The Road to AI Integration

Investigating the Dimensions of AI Readiness in Educational Settings

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ABSTRACT (MAX. 200 WORDS):
Artificial Intelligence (AI) holds the potential to radically transform various industries in the coming years, yet its impact on higher education remains underexplored. This study investigates how AI tools are integrated and utilised by teachers in higher education, employing a qualitative method and abductive approach to examine internal and external dimensions of AI readiness that influence teachers' ability to integrate AI. Through semi-structured interviews with educators across multiple disciplines, the research identifies a significant gap between AI's potential and its practical application, underscoring the critical need for ongoing professional development and institutional support. The findings suggest that while external dimensions are important for AI integration, teachers' reluctance to adopt AI tools is primarily influenced by internal dimensions of their teaching practices. Moreover, the research indicates that external dimensions significantly influence internal dimensions, highlighting the interconnection of these dimensions in the context of AI integration in higher education.

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1 Introduction

This chapter will introduce the background of the thesis, as well as the problem and purpose. Later, the research question and delimitations are presented.

1.1 Background

Artificial Intelligence (AI) has been widely recognized as a transformative force reshaping numerous industries. Russel and Norvig (2022) highlights that recent surveys ranks the AI industry as the fastest growing field, generating over one trillion dollars in revenue each year and have estimations to contribute to the global Gross Domestic Product (GDP) with 13-15,7 trillion dollars (van Giffen & Ludwig, 2023). In the educational sector AI has shown great potential (Dwivedi et al., 2021; Huang et al., 2023) and recent innovations have led to a shift within the educational sector where AI has emerged as a proven tool to enhance both students and teachers with positive learning outcomes (Chu et al., 2022). Therefore, there is a need to explore the influence of AI in university settings (Firat, 2023). PP

AI promises to further improve the strategies used for teaching and as AI tools are becoming more advanced and sophisticated, new opportunities will arise at a fast pace at the higher educational level (Crompton & Burke, 2023). However, the integration of AI technology in higher education has progressed at a measured pace (Hannan & Liu, 2023). To stay relevant and remain competitive, the authors suggest that institutions need to adopt more innovative strategies to effectively integrate AI tools. According to Susarla et al. (2023) conversations have emerged about how higher education should utilise AI tools. However, the successful integration and utilisation of AI in education depends on more than just the technology, it requires a readiness among educators to effectively adopt these tools.

Chen et al. (2020) argue that AI can enhance various aspects of a teacher's work, including administrative tasks, assessments, and feedback processes. With the continuous development and implementation of new technology higher education enters a new era referred to as education 4.0 (Ciolacu et al., 2018). Additionally, teachers are beginning to leverage AI tools in the learning process, learning technologies, intelligent conversation platforms (Ciolacu et al.,2018), and AI integration is believed to change the roles and responsibilities of educators (Ghamrawi et al., 2024).

AI readiness is a term that previously has been used to describe the knowledge and application of AI-based technologies in both education as well as other fields (Sperling et al., 2024). AI readiness in education is important for leveraging the capabilities of emerging technologies. However, the concept of AI readiness is still in its early stage and most of the studies made on the phenomena have been made in the business landscape where the integration of AI has been made at a faster pace (Luckin et al., 2022; Holmström, 2022; Jöhnk et al., 2021). Additionally, in previous Information System (IS) research, adoption and readiness has only been described as two loosely associated concepts (Jöhnk et al., 2021).

This thesis explores internal and external dimensions of the concept of AI readiness in higher education. AI readiness is defined as: a way to describe the transition that an individual will

have to make to go from not understanding what AI is and its implications, to being able to understand what AI can achieve (Luckin et al., 2022). AI readiness aims to prepare teachers to effectively integrate AI into their teaching, research and administrative practices. While the use of AI in learning processes has been widely acknowledged, its application in facilitating teachers work remains relatively unexplored. Building on these insights, this research aims to delve deeper into understanding the role of AI in the context of higher education, specifically focusing on how they are being integrated and used today. This is done by investigating dimensions of AI readiness affecting the adoption of AI tools in their daily work.

1.2 Problem Identification

Given AI's growing significance in education, Pisica et al. (2023) argue that institutions risk falling behind competitively if they do not embrace AI. Therefore, it is crucial that institutional leaders understand that approaching AI integration passively is essentially the same as opposing it (Pisica et al., 2023). A passive approach can also lead to modern students, who are accustomed to digital technologies, not being satisfied with traditional educational models that disregard advancements in AI (Pisica et al., 2023). However, there are certain factors that hinder the effective use of AI tools. A significant gap in connecting AI technologies with their practical application in teaching was identified by Chiu et al. (2023). They note that teachers' general lack of understanding about how to effectively utilise these systems hinder their ability to comprehend the impacts of AI in education.

Building upon this, Wang et al. (2023) have highlighted some gaps in our understanding of the factors influencing the integration and effective use of AI by teachers in higher education. The authors acknowledge that while the importance of AI readiness is recognized, its interplay with broader aspects of teachers' professional lives and how they are influenced by AI usage remain underexplored. This limitation suggests a need for a comprehensive examination of how AI readiness correlates with the broader professional aspects (Wang et al., 2023). Furthermore, the authors point out a critical oversight in the literature concerning the specific needs and challenges that educators face in AI-enhanced teaching environments. Amado-Salvatierra et al. (2024) also mention that as the relationship between AI and higher education evolves, ongoing research is essential to understand its implications, identifying optimal implementation strategies and redefining the role of educators in an AI-enhanced educational environment.

Despite the known benefits of AI for student learning, the practical and personal challenges that teachers encounter when integrating AI tools into their teaching practices are not well-documented, indicating a gap in empirical understanding that this study aims to address (Wang et al., 2023). Given that the full potential of AI in higher education has yet to be realised, it is important to define AI-related skills among teachers. Hence, further research is required to assess the level of teachers' knowledge, skills, attitudes, and engagement with AI within their teaching settings (Celik et al., 2022). Luckin et al. (2022) underscored the importance of simplifying the way people are educated about AI and although the low number of studies being made on the subject, the results have indicated that teachers that are "AI ready" not only have a better chance of understanding and implementing AI technologies into their daily task, but it also puts the educators in a place where student learning is enhanced.

1.2.1 Lack of distinction between AI readiness and AI adoption

AI adoption is a concept that in the literature has been closely related to AI readiness. Research on readiness for technology change has only emphasised the level of readiness as a precursor for AI adoption. Furthermore, successful AI adoption often includes an iterative process where different use cases are explored. Therefore, AI readiness becomes an ongoing concern rather than a one-time issue. Jöhnk et al. (2021) explain that this is because the prerequisites for AI readiness change depending on the lessons learned from previous experiences and the intended use of AI. Lastly, Jöhnk et al. (2021) argue that the concepts of readiness and adoption should be discussed as two separate concepts because they both offer different lenses on how technology is used in different entities, a stance that previous literature has failed to accomplish. Further, Jöhnk et al. (2021) argue that discussions regarding the interconnection between AI adoption and AI readiness have been lacking and could offer value to those who seek to benefit from the potentials of AI.

1.3 Purpose

The purpose of this study is to explore the integration of AI tools in higher education by investigating the dimensions of AI readiness among educators that influence their ability to integrate and effectively utilise AI tools in their teaching practices. As institutions increasingly integrate AI into their curricula it becomes important to understand the factors that contribute to successful AI implementation by educators and by examining the experiences, perceptions, and challenges faced by teachers when integrating and utilising AI. Ultimately, the findings could inform strategic actions to enhance AI integration in educational settings, thereby improving both teaching outcomes and student learning experiences. Further, the study aims to address the concept of AI readiness as a standalone concept within the IS research field and distinct it from AI adoption.

1.4 Research Question

Based on the problem identified and the purpose of the study, the following research question was formulated:

 How does the dimensions of teachers' AI readiness influence the integration and utilisation of AI tools in higher education?

1.5 Delimitation

This study focuses on the integration and utilisation of AI in higher education, and while comprehensive in its approach, is bound by certain delimitations. These delimitations are set to clarify the scope and focus of the research, helping to refine the findings and conclusions drawn. First, the study is limited by its timeframe and therefore data will only be collected over a specific period, which means that the results may not accurately reflect long-term trends of AI readiness or shifts in general educational policies that take place after this study.

Furthermore, this study will only focus and collect data about teachers in higher education and therefore our results might not be applicable for primary and secondary educational levels. Third, this study includes respondents from various academic disciplines. However, it does not cover all disciplines, so the findings may not be applicable to every academic field.

2 Literature Review

This chapter will introduce the concept of artificial intelligence, generative artificial intelligence, how it has been used in education and research, together with human-AI collaboration. Secondly, AI readiness together with identified internal and external dimensions will be presented. Lastly, a conceptual framework based on the literature will be presented.

2.1 Artificial Intelligence and its Utilisation in Higher Education

AI has existed for more than five decades, and its rapid development in recent years has led to comparisons with the transformative impact of electricity (Ciolacu et al., 2018). Numerous sectors have recognized and leveraged AI to achieve greater economic and social benefits, with the field of education also embracing its transformative potential (Kavanagh, 2019). The original definition of AI emerged in the year 1955 where it was defined as "making a machine behave in ways that would be called intelligent if a human were so behaving." (McCarthy, cited in Kavanagh, 2019).

However, AI is a broad term, where many have different perceptions of what it is. Russel and Norvig (2022) explain that AI encompasses a wide range of subfields, varying from general areas such as learning, reasoning and perception to specific applications such as playing chess. The birth of AI is generally considered to have taken place at Dartmouth College 1956, organised by John Mcharty, and in the years that followed further improvements have been developed. New advancements in Machine Learning (ML) have contributed to the development of expert systems in the year 1969 and later Deep Learning in 2011 (Russell & Norvig, 2022), and lastly Generative Artificial Intelligence.

