- AI and Me: Power Dynamics, Social Structures and Cultural Influences
- AI and Myself: Exploring My Relationship with AI

(4) Unit 4 – Input Quality and Output Effectiveness of AI

- Enhancing User Experience: The Role of Context in AI Interactions
- Crafting Quality Input: Maximising AI Output Effectiveness
- Iterative Refinement: Enhancing AI Interactions through User Learning

(5) Unit 5 – Developing a Personalised Prompt Bank

- Tailoring AI Interactions to Individual Needs

(6) Unit 6 – Navigating Limitations and Challenges of AI

- Understanding AI's Output Challenges
- Ensuring Reliable Information from AI
- Ethical Considerations in AI
- Limitations of Current Tools and Systems

(7) Unit 7 – Understanding Perceived Human-Like Interactions with AI

- Perceiving Human-Like Interactions: Dynamics of AI Communication
- Interpreting ChatGPT's Output: Opinions vs Predictions

(8) Unit 8 – AI as a Personal Aide and Tutor: Enhancing User Experiences

- Enhancing User Ideas and Efficiency
- Versatility and Support Beyond Academics
- Feedback, Enhancement and Knowledge Impartation

(9) Unit 9 – Navigating AI's Impact on Learning and Responsibilities

- Understanding AI's Impact on Learning
- Strategies for Adapting to AI in Education
- Learner Responsibilities in the AI Era

(10) Unit 10 – Generalised Versus Specialised Bots

- Understanding Generalised Bots: Scope and Limitations
- Addressing Limitations: Disciplinary Context Constraints
- Cultural Considerations: Challenges for Generalised Bots
- Investigating Specialised Bots

(11) Unit 11 – Ethical Considerations in AI Chatbots

- Understanding Ethical Challenges in AI Chatbot Development
- Navigating Ethical Dilemmas: Development and Use
- Real-World Examples: Ethical Dilemmas in Action

(12) Unit 12 – AI Threats, Policy and the Role of Universities

- AI Threats and the Call for Ethical Policy
- Exploring the Imperative for Ethical AI Policy
- Uniting Ethical Insights: Universities and AI Discourse

(13) Unit 13 – Future Trends and Innovations in AI Chatbots

- Emerging Trends and Advancements in AI Chatbot Technology
- Integration of AI Chatbots with Emerging Technologies
- Evolving Roles of AI Chatbots across Industries

(14) Unit 14 – Configuring and Training Your Own AI Chatbot

- Tools and Platforms for AI Chatbots
- Configuring and Training a Basic AI Chatbot
- Addressing Best Practices, Customisation Options and Troubleshooting

(15) Unit 15 and 16 – Presentation and Critique of Personalised Chatbots

In summary, this AI literacy course will empower students to become proficient in AI chatbots. They will grasp the technology, address challenges and explore ethical dimensions. With practical skills and critical thinking, students will adeptly adapt AI chatbots, understand their societal impact and navigate their use in education and beyond.

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