Generative AI is a subfield of AI that uses Deep Learning and with high accuracy can generate human-like content when tasked with complex and varied prompts (Lim et al., 2023). Technologies such as DALL-E, GitHub Copilot and GPT-4 are large language models (Feuerriegel et al., 2024), that are trained on large amounts of text data (Kasneci et al., 2023). Furthermore, Kasneci et al. (2023) claims that the recent development of these tools is mainly because of the use of transformer architectures and their underlying attention mechanism. Generative AI has become the most popular type of AI because of its applicability for various use cases and its recent advancements. According to Venkatesh (2022) the definition of AI tools and what they are, is continuing to evolve when a constant integration of new technologies occurs. The author also states that, while AI tools come with great promises, they will face challenges in integration and use, like other new technologies. Figure 2.1 visualises the AI hierarchy as described above.
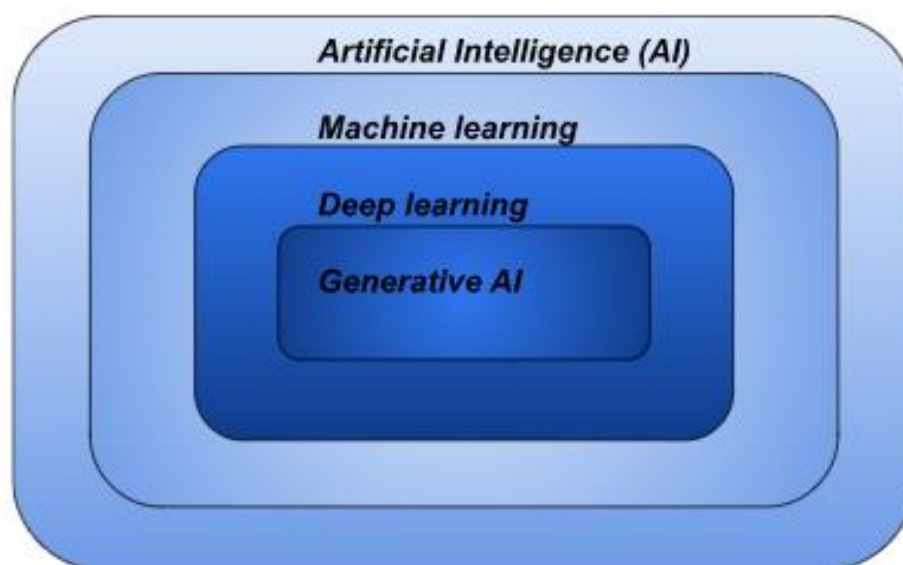
Figure 2.1: Visualisation of the AI hierarchy

2.1.1 AI role in Education

AI tools significantly influence educational practices by their capacity to receive, store, and process information, suggesting a broad and diverse application range in education (Al Darayseh, 2023; Kasneci et al., 2023). Al Darayseh (2023) identifies five key areas where AI tools enhance educational functions: smart private teaching, adaptive learning environments, AI-based assessments, smart content, and virtual reality tools. Additionally, Chiu (2024) conducted a systematic literature review, highlighting three areas; adaptive teaching strategies, enhanced teaching abilities, and support for professional development as critical areas in higher education where AI can be applied. Furthermore, elaborating on the utility of AI, Fui-Hoon Nah et al. (2023) argue that AI tools facilitate the creation of teaching plans, preparation of materials, and the review and grading of assignments, thereby improving the feedback mechanism for students. Alqahtani et al. (2023) also mentions that AI as a grading assistant can save time, increase consistency, provide quicker feedback, analyse performance, and adapt to specific grading criteria which is believed to enhance the teaching and learning environment. Gill et al. (2024) further discuss the influence of AI on enhancing analytical and critical skills, illustrating the broad utility of these tools in educational settings. However, the authors also highlight a controversial aspect: AI's ability to generate human-like content in exams and essays, sparking a debate about authenticity and academic integrity.

Moreover, another essential role of AI tools is in language exploration, where they assist in refining sentences, practising proper pronunciation, understanding sentence construction, and providing real-time translations. This capability not only supports language learning but also enriches communication skills across diverse linguistic backgrounds. Addressing digital inequality, Gill et al. (2024) stress the importance of discussions around universal access to digital tools, advocating for equitable educational opportunities. This is crucial as AI tools continue to reshape personalised learning by identifying students' challenges and offering tailored recommendations (Alqahtani et al., 2023). According to Al Darayseh (2023), such tools

significantly influence the educational process by developing adaptive learning systems that adjust to each student's unique needs. Generative AI technologies, e.g. Chat-GPT, can further support personalised learning by aiding in information retrieval, addressing specific subject questions, and enhancing writing skills in multiple languages (Fui-Hoon Nah et al., 2023). Celik et al. (2022) notes that the integration of AI into chatbots and intelligent tutoring systems further personalised and enhances the educational experience, demonstrating the multifaceted benefits of AI in education.

2.1.2   Teacher-AI collaboration

How AI tools can be utilised by teachers, the advantages they offer, and the potential change to their roles is crucial for educators to understand (Celik et al., 2022). It has been suggested that teachers must understand how AI technology can effectively augment their expertise (Luckin et al., 2022). According to Celik et al. (2022), the use of AI technology in education does not imply that teachers will be obsolete. Rather, educators must learn how to use AI tools and recognize how these tools can alter their roles. In line with this, Jeon and Lee (2023) argue that effective learning results come from the collaboration between AI and humans. They observed that AI tools alone did not improve education, instead, a human expert is needed to complement the AI tool to maximise its potential.

According to Rai et al. (2019) there are three different types of hybrids. These include AI replacing humans (substitution/automation), humans and AI augmenting each other (augmentation) and AI and humans being brought together and functioning dynamically as an integrated unit (assemblage), see Table 2.1. Augmentation implies that humans remain actively involved, while automation entails replacing the human role with technology (Leyer & Schneider, 2021). Additionally, the authors claim that tools are designed to complete cognitive tasks that humans can perform themselves e.g., a software tool for grading assignments. The result of tools being able to perform differently have resulted in two different levels of AI, tool augmentation and tool automation. Further, (Rai et al., 2019) describe that the different hybrids will execute different tasks with different efficiency, depending on task inputs, performance, communication, and implementation and the collaboration between human and AI.

Table 2.1: AI hybrids

Augmentation	Automation	Assemblage
Human and AI work together, with humans being interactive and AI enhancing human capabilities.	AI works separately from humans, automating tasks without human interaction.	Human and AI work together as an integrated unit, combining their strengths and capabilities.

2.1.3   AI in research

A teacher within higher education's work does not only include educating students, it also involves conducting research of their own. AI tools have already been used to screen papers for plagiarism, identifying similarities between papers that are published and waiting to be published, and have sped up the peer review process (Sarker et al., 2024). Moreover, Susarla et al.

(2023) conducted a study on how generative AI tools can be used in research. In the beginning of a research, researchers can use generative AI tools to come up with ideas, by prompting the tool with key questions, arguments, and concepts, and by doing so, creating an iterative process. Dwivedi et al. (2023) claim that academic writers can use generative AI to gather information and create a first draft. Moreover, when the text has been written, researchers can use generative AI tools to evaluate the quality and completeness of the paper, as well as identify additional studies that are relevant. Additionally, the authors claim that generative AI tools can act as support during data collection methods, by assembling data sets and identifying patterns in the data across different sources. On the other hand, the authors identify that this process can only partially be automated, the researcher still needs to verify the quality of the results because the AI may lack training data to correctly match all sources.

Lastly, Susarla et al. (2023) mention that in the research field, there is a growing concern that these tools may focus on the performance and predictive accuracy rather than transparency, open access, and equity. Besides, there is a risk with biases that replicate the societal biases if there is a lack of safeguards and protections. Additionally, the use of generative AI in academic contexts have potential drawbacks. Susarla et al. (2023) argue that these tools are trained on published literature, they tend to recommend research questions that are already well-established within a field's existing literature, rather than suggesting novel, cutting-edge questions that push the boundaries of current knowledge of the researcher's active field. In table 2.2, a summary of identified applications where AI tools are used today are presented.

Table 2.2: Summary of applications for AI in higher education

Theme	Applications	Description	Source
Personalised learning and support	Smart private teaching and adaptive learning environments	Virtual assistance and customised learning.	Al Darayseh (2023); Alqahtani et al. (2023)
	Generative AI	Information retrieval and writing enhancement.	Gill et al. (2024); Fui-Hoon Nah et al. (2023); Celik et al. (2022)
Assessment and feedback	AI-Based assessments and enhanced teaching	Automated grading and lesson planning assistance.	Alqahtani et al. (2023); Chiu (2024); Fui-Hoon Nah et al. (2023)
Content and teaching enhancement	Smart content and VR Tools	Automated material creation and immersive learning.	Fui-Hoon Nah et al. (2023); Al Darayseh (2023)
Teacher support	AI utilisation by teachers	Enhancing teacher expertise and collaboration with AI.	Celik et al. (2022); Luckin et al. (2022); Jeon and Lee (2023)
	AI in Research	Plagiarism screening, idea generation, and data collection.	Sarker et al. (2024); Susarla et al. (2023)

2.2 AI Readiness

As mentioned earlier, the concept of AI readiness is closely related to adoption of AI, however it acts more as a precursor of AI adoption and is something that calls for persistent assessment (Jöhnk et al., 2021). AI readiness is also closely related to the term AI literacy (Sperling et al., 2024). However, literacy refers more to the competencies that enable users to collaborate and use AI as a tool in contrast to the concept of being ready for AI implementation. In this study, the term AI literacy will not be used and instead the closest component to AI literacy that affects readiness is described as *Ability* and will be presented in Section 2.3.1. Research on AI readiness has traditionally been approached from two distinct perspectives: organisational and individual. In the following sections, we will explore these concepts of AI readiness and their implications for higher education.

2.2.1 Organisational Readiness

Organisational AI readiness in the context of higher education refers to the preparedness of educational institutions to effectively integrate and leverage AI technologies. However, AI differs from other technologies because it is neither easy to use nor easy to deploy. Therefore, technical and non-technical abilities of organisation is a challenge that is constant both before and during the AI implementation (Jöhnk et al., 2021). The AI readiness assessment enables organisations to consider these complexities and identify gaps proactively and ensure smoother AI integration (Jöhnk et al., 2021). Moreover, the capability of measuring organisational AI readiness can reduce the risks of the actual implementation. Although the focus of the study is to investigate the readiness of individual teachers, it has been argued that entities who possess a higher degree of AI readiness give their associates a greater foundation for being able to integrate, validate and prepare for new AI technologies (Yin et al., 2024). Therefore, organisational readiness is an important part of the general readiness of teachers. Yin et al., (2024) makes an argument that people of organisations with higher degree of AI readiness are more likely to believe in AI's potential to assist in performing tasks.

Low levels of AI readiness have been found to limit the AI-enhanced innovation (Wang et al., 2023). This is further emphasised by Yin et al. (2024) who explain that a lack of organisational preparation complicates employees' ability to utilise AI in their innovative efforts. This difficulty persists even among those who have strong faith in their creative capabilities. As such, being innovative with AI tools can be hindered without adequate support and resources from the organisation.

2.2.2 Educators Readiness

Educators' readiness refers in this study to the AI readiness from a teacher's point of view. Although closely related, this does not include factors from organisational level but instead focuses on how AI ready the individual teacher is to integrate AI into their daily work. Firstly, having a foundational understanding of AI's nature, capabilities and limitations allows educators to effectively utilise AI technologies into their teaching (Luckin et al., 2022; Ayanwale et al., 2022). High levels of AI readiness have also shown to increase the capabilities of teachers using AI technologies to streamline their work (Wang et al., 2023). The authors explain that when teachers possess a broader foundation knowledge of AI, their ability to effectively apply it in suitable situations increases.

Luckin et al. (2022) argue that there is no need for the vast majority of those involved in education to have the technical expertise to build AI systems. Instead, it is crucial for them to understand how AI can be utilised to improve and support their teaching methods. Furthermore, this general understanding can be used to make informed decisions about pursuing the right types of AI software. Thereby ensuring that the tools closely align with their educational goals and needs. Adding to the discussion, Shahid et al. (2024) performed a study that investigated whether university teachers' readiness and willingness to adopt AI was influenced by previous experiences of AI usage and how that in turn shaped their attitudes. The study found that anxiety towards AI assessment systems affects teachers' willingness to use the system negatively which aligns with previous research regarding technology adoption models. In contrast to this, Ayanwale et al. (2022) argue that anxiety does not influence the behavioural intention of teachers.

Furthermore, Wang et al. (2023) explain that low AI readiness could lead to increased anxiety in the form of perceiving AI as threatful and as a disruptor of work habits. In line with this, Shahid et al. (2024) found that AI readiness can reduce anxiety which leads to more efficient use. The authors also found that teachers' personal factors, such as experience and efficacy influenced shaping attitudes towards AI systems. Teachers' enhanced understanding of the functionalities of AI is also an important factor in being able to give their students informed content to use AI tools. Higher levels of AI readiness are also believed to enhance teachers' ability to clarify AI for other people in the institute which can foster a knowledge sharing culture. Luckin et al. (2022) argue that this is critical for understanding and complying with the ethical implications of AI. In line with this AI ready teachers can enhance students to use AI technologies for information, communication, content creation and problem solving more responsibly (Ng et al., 2023).

Further, Ng et al. (2023) emphasise that university educators, across multiple disciplines, must acquire the necessary skills which in turn will enable their students to express ideas, solve problems and handle AI applications. In this way the students of today will also be more AI ready for the future. As mentioned several times before, AI readiness is a continuous assessment more than a one-time consideration, therefore teachers must stay AI ready by updating both knowledge and practical skills. Something that has been argued for will enable creation of a more suitable student learning environment (Ng et al., 2023).

2.3 Internal Dimensions of AI Readiness

2.3.1 Ability

In the context of AI readiness, ability refers to the competence and skill set that educators possess to effectively utilise AI tools and technologies in their teaching practices (Wang et al., 2023). This includes not only technical proficiency but also knowledge of how to integrate AI into curriculum design, ensuring that these technologies enhance learning outcomes and align with educational goals. Celik et al. (2022) found that one of the biggest challenges when integrating AI is the limited technical capacity and knowledge of teachers. Although technical ability is not mandatory for effective AI usage, some knowledge regarding what AI is and what it is able to achieve, and not achieve, could help educators to more easily integrate AI

into their teaching (Luckin et al., 2022). Moreover, a higher ability of AI utilisation can empower teachers and make them both more effective and enhance their decision making (Ng et al., 2023). Therefore, those who do not possess the ability to use AI may be at a competitive disadvantage to those who have greater ability (Ng et al., 2023).

It has also been found that when AI ability is high, teachers are more likely to create and support personalised learning which can help teachers understand student's learning progress and needs (Ng et al., 2023). In line with this, teachers' knowledge of AI is important as it increases their understanding of when AI is to be used and in cases where it fits, can give their informed consent to their students (Luckin et al., 2022).

2.3.2   Cognition

Cognition refers to teachers' understanding of the importance of AI and of its purpose to enhance their professional expertise (Wang et al., 2023). When an individual understands how an AI tool can improve specific aspects of their teaching, they are more likely to recognize its value and integrate it into their educational practices effectively. Therefore, Ng et al. (2023) propose that teachers should identify what types of AI technologies that exist that can enhance their expertise. Moreover, they must actively consider how these tools can be incorporated based on specific learning goals and learning environments.

2.3.3   Trust and Fear of AI

A part of being AI ready is to understand the ethical implications of AI use in higher education. However, it is not enough to only understand the ethical implications, but more so to understand how educators in higher education comply with and gain knowledge on how to deal with them (Wang et al., 2023). Previous research has also shown that teachers' knowledge of AI ethics has a connection with their AI readiness (Fundi et al., 2024).

Studies have found that teachers' belief in the potential and trust in AI systems significantly influence their engagement with these technologies. Therefore, trust is deemed as a crucial factor that should be considered when preparing for the implementation of AI in educational settings (Cukurova et al., 2023). However, there are certain factors that can hinder the amount of trust that the user puts into the system. Loos et al. (2023) explain that AI tools can produce so-called hallucinated results. In previous IS research, AI Hallucinations have been defined as "generated content that is nonsensical or unfaithful to the provided source content" (Susurla et al., 2023). Hallucinations make it difficult for users to differentiate whether the AI system is providing a correct or misleading response. Loos et al. (2023) and Sarker et al. (2024) explain that if an AI system is to be trusted, then the user must have high confidence that the system has the ability to meet its predetermined requirements. Ng et al. (2023) further emphasise this and mentions that unreliable recommendations from AI can lead to a negative performance, especially when a teacher is solely relying on the ability of AI. The inaccuracies of these systems not only interrupt the value of their use, but they also challenge the credibility and in an educational environment this can lead to break of trust (Gill et al., 2024). This is seen as an ethical dilemma as the AI is put in a position where it must make a challenging decision which a human can be directly or indirectly affected by (Mirbabaie et al., 2022).

As has been elaborated upon earlier in this paper, AI can both augment and automate the work of teachers. Sarker et al., (2024) argue that although the ease of work may be welcomed by many, there can also be fears that arise. As AI becomes more powerful, people have expressed fears about AI replacing both work processes and positions. Pisca et al. (2023) also found that there are some concerns among educators that some concerns have been expressed regarding AI's potential to replace specific work processes or even humans. However, the results of their study were mixed, as there were also indications that some educators did not consider AI as threatening. On the other hand, Fundi et al. (2024) did not find any correlations between perceived threats from AI and its effect on teachers' readiness.

2.4   External Dimensions of AI Readiness

2.4.1   Top Management Support

Top management support in higher education can provide educators with strategic leadership, shape policies and foster an adaptive culture to successfully integrate and sustain AI and other technological innovations within the institution. Alsheibani et al. (2018) explain that lack of Top Management Support can lead to both increased risks of failing to implement innovative technologies and lead to technology implementation failures. Further, Jöhnk et al. (2021) argue that leadership is important to foster the knowledge, general awareness and initiatives of AI across an entity. In line with this, Uren and Edwards (2023) found that top management support is needed to create a culture of knowledge sharing through an organisation.

Within higher education top management support has been shown to enhance teachers' ability to integrate new technologies into their everyday work. It was found that top management support not only enhanced the knowledge of technology utilisation but also the overall effectiveness of implementing innovative technologies into their teaching and learning abilities (Landa et al., 2023). In line with this, Rahiman and Kodikaln (2024) states that universities that provide AI training to their teachers must also offer support to ensure that teachers have the skills and knowledge to effectively incorporate AI technologies in their learning. However, studies such as those conducted by Frick et al. (2021) found no correlation between AI readiness and top management support. These studies suggest that resistance to change, often fueled by fears of AI replacing or altering job roles, indicates that top management support alone may not be sufficient to foster AI readiness. Moreover, top leaders often push for rapid change, thereby placing high levels of responsibility on employees, which can exacerbate resistance rather than mitigate it (Frick et al., 2021).

Further, there is a need for more tailored support to develop educators' AI teaching abilities (Kohnke et al., 2023). The authors mention that hands-on workshops, self paced learning and personalised coaching are all elements that should be incorporated to enhance teachers. Government and private sector support is also mentioned, as these organisations can provide universities with both the necessary resources and funding. The absence of top management support can result in a decrease in efficiency because it puts processes and integration motionless (Hu et al., 2023).

2.4.2 Training

Because of the integration of AI, higher education is undergoing a digital transformation. This challenges the teachers because new requirements are presented to them which earlier has not been a part of the traditional expectations (Ng et al., 2023). Furthermore, teachers can feel challenged when they must understand the new trends of integrating AI in their education. Training is an important factor that can have a positive effect on the integration of AI in education. Celik et al. (2022) emphasises that to achieve an effective integration of AI in education, institutes should provide their teachers with the necessary knowledge and skills to empower them. In line with this, continuous professional development through training is necessary for teachers so that they continuously acquire and update their skills and knowledge (Ng et al., 2023). Luckin et al. (2022) suggest that the training offered should be more comprehensive than just general AI courses. This is because teachers need AI tools to be presented in a way that puts it into the context of their specific requirements and use cases. This requires that educators both participate and stay active to see the benefits from the presented training (Luckin et al., 2022). However, there are only a few existing studies that have discussed how training could enhance the ability to use AI for teaching, learning and assessment (Ng et al., 2023).

2.4.3 Dealing with Academic Integrity

The recent wave of generative AI tools has become a great threat to academic integrity. For example, generative AI tools such as ChatGPT have been able to create content that passed traditional plagiarism detection tools because of its ability to produce content that appears unique (Gill et al., 2024). A common concern is that modern AI tools offer students with a lot of temptations due to its capabilities and thereby inaccurate examination results can be the outcome (Pisica et al., 2023). Concerns regarding accountability and authorship have also been raised. Burkhard (2023) emphasises that as these AI tools get increasingly better, clearer transparency regarding the human contribution is needed. If transparent use is not achieved then, from the educators' point of view, concerns such as cheating, plagiarism and irresponsible use of AI arise (Pisica et al., 2023; Burkhard, 2023). This in turn challenges educators to perform fair assessment of student learning (Gill et al., 2024).

Educators are responsible for teaching their students various strategies to effectively utilise AI, while also clarifying both the potential and the limitations of AI utilisation (Burkhard, 2023). The release of Chat-GPT forced higher education to reassess how examinations were conducted (Kajtazi et al., 2023). This is further underscored by Cotton et al. (2024) that suggests that universities must consider alternative examination forms that aim to limit irresponsible AI usage. However, there is a thin boundary between how much universities should try to hinder the use of AI as there is a risk that the focus might be shifted toward preventing AI use which in turn would hinder the innovative use of AI (Fowler et al., 2023). For instance, Gupta and Baskar (2020) found that teachers tend to have an unwillingness to adopt innovative technologies because of institutional barriers. On an institutional level, there are also concerns that unreasonable AI use and wrongful assessment can lead to the university being discredited. Cotton et al. (2024) mentions this and explains that ensuring academic integrity is important so that the educational program won't be discredited due to suspicion of wrongful assessment.

Moreover, controlled AI use can address the previously mentioned concerns. Creating a clear understanding and guidance of how AI technologies should be used ensures that both teachers as well as students are aware of the rights and responsibilities they have when using AI, especially with AI being so accessible as it is today. Mirbabaie et al. (2022) mention that some guidelines and policies that address ethical concerns regarding AI have been established. However, these policies are formed at higher levels such as the European Union expert committee, which operate above the individual educational institutions. Currently there is a lack of guidelines that can inform educators what types of digital skills are mandatory to help students become AI empowered learners (Ng et al., 2023). Therefore, Fowler et al. (2023) underscores the importance of universities forming their own regulations and policies. These policies and regulations should aim to mitigate the risk surrounding academic integrity by clearly stating what type of AI use that should be acceptable. Due to transparency and accountability concerns raised by Bansal et al. (2024), the creation of policies and guidelines aim to highlight the benefits of AI tools while cautiously addressing their shortcomings.

2.5 Conceptual Framework

The themes of internal and external dimensions were purposefully selected as they emerged from a thorough review of the existing literature. The literature indicated that both external and internal dimensions were repeatedly cited as important for the successful integration of AI in education however the dimensions were studied separately. This highlighted the need for a framework that encompassed both. Therefore, the conceptual framework was designed to address the nature of AI readiness by encompassing various dimensions that together covers a larger spectrum of AI readiness. see Table 2.3. To the best of our knowledge previous research has not investigated the individual teacher by incorporating both external and internal dimensions of AI readiness. Instead, they solely focus on internal dimension (Luckin et al., 2022; Wang et al., 2023, Ng et al., 2023) or broader external dimensions (Holmström, 2022; Jöhnk 2021; Alsheibani et al., 2018; Frick et al., 2021).

The literature review begins by providing an overview of AI and its tools, tracing their historical development before examining their current applications in higher education. It highlights how AI tools are used today and extends to the role of teacher-AI collaboration and AI tool use in research. Next, the concept of AI readiness is discussed, breaking it down into organisational readiness and teachers' readiness, explaining their significance in the context of higher education and their impact on individual teachers' readiness. The third section delves into internal dimensions that influence educators' readiness, including ability, cognition, trust, and fear of AI. Additionally, the literature review covers the external dimensions such as top management support, training and academic integrity. The proposed conceptual framework for AI readiness in educational settings was important for shaping a comprehensive understanding of how AI can be effectively integrated into higher education. Details on how the search procedure for the framework and literature review can be found in *Chapter 3.2*

Table 2.3: Conceptual Framework

Theme	Description	Subthemes	References
Artificial Intelligence	Examines the history and current AI tools	**Context**	Ciolacu et al., 2018; Kavanagh, 2019; Russel & Norvig, 2022
		AI tools	Feuerriegel et al., 2024; Kasneci et al., 2023; Lim et al., 2023; Venkatesh, 2022
AI utilisation in education	Examines how AI technologies are applied within educational settings.	**Role in Education**	Al Darayseh, 2023; Alqahtani et al., 2023; Celik et al., 2022; Chiu, 2024 ; Fui-Hoon Nah et al.,2023; Gill et al., 2024; Kasneci et al., 2023;
		Teacher AI collaboration	Celik et al., 2022; Jeon & Lee, 2023; Leyer & Schneider, 2021; Luckin et al., 2022; Rai et al., 2019;
		AI in research	Sarker et al., 2024; Susarla et al., 2023
External dimension affecting readiness	Examines the external dimensions that influence teachers AI readiness.	**Top Management Support**	Alsheibani et al., 2018; Frick et al., 2021; Hu et al., 2023; Jöhnk et al., 2021; Kohnke et al., 2023; Landa et al., 2023; Rahiman & Kodikal, 2024; Uren & Edwards, 2023; Yin et al., 2024
		Training	Celik et al., 2022; Luckin et al., 2022; Ng et al., 2023
		Academic Integrity	Bansal et al., 2024; Burkhard., 2023; Cotton et al., 2024; Fowler et al., 2023; Gill et al., 2024; Gupta & Baskar, 2020; Kajtazi et al., 2023; Mirbabaie et al., 2022; Ng et al., 2023; Pisica et al., 2023
Internal dimensions affecting readiness	Examines the internal dimensions that influence teachers AI readiness	**Ability**	Celik et al., 2022; Luckin et al 2022; Ng et al., 2023; Wang et al., 2023
		Cognition	
			Ng et al., 2023; Wang et al., 2023
		Trust	
			Ayanwale et al., 2022; Cukurova et al., 2023; Gill et al., 2024; Loos et al., 2023; Mirbabaie et al., 2022; Ng et al., 2023; Sarker et al., 2024; Susurla et al., 20
			Fundi et al., 2024; Pisca et al., 2023; Sarker et al., 2024
		Fear of AI	

3 Method

In this chapter, the research strategy will be presented and argued for, along with how the literature review was conducted, data collection, interview guide, analysis, ethical considerations, and scientific quality.

3.1 Research Strategy

3.1.1 Research Philosophy

Every research is shaped by its underlying research philosophy, which plays a pivotal role in the outcome. The philosophy implicitly guides each aspect of the scientific process, making it important to choose it carefully. Lee (2004) suggests that the insights information systems (IS) researchers gain from philosophy lead to a deeper understanding of the research object, and therefore disregard of philosophical aspects could lead to deceptive research results (Hassan, Mingeers & Stahl, 2018).

Given that the aim of this research is to conduct a study that investigates the dimensions of AI readiness among educators that influence their ability to integrate and effectively utilise AI tools in their teaching practices, the chosen research philosophy is interpretivism. According to Goldkuhl (2012), interpretivist approach emphasises the importance of understanding the subjective experiences and cultural perspectives of individuals. Through interpretivism, the research can delve into the complexities of human behaviour and organisational dynamics, allowing for a richer, more nuanced understanding of the social contexts that influence technological integration (Goldkuhl, 2012). Interpretive research is grounded in understanding phenomena shaped by their social and historical context, where such factors cannot be isolated (Recker, 2013). This is especially relevant in educational settings where the perceptions and experiences of teachers directly influence the integration and effectiveness of new technologies. Interpretivism enables us to explore these aspects in depth, by focusing on the meanings that teachers assign to AI tools within their teaching practices and institutional environments. This approach is aligned with the need to understand not just the technological aspects of AI, but more critically, how these tools are perceived and utilised by educators in their daily practices. By adopting interpretivism, this study aims to capture the varied and complex factors that contribute to or limit the utilisation and integration of AI tools in higher education, providing insights that are grounded in the actual experiences and perspectives of those directly involved.

Research that is conducted within the IS field focuses on more than just the IT artefact, instead the focus is to encompass the environmental aspects where the artefacts are used (Lee, 2004). The study was deemed suitable for the information system (IS) field because its focus is to investigate the determinants of AI readiness among educators, which influence their ability to integrate and effectively utilise AI tools. In this research the environmental aspects are defined as teachers working within the higher education sector, and the artefact investigated are the AI tools that are being implemented. This aligns closely with the aim and extent of this study, where the emphasis is shifted from the technological artefact to a more human-centred

approach. Second, a qualitative research method has been chosen for this study. One of the characteristics of a qualitative method is that it often consists of interpretive research (Recker, 2013). This means that researchers develop their interpretations based on the data that is collected and analysed. Lastly, Goldkuhl (2012) argues that interpretivism is heavily associated with qualitative research as it focuses on understanding individuals' subjective experiences and interpretations. Since our study aims to understand AI integration in higher education, the interpretivist approach was suitable to strengthen the qualitative approach.

3.1.2 Research Approach

Given that this study aims to gather empirical data to comprehend the perspectives and viewpoints of teachers in higher education, a qualitative methodology has been selected. Applying a qualitative approach to research offers increased depth of understanding, but sacrifices the breadth typically achieved through a quantitative methodology (Patton, 2015). A qualitative method is when a study is conducted about people in a certain context where they live, operate and behave (Recker, 2013). Moreover, it is stated that the qualitative method is designed with emphasis on explaining why individuals act in the way that they do. This study aims to examine how teachers in higher education integrate AI tools into their work, such as during lectures and examinations, to understand their readiness to implement the artefact across different domains. According to Patton (2015) a qualitative inquiry collects data through in-depth interviews, open-ended questions on surveys, direct observations, postings on social media, analysis of documents, and focus groups. For this research, in-depth interviews have been chosen as the most suitable to understand how eight teachers in higher education use AI tools today, and why they do so. Moreover, Patton (2015) argues that there are no perfect research designs and that trade-offs are needed due to the limitation of time, resources, and human ability. For this study, we needed to be aware that after the literature review was conducted, we had to focus on specific parts of the subject to gain an in-depth analysis. However, we accepted some trade-offs, such as conducting a limited number of interviews and including fewer represented universities. Moreover, it is important to have controllability, and Recker (2013) mentions that the researchers are in control over the events that occur during the process. Since this research was conducted in an environment where the researchers did not have high controllability, it was important to keep in mind. One of the factors that the researchers could not control was the fully booked schedules of our respondents, and we therefore had to be very flexible when and where the interviews were conducted.

3.2 Literature Search Procedure

A comprehensive and extensive literature review was conducted to ensure that the authors had a foundation to create an extensive and well formulated foundation for the questions that are going to be used during the interviews. According to Oates (2006), an important aspect of gathering literature is to avoid relying solely on personal research. The author emphasises the benefits of consulting others to discover recently published works they may have read. We applied this by consulting other students and our supervisor, who occasionally provided us with relevant sources. However, only a few sources in this paper originated from these consultations. Furthermore, online databases such as Google scholar, Scopus, and LubSearch have been used to collect the literature. Google scholar is one of the databases that Oates (2006)

recommends using, but the author describes the restrictions with it as well. The database only contains articles that have been published online, meaning that anyone can publish there, and it does not include papers that have been published in print. Therefore, Scopus and LubSearch have been used as well. Scopus is an online database run by Eleviser, and LubSearch is Lund University's own database. Another reason why Scopus was used is because of Oates (2006) recommendation to search for articles outside the authors own institutional libraries. Since Google scholar and LubSearch fall into the risk of this, Scopus was added as an alternative database for finding relevant articles for the literature review. While browsing on these web-sites, Oates (2006) highlights a lot of important factors that were considered to ensure the effective gathering of the correct information. One of the factors mentioned was to conduct the search by investigating similar concepts and find synonyms to keywords identified as fitting for the study. Moreover, it was also important to critically evaluate the literature found online since it is a platform where everyone can publish. During our search for literature, we looked for papers/articles/books written by eminent authors within the IS field. Additionally, we also searched within well-known IS journals that have existed over a long period of time but have also allowed journals from education and AI that were considered containing relevant information for this study.

Before we started to search these databases, we discussed the concept. It was especially important to define the concept of AI since the concept of AI has a lot of different interpretations and there are a lot of different AI tools. This allowed us to come up with relevant keywords that were deemed appropriate for the context of the study. Oates (2006) emphasises the importance of creating a list of alternative terms for research arguing that this broadens the search scope and ensures a more comprehensive literature review. This approach was particularly important for our study to capture all relevant research and perspectives on AI readiness in higher education. Therefore, a list of keywords that defined the concept was created and these words were used in queries on the different databases, and with advanced Boolean searches such as AND, OR, NOT, we were able to find literature relevant for this specific study but also within the specified concept of AI.

Terms that we have used when searching for articles on these different databases can be seen in Table 3.1, where the keywords have been used in different advanced Boolean searchers. Once an interesting article was identified, it was downloaded to our local space and added in a mapping system and Zotero, and the link to the online article was saved in a document so that it was easier to find the next time it was to be used. Oates (2006) believes it is important to be aware that documents can be removed from these databases, and therefore it is good to have an independent copy. Furthermore, it is important to not be overwhelmed over all the literature that has been found, instead systematically read and make notes from them.

Table 3.1: Keywords

Keywords
Artificial intelligence
AI tool(s)
Higher education

AI readiness
AI integration
Agumented
Automated
Integration
Human-AI collaboration
Teachers
Educators
Organisational readiness
AI training
AI literacy
AI ethics
Educational policies

3.3 Data Collection

3.3.1 Pilot Interview

A pilot interview was conducted during the literature review, when the foundations had been identified to be able to highlight areas that may need more focus, but also to test our initial interview guide to formulate us better, and check if any questions needed to be added or revised. Since the study uses an abductive approach, we were able to use deductive elements to formulate the questions for the pilot interview guide (see Table 3.2). Chenail (2011) suggests that a pilot interview serves as a trial run for the main study. It provides researchers with early warnings about potential failures in areas such as interview questions or chosen methods.

Therefore, we conducted the interview P_R1 with a higher education teacher known for using AI tools, ensuring valuable insights from practical experience. The pilot interview guide was used (see Table 3.2). With the abductive approach, the insights we gained from this interview led us to add more questions and revise existing ones to better address the areas indicated by the literature (see Appendix 1). A follow up interview with P_R1 would have been beneficial to increase validity and reliability. However, given the time frame this was not considered possible. The data collected is considered to have covered the same three themes as the other respondents, and therefore it was deemed useful in the empirical findings.

Table 3.2: Keywords

Question number	Question
1	What is Artificial Intelligence for you?
2	Do you use AI in your work today? If yes: What areas and is there any other where you would like to use it? If not: Are there any areas where you think you possibly can use AI?
2.1 If yes	How do you feel AI has helped you with your work?
2.2 If yes	How do you feel AI have made your work harder?
3	How much knowledge do you have about AI?
3.1	How would you consider your previous or gained knowledge about AI have contributed to your use?
4	What types of AI have you explored/used?
5	Are there any restrictions from your employer on how to use AI? Is there any other legal restrictions that prevent you from using AI as you want?
6	What are the ethical aspects of implementing AI in your work?
7	If you would/have implemented AI in your work, what's your vision of using it?
8	Are you pro or against AI? Why?
9	How is your institution's view of the use of AI? Why do you believe they are pro/against?

3.3.2 Respondent Selection

The participant selection was crucial for the success of this study, and choices made during the process were instrumental to address our research question effectively. Recker (2013) emphasises that qualitative research relies on purposive sampling. Alvehus (2023) highlights the importance of strategic selection to ensure rightful acquisition of desired information. This selective approach is fundamental to the study, as it guides the decisions made and directly impacts the validity and reliability of the findings. Because of what Recker (2013) and Alvehus (2023) mentions, certain criteria's were set for our respondents. First, we identified that the respondent must be an active teacher within higher education in Sweden. Secondly, to give the study more generalizability, each respondent must be from different institutions and different universities.

To find respondents that fit our criteria, we used different universities' homepage to browse and find teachers' email addresses, and later we contacted them. Additionally, connections within the research community were contacted to be able to easier identify key individuals at

institutions who later were contacted. Snowball sampling was also used to identify if the respondents believed some of their connections would be beneficial for the study. According to Alvehus (2023) snowball sampling involves using the existing contact person to reach new interviewees. This allowed for finding new respondents within their network to efficiently contact new individuals. Alvehus (2023) also mentions disadvantages, such as ending up in a small network where individuals share the same views on the matters we seek answers to. To address this issue, we decided to conduct a new strategic selection by establishing criteria for our next interviewees. These criteria required that they be new individuals from different institutions or universities, ensuring that the study was not confined to a single unit.

Initially, it was difficult to determine how many respondents that needed to be interviewed to reach saturation, something that Alvehus (2023) also mentions. He notes that it is hard to know in advance because one doesn't know how rich the interviews will be. Saturation is achieved when the same information emerges during interviews and the information becomes redundant (Alvehus, 2023). For this study, 7 interviews together with 1 pilot interview was deemed as a fitting total for the scope and purpose of the study. The participants are listed in the table below along with their field, the date of the interview, the format of which the interview took place and the duration time of the interview, see Table 3.3.

Table 3.3: Respondents

Participant	Field	University	Institution	Date	Format	Duration
P_R1	Technical	1	1	15/4-2024	In person	40 min 20 sec
R1	Economy	1	2	22/4-2024	In person	45 min 26 sec
R2	Technical	1	3	22/4-2024	Digital	43 min 56 sec
R3	Technical	2	4	23/4-2024	Digital	44 min 18 sec
R4	Chemistry	2	5	26/4-2024	Digital	40 min 02 sec
R5	Technical	2	6	2/5-2024	Digital	47 min 18 sec
R6	Medicine	1	7	3/5- 2024	Digital	50 min 30 sec
R7	Economy	1	8	6/5- 2024	In person	47 min 02 sec

3.3.3 Interview Guide

For this study, the data collection method selected was semi-structured interviews, which is one of the most common techniques (Recker, 2013). They are structured with pre-defined questions (see Appendix 1) but allow for flexibility to add questions that may occur during the interview. This approach allowed the conducted interview to be more of a conversation rather than an interview. This is something that Recker (2013) highlights and adds other benefits such as they are less intuitive and more confirmatory. Semi-structured interviews can be concocted face-to-face, in group or over telephone/online. For this study this was considered important as we wanted to ensure that the participants felt a flexibility in choosing the

environment they felt most comfortable in, something that has been highlighted by Recker (2013). Additionally, humans cannot observe the subjects' feelings, thoughts and intentions, and therefore interviewing the participants to understand this is important (Patton, 2015). The interviews were conducted in a descriptive manner, where the interviewers introduced the concept of AI readiness to the respondents. Recker (2013) argues that it is crucial to ensure that all respondents understand the subject and the research phenomena.

However, there were some limitations that had to be kept in mind. Patton (2015) argues that it is important to understand people's language and meanings, as individuals come from diverse backgrounds and may use different words for the same concept or have interpretations that differ from what the researchers anticipate. It was important for us as researchers to understand what background our respondent had. One from technology, who has great knowledge about computers, might have used more advanced formulations than a teacher from, for example, medicine. Moreover, Recker (2013) mentions that there are other challenges such as reflexivity, inaccuracy, artificiality, and system bias. To cope with this, and minimise the risk of this occurring, it was important that our questions were very well-formulated (Patton, 2015). All this because the quality of information that was obtained during the data collection depended heavily on us interviewers and how they were carried out (Patton, 2015).

Furthermore, Patton (2015) describes how researchers should act during an interview. The author states that it is important to give feedback during the interview. This feedback can be both verbal and non-verbal, such as nodding, using affirming words like "mhmm" and taking notes. The author claims that these gestures will encourage greater depth during the interview. These aspects that the author states are skills that both the researchers feel comfortable in using and aim to always encourage the interview subject to a deeper interview. During the interviews, respondents were informed about consent and confidentiality, as detailed in Section 3.5. The interviews conducted had three main themes, see Table 3.4. In the first theme, AI use today, the respondents were asked questions that answer how and if AI tools are used today. The second theme incorporated questions about the internal dimension that affects their usability and integration. Finally, the third theme included questions regarding the external dimensions of AI readiness. Additionally, as the literature was reviewed and questions were formulated, it was noted that some questions could address or touch upon multiple dimensions, and the ethical dimension is important in both internal and external dimensions. This consideration was kept in mind for the data analysis.

Table 3.4: Foundation for interview guide

Theme	Dimensions	Question
AI use today	Teacher use of AI	2, 2.1, 2.2, 2.3, 2.4
	Personalised learning	13, 14
Internal dimensions	Ability	1, 3, 3.1, 4.1
	Cognition	3.2, 4, 8.1, 11

	Training	8, 8.1, 8.2
	Fear of AI	16
	Ethics	10
External dimensions	Organisational readiness	5, 5.1, 15, 15.1, 15.2, 17, 17.1, 18
	Policy/Regulations	6, 6.1, 9
	Academic integrity	7, 12, 12.1

3.3.4 Transcription

Lastly, the final step of the data collection was to transcribe the interviews. All the interviews were transcribed through an AI tool called Whisper, that was run locally on our computers to ensure confidentiality of the respondents. Oates (2006) claims that the interviews should not be accessible to anyone except the researchers, therefore it was run locally and not in the cloud version where we do not have control over the data. Later, the transcriptions were manually transcribed to ensure that the digital transcriptions were identical, and no errors were made by the tool, and words such as "hmm" were removed. According to Oates (2006) it is common to remove such words to further increase readability of the transcriptions. Additionally, Oates (2006) emphasises the importance of numbering each line, a practice that was followed in this study. After the transcribing was completed, the audio files from the interviews were deleted from our recording devices and computers. Lastly, the finished transcriptions were then sent to each respondent.

According to Oates (2006) changes need to be made to the transcription to ensure the anonymity of respondents. Because of this and to follow our ethical rules, names, places, courses, pronouns and other identifiable details have been stated with X, [name], [university]. Additionally, the pilot respondent was tagged as P_R1, and all the responses are tagged with Rn, where n represents a number between one and seven. The authors of this study are SPK_1 and SPK_2.

3.4 Data Analysis Method

Qualitative research often consists of two sequential stages, data collection and data analysis. An abductive approach was taken during the data analysis which in practice is a combination of inductive and deductive approaches (Patton, 2015; Skjott & Korsgaard, 2019). Since this study incorporates the whole spectrum of teachers' AI readiness, we decided that a abductive approach was the most beneficial. This decision was based on two main reasons. *(1)* Previous research has focused on either internal or external dimensions, making it difficult to draw hypotheses that encompass both. *(2)* By examining both dimensions, we may uncover new themes that have not been identified in the existing literature, which can help us answer the research question. The abductive approach allows the researcher to remain receptive to unexpected findings in the data while also staying aligned with existing literature (Skjott & Korsgaard, 2019). Furthermore, Alvehus (2023) explains that a purely deductive approach with hypothesis creation can become problematic in qualitative research as the empirical findings are up for interpretation. As a result, it is unclear whether the outcomes are a test of the hypothesis itself or a reflection of the researcher's ability to interpret the data. This challenges the objectivity in qualitative research, raising questions about the validity and reliability of the findings (Alvehus, 2023).

The advantage of conducting semi-structured interviews is that a great amount of data can be collected (Recker, 2013). However, this data requires thorough analysis to determine its relevance to the final outcome and to extract clear insights. According to Patton (2015), there are no rules on how to conduct the data analysis, instead there are some general guidelines. Through the analysis method, the researchers not only make sense of the world, but also make sense of the relationships. The author continues to argue that the researchers need to create a framework to communicate the patterns to others. Therefore, after the interviews were conducted and transcribed, this unstructured data was analysed through an selective and open coding method to visualise themes and sub-themes within the collected data, see Table 3.6.

3.4.1 Coding

For this research, the coding technique has been used to identify themes and subthemes. The coding technique is according to Recker (2013) one of the most common techniques and allows the researchers to divide the unstructured data into different themes and subthemes. Since we had a thorough literature review before the data collection selective coding was used as the primary method. According to Recker (2013), selective coding is used to identify one or a few central concepts. This approach allowed us to identify AI utilisation in education, external dimensions, and internal dimensions as central themes and then later connected subthemes to these, see Table 3.5.

Table 3.5: Examples of how themes are coloured

Text	Theme
No, no, no, no event from the teaching and learning environment. I have been at a very beginning research ethics lecture on AI and ethics. So explicitly, I mean, on this point, what do we do with the originality and how do we approach it? And at that point, the conclusion was mostly that we need to deduce it from our existing Ethics rules.	External Dimensions

Okay, okay. And what type of professional development do you think is necessary for the faculty to effectively use AI in their teaching?	
Yeah, the problem is, the problem is that we need to trust when they are decision made. And so in teaching, we need to teach of course, students to use the tools we need to tell them that there are some problems because it's heavily depending on what it has been trained on. If we want to use it also for instance what would be very nice in grading. There we have of course a big problem that how can we ensure that we can trust that the system is producing an assessment, a fair and good enough assessment. Maybe it can be only used for assistance to point out flaws. What did you say for teaching otherwise? Of course it can be also used for trying to provide personalised education. So identifying from a test what competences are missing. So that would be perhaps very nice if there are tools. I do a diagnostic test with the students in the course. I'm from abroad in the master degree course and then I see I only see the aggregation of the results. From the aggregation of the results I see some are missing, some topics have perhaps not studied enough on it. Either the course was not deep enough at their university or so there's a diversity of competences and then it would be very nice if there's a tool who's trying to learn or trying to give you an answer of yeah you need to study this aspect a little bit more, you need to have a look at this something. Because I'm not going into it I say it's a, it's not, um, so there's no, I don't, it's an anonym test. So I don't know for each student where they didn't do well. So if there's a algorithm which is giving them their answer and a little bit more advice, that would be nice.	Internal Dimensions AI utilisation in education

When the themes had been identified, open coding was used to uncover and name new concepts that were identified from the data collection, to identify concepts that the literature review had not identified. This represents using inductive elements to find new concepts within the data (Skjott & Korsgaard, 2019). Based on the literature review and open coding, twelve sub-themes connected to the themes were identified, see Table 3.6. As can be seen in the table, each sub-theme has received a separate identifiable code. When conducting the coding, it is beneficial to conduct the coding sequence individually and later discuss similarities and differences, by doing this analytic triangulation, important insights can emerge (Patton, 2015). Because of this, we used two different documents to highlight the identified concepts from the transcribing, and later had a discussion on why we classified the results as different things.

Table 3.6: Framework for coding

Theme	Colour	Subthemes	Code
AI utilisation in education	Green	**Role in Education**	RIE
		AI in research	AIR
		Human AI collaboration	HAC
External Dimensions	Blue	**Top Management Support**	TMS
		Policy and regulations	PR
		Collaborative knowledge sharing	CKS
		Academic Integrity	ACI
		Training	TR
	Yellow	**Ability**	AB

Internal Dimensions		Cognition	COG
		Ethical Challenges	EC
		Trust	TRU

3.5 Ethical Considerations

When conducting research, the ethical aspects of the study are of importance. Ever since the early days of digital computing scholars have discussed the ethical considerations of information systems research (Hassan, Mingers & Stahl, 2018). Although IS research, unlike medical or biological research, does not carry the potential of direct harm to people to its participants, Recker (2013) presents ethical actions such as responsibility, accountability, liability, and due process. The author highlights that since research within the information system is a social science, researchers must be aware of the responsibilities in securing permissions and the interest of the people who are involved in the study. These responsibilities have been done as described in Section 3.3.3. Additionally, the researchers ensured that they understood the due process, such as laws regulating how we can act.

In this research data will be collected through semi-structured interviews which have been previously elaborated upon. To protect the integrity of the subjects that will be interviewed during this research, they will have the option to be anonymous. In the beginning of every interview, the respondents were asked if we were allowed to audio record the interview, and then informed that they have the right to not participate, right to withdraw, right to anonymity, right to confidentiality, and right to not answer any question. This is something that Oates (2006) highlights as important. However, it may be difficult to keep the participants anonymous if the interviews are conducted face-to-face. Therefore, during face-to-face interviews, it was important to ensure high confidentiality for the interview subjects if the participants desired it (Patton, 2015). The author explains that the most common practice is to ensure that names, locations, and other identifying information are concealed, as described in Section 3.3.4. Patton (2015) also mentions that it is important to set the boundaries of the interview. Since the topic of this research was not viewed as a particularly sensitive one, the participants were never pushed too hard to get answers. However, if participants showed signs of discomfort, these signals were not ignored.

Once the interviews were completed and the data had been collected, it was crucial to consider the handling and management of the data. Firstly, the participants should be informed of who has access to the data that is collected and how it will be used (Patton, 2015). If the data was to be shared and accessed by others such as peer reviewers, the participants were also to be informed about the purpose of this. To cope with this, all the data have been stored locally, and anonymised before peer reviews. Furthermore, when writing research, the ethical aspect must be considered to address issues related to plagiarism, recognition of co-author contributions, honest reporting and appropriate use of language (Recker, 2013). Taking these aspects into consideration while the research is conducted will both ensure the originality of the paper and increase the scientific quality. Furthermore, with the availability and power of today's AI

tools, an AI contribution statement has been made to ensure transparency regarding the extent of AI use, see Appendix 2.

3.6 Scientific Quality

When conducting scientific research many factors were considered to ensure the quality of the study. Recker (2013) argues that the variables that the research wants to measure must meet the theoretical constructs, and this factor is called validity. The second factor that needed to be considered was reliability. This means that the measurement variables must measure the theoretical constructs with precision and consistency. These two factors are part of the psychological measurement properties, and if followed properly, result in higher quality of the research (Recker, 2013). Meanwhile, Salkind (2010) identifies threats to validity. The author mentions that lack of clarity, history and maturation can affect the scientific quality. For this study it was important that we, as researchers, not only recognised such factors but indeed acknowledged them, ensuring the study's design was robust. To address validity, we ensured that our measurement variables accurately reflected the theoretical constructs by defining our interview questions based on both the established AI readiness literature and the emerging patterns observed in the data collected through the pilot interview. Once this was done, we maintained consistency by the standardised interview guide (see Appendix 1), across all participants and conducting a pilot interview, ensuring the reliability of this study. Additionally, to increase the validity of this study, each respondent's transcripts were sent to them to peer review it. This allowed the respondents to fact check their answers and if necessary, change incorrect data, further increasing the validity of the study.

Moreover, Salkind (2010) states that it is important for research to have repeatability and generalisability. The repeatability refers to the level of what the findings can be the same when the study is conducted again. The generalisability on the other hand, refers to if the results can be generalised beyond the research. For this research, high repeatability is accomplished by writing a transparent and in-depth method chapter, easy to understand so it can be conducted again. Meanwhile, since this study is conducted within the IS field with an in-depth analysis, the generalisability to other fields is extremely hard to cope with. This is because there are weaknesses with conducting a qualitative study (Recker, 2013). This study also has low generalisability within the field of universities, since only one pilot and seven interviews were held. According to Recker (2013), it is harder to keep a high generalisability for a qualitative study than a quantitative since it focuses on a subject in-depth. We need to raise the scientific quality of this study by calling for transparency, strictly observing principles of validity and reliability, and aiming for high repeatability. As a result, we aim to confront these challenges to reach a high scientific quality for this study.

Patton (2015) highlights that when conducting a qualitative study, the researchers are observing individuals in their natural habitat, and to gain in-depth knowledge needs to put themselves in their own shoes. When doing so, it is easy to get biassed and the professional approach will decrease. To deal with this, we aim to pursue this research with caution by using triangulation in the data analysis, be transparent in our method to collect the data as well as presenting the transcribed and anonymised interviews for anyone that wants to control the data.

4 Empirical Findings

In this chapter the empirical data collected from the interviews will be presented, following the main themes of the conceptual framework presented in chapter 2.2.5. Citations from the respondents will be used.

4.1 AI Utilisation in Education

4.1.1 Role in Education

There was a wide range of results indicating that AI had been used by teachers in multiple ways and for different purposes. R1 explained that they had used Generative AI, more specifically ChatGPT, to come up with example questions for students and had tried to generate a multiple-choice question (R1:6). R2 also mentioned the use of ChatGPT for shortening text and asking the tool to improve existing text, and that AI tools were integrated into some courses (R2:6;26). R3 mentioned that they had not used AI tools to gather any information; instead, the usage had been more applicable when the respondent felt that it would make their life easier (R3:6;9). P_R1 mentioned extensive use of ChatGPT-4, a tool that required a paid subscription, and GitHub Copilot:

> *"There are different areas of use. A Lot of content creation. In one of my courses I have changed a tool to another framework. It was a lot of work with that and I don't think I would've been able to do it without some help from AI."* (P_R1:6).

R7 mentioned that they already taught about AI such as pattern recognition and predictive analysis, but that it was difficult to implement such tools for the students. However, the respondent answered that with generative AI, everyone could use it more easily, and had tried to use it in a small manner but was going to incorporate generative AI in the lectures and give the students assignments where they had to use AI tools (R7:4). Furthermore, R7 believed AI tools should be integrated into courses to give students a competitive edge upon graduation and envisioned AI as a core part of teaching. In research, AI was seen more as an assistant, helping generate ideas and analyse literature, while the researcher remained the primary contributor (R7:43). R7 describes:

> *"So I'll be implementing for the first time in autumn with tools that, you know, they have to use AI to complete assignments. But last year, it was again mostly introductory, like what can be done, what can it change, so the possibilities. But I have not implemented it yet in my own teaching, but it will be implemented starting from next semester."* (R7:4).

R6 mentioned that they often started by acquiring an overall understanding of a new area with the help of AI. This initial exploration helped them to familiarise themselves with the main themes of the subject and to delve deeper into the field (R6:4). Further, R6 explained that they had used AI to create outlines for lectures but only in fields where they already possessed

great knowledge (R6:4). R5 mentioned that the AI tool GitHub Copilot had been used for programming and that it had saved a lot of time (R5:6).

R7 was the only respondent that mentioned an ongoing discussion about handling paid subscription:

"As teachers, we have access to, you know, enterprise-level GPT with bing, big thing, but we also don't have GPT pro. No. I, I have it with personal subscription. Yeah. But we discuss it, that we agree with the department, that we agree that everybody should have access." (R7:57).

Additionally, there was a difference in the accessibility of different AI tools due to teachers using different subscriptions. R5, R6, and R7 reported that they had access to paid subscriptions to Bing or Microsoft through their university (R6:59;61;R5:59;R7:57). R2, R3, and R4 explained that they only used the free public version (R2:24;R3:19;R4:12).

4.1.1.1 *Educators' Perspectives on AI in Personalised Learning*

Many of the respondents mentioned ways of how AI could be used for their students. R1, R2, R5, and R6 all believed that AI was a tool that could be used for personalised learning (R1:65;R2:43;R5:45;R6:45), and R2 mentioned that it could be used by students to compare their knowledge with pre requisites when applying for master program abroad (R2:45). R7 further elaborated that while current technology allows AI tools to help students personalise their learning across different subjects, the main implementation challenges lie in resource allocation, management, and sufficient knowledge (R7:51). R4 believed that there still is a need for human-human interaction (R4:77). One problem that R1 identified was that the short duration of time some courses have, could limit how effectively students can use AI tools to support personalised learning (R1:67). R7 reported that they have allowed students to use AI but still needed to regulate it to prevent cheating (R7:20).

R3 was hesitative, and the respondent explained that an educator's work is to educate, and if AI tools are implemented, their task is to make students reflective of what they have learned and not when using the tools, rather than improving students' learning curve (R3:63). R7 agreed and claimed that the students at the moment do not learn how to effectively use an AI tool for personalised learning (R7:47).

Some respondents reported that one aspect that they still believe is vital för teaching is the human-human interaction in the classroom. R1, R4, and R6 explained that they like to work with the students face to face, and to have a discussion with them (R1:75;R4:59;69; R6:65). Respondent 4 further elaborated, expressing the belief that AI tools lack the ability to provide good follow-up questions during a discussion (R4:77). Additionally, R5 did not believe AI tools have changed how the students study, instead they thought it was an effect from the pandemic (R5:51).

4.1.2 *AI in Research*

The respondents have used AI differently in their research, one of the respondents has been designing learning algorithms in their research (R2:4). R4 used AI algorithms to understand

how drug hounds' noses work (R4:4). R5 and R7 mentioned that they have used generative AI tools such as Chat-GPT to process their written texts, get suggestions on improvements but mentions that the AI tool was not sufficient to write a research text on its own (R5:4; R7:4). R7 added that personally AI did not save time but instead boosted their creativity (R7:6). Additionally, the respondent described the process of how the use of generative AI was conducted:

"So I write my original text and use it. Or I use it for maybe some idea generation. Now they have access to internet. So I can actually use it to ask, for example, if this research fits that outlet. Or is that topic relevant to this or something? So I can ask these kind of questions also." (R7:4).

R5 argued similarly to R7:

" So I write, decide what the logical consequences are that I should write. But then I can write much more carelessly in the first draft. Typically, I have a process where I write directly in a tool like Grammarly, which is more about grammar checking. And it also starts to incorporate AI methods. But then I often take that text and transfer it to OpenAI instead. I ask it to change the text. And then, since I don't really like how the final text from OpenAI always turns out, I usually bring it back into Grammarly later to finalise it there." (R5:6)

Moreover, R5 and R6 raised concerns on how AI is used in research, with concerns regarding research articles produced with generative AI becoming less content rich and failing to offer any new contributions to the research community (R5:14; R6:36). Additionally, R5 mentioned that the use of AI tools in research may benefit the individual researchers but may affect the research community in a negative manner (R5:34).

"Or if researchers start churning out a lot of texts that gradually become less and less content-rich, it is a problem for the research community." (R5:14).

R6 elaborated further on the limitations of AI in academic settings, stating:

"Using AI to, like, outline their articles and scientific papers, their teaching and so on, in the end, you're just rehashing the same soup over and over and over again, and over time, the influx of what was the original database or what was called the corpus for AI to work from diminishes" (R6:34).

4.1.3 Teacher-AI Collaboration

None of the respondents reported that they have been using AI for automated tasks, however multiple respondents used AI tools to augment them. R1 mentioned that they have used brainstorming (R1:16), R2 has tried to use Chat-GPT as the only source to write an essay (R2:4). R3 gave examples of how they use AI tools to augment them:

"It can help me come up with tasks or it can help me generate calendar events."   (R3:9).

Additionally, R7 reported that they use A all the time, to refine text and to guide the research topic in a relevant direction (R7:4). R6 added that they have used tools to get an overview of a subject in a short time once again showcasing AI augmentation:

> *"It's about finding things out when I want to enter a field, like a first overview, that I have asked to get an overview of something."* (R6:4).

Regarding disbelief in AI's ability, R7 argued that the system is not the problem, it is the user. The respondent further elaborated that experts in a field will benefit the most from AI tools, rather than those who are in experienced within a specific field (R7:49):

> *" I think that today, people who would, who benefits most from it, are people who are experts, in that field, actually. I don't think novices get a lot of help."* (R7:49).

Moreover, some respondents claimed that their subject is too difficult for an AI tool to be an expert and help them in their subject (R1:22;R3:25;59; R4:6).

4.2 External Dimensions

4.2.1 Top Management Support

R1 reported that the institution's view of AI is positive (R1:24). Initially, it was up to each teacher to learn how the AI tools worked on their own (R1:12). Later, they received email instructions on how students should use the tools (R1:28). R1 believed that it was the universities responsibility to inform the staff on how AI tools could be used, and whom to contact if the individual wanted to learn more (R1:85; R1:87).

Respondent 7 described that their institution has been very positive towards integrating AI and because the head of department got interested in the integration they were very lucky. R7 explained:

> *" I think it depends a lot on the leadership. I'm pretty sure there are some institution leaders, you know, at other universities, other departments that maybe they don't see the value in it. Maybe they just think the hype is going to go away. And as a, if you're, you know, as a teacher or like somewhere lower in the hierarchy, if you try to push, then there will be a pushback. Like they don't want to implement or they don't want to put resources. So luckily we have leadership that is actually quite interested in it themselves as a person. So which helps in that sense"* (R7:14).

P_R1 mentioned that nobody has informed them, instead, they have been the one who informs other colleagues and acts as support (P_R1:18). R5 mentioned the absence of clear guidelines. They describe an ethical vacuum where each teacher has their individual opinions without knowing the official stance of the university (R5:53). R2 reinforced this narrative, explaining that although they attended an ethics seminar, there was no clear guidance on the proper use of the technology. The seminar lacked specific directives, and despite discussions, no clear positions were taken (R2:73). R3 explained that although a teaching support unit is available, they believe many of their colleagues still feel that they lack sufficient support or a reliable

point of contact for their AI-related questions (R3:91). R7 highlighted that the faculty leaderships importance by giving examples:

> *"So, then the faculty, actually, should give more and more incentives to implement these kind of things, throughout the research, and teaching. "* (R7:43).

R4 explained that in their institution the discussion regarding use of AI has not been present, instead a university wide discussion has been held (R4:18). Furthermore, the respondent explained that they lacked the proper tools and guidelines to effectively integrate AI into their work. They believe that the implementation process is still in its early stages and will take time to fully develop (R4:55). R1 identified a problem with the rapid pace of AI tool development, believing that it poses a challenge for higher education to keep up and stay prepared (R1:71).

R7 believed that generative AI tools is not just a hype, instead it is a technology that will stay for years to come. They view AI integration as a path to competitive advantage for universities:

> *"So it's a competitive advantage, they need to understand it's a selling point for them. So they should not only use it for increasing the productivity of students, or like creativity of academics, at the same time to increase the competitiveness of their programs, of the faculty, of the university."* (R7:63).

R5 claimed that the university has a responsibility to teach the students on how to use tools they will use during their career and is convinced that AI tools will be used in almost every organisation, and therefore students need to learn how to use and work with them already during their education (R5:22).

4.2.2 Collaborative Knowledge Sharing

R1 and R4 reported a positive collaborative environment, noting that they were encouraged to test AI tools and experienced good support from colleagues (R1:10;73; R4:30). R2 observed that many teachers were initially unsure about how to engage with AI tools, leading to discussions aimed at understanding their application (R2:71). However, R4 claimed that their discussions did not lead to any new breakthroughs in their understanding (R4:30).

R3 and P_R1 said that one important aspect in their work was to educate other teachers about AI tools (R3:25; P_R1:18). R3 and R4 had access to AI experts within their institution, a resource they believed might not be equally available to their colleagues (R3:91; R4:20). During the education of teachers, R3 have brought up topics such as:

> *"What does this mean for higher education? How can we act? How can we think?"* (R3:36).

Additionally, R3 used their external network to enhance their understanding of AI tools to bridge knowledge gaps outside of their institution (R3:91). R7 also had a presentation for others on how to use AI tools, but is unsure if it is sufficient:

"Yeah I presented in front of lots of people like some example prompting how I use it myself what is possible I did, but again like the question is like was it sufficient? I don't know [...]" (R7:73).

Similarly, R5 engaged in active discussions with PhD students regarding the practical use of AI tools, but also talked with other resources at the university on how to implement it in education (R5:16; R5:24).

4.2.3   Policy and Regulations

There are a lot of different findings regarding the existence of policies and/or regulations and how these affect teachers' integration of AI in their work. R1 mentioned that there are no written policies, but they believed there will be (R1:26). The respondent further explained that there are some general rules. For example, they are not allowed to upload student work on external AI tools where they do not have control over the data, which is also underscored by P_R1 (R1:28; P_R1:22), and they are not allowed to force students to use it (R1:28). R1 and R6 explained that ultimately it is up to the responsible teacher to control how students use AI tools (R1:28; R6:22). The respondent added that they believe the institution is waiting on a policy that will inform both teachers and students on how to use it (R1:100).

R2 explained that they have been asking their institution whether there are any policies or regulations, but have gotten the answer that they should follow the general ethics rules in research and education (R2:28). Similarly, R5 responded that there are policies for the research groups, but there is no general policy for the institution, as the manager is currently waiting for a general policy from the university (R5:18). To tackle this the respondent explained that discussions with their students were held. The purpose of this discussion was to ensure that the students understood the acceptable use of AI tools and to inform that different journals have varying perspectives on the use of AI in research (R5:16). R7 responded that they were quick to regulate student use but not themselves, and the reason for this is that they are already regulated from their scientific field and academic journals (R7:24). R5 pointed out that there are different views of AI tools in the nature field and science field (R5:16). Consistently, R4 demonstrated agreement in their views:

"It kind of falls within our usual rules about research integrity and ethics and our usual policies. That we should use things with responsibility and understanding of what we do. And that we should not be able to abuse in any way or that we should cheat in any way or things like that. But it is not something that I have specifically said at the institution that it should be done in or so." (R4:24).

Further, R4 explained that it takes time to develop policies and regulations and it is of importance that they are precise and that the regulations are correct (R4:34). R2 discussed how leaders of the education sector should develop guidelines informed by their own experiences, as well as by observing how other universities are managing AI tools. They mentioned that there are people that have started this work but it has not been finalised yet (R2:83).

R3 stated that the faculty has a policy stating that courses should not be assessed solely through home exams, and that the rules for AI usage by students should be explicitly outlined (R3:30). R3 further described the absence of a written policy for students (R3:85) and mentioned that the institution's existing policy for teachers, established in spring 2023, encourages

them to experiment with AI tools (R3:89). In contrast, R1 reported that there was no written policy for encouraging students to use AI tools. However, they were encouraged to motivate students to try AI tools (R1:14). Additionally, R6 reported that AI is prohibited during exams, but outside of this context, there are no general regulations, but are aware that they should not upload copyright material (R6:32). According to R6, it is up to the grading teacher to decide on the use of AI within their course (R6:18).

R7 reflects on the initial focus on preventing AI cheating, noting that everyone was concerned about it at first. They mentioned that guidelines for responsible AI use were created, but there was a lack of focus on integrating AI into courses. Now instead, there is a shift towards developing guidelines for incorporating AI into the curriculum, and R7 believed that the initial reaction to prevent cheating was misguided (R7:71).

4.2.4 Academic Integrity

4.2.4.1 Fear of Irresponsible Student Use

R7 recalled initial concerns about preventing or detecting AI use by students but notes a shift towards creating assignments that require and encourage AI use (R7:43). R2 reported that they are expecting the students to use AI irresponsibly. However, many of their students have been open and explorative of the AI tools they use. Even if there was irresponsible use, R2 viewed this as the students being in the phase of trying to explore AI and therefore they were not afraid of irresponsible use (R2:65).

R5 believed that the students use AI tools for almost everything, and sometimes a little bit too much (R3:53). R1 noticed that some students do not use AI tools irresponsibly, the writing style was so bad that R1 believed no AI tools had been involved (R1:55). Further, the respondent believed that students are too afraid of getting wrongly accused of cheating, as they are fully responsible for what they hand in (R1:57; 59).

To educate their students on appropriate AI use, Respondent 3 incorporated an academic quiz. This quiz contained various scenarios, asking students to determine whether the AI use in each situation was acceptable or not. Through this method R3 ensured that students were informed and could not later claim ignorance as an excuse for inappropriate AI use (R3:32). R2 noticed that some teachers do not inform their students at all regarding how they shall use AI tools, instead they ignore it and hope for the best (R3:32). R7 pointed out that without guidance on AI use, some students might not use it at all, while others might use it extensively (R7:45). R6 believed that the examination needed to be changed to make sure students do not use AI tools to cheat (R6:65).

4.2.4.2 Altering Examinations and Tasks

Some of the respondents brought up examples of how their examination forms have been altered in order to deal with AI. Some respondents chose to revise their examination methods to limit AI involvement, while others tried to integrate AI into their examination forms. R6 discussed how they must protect their examinations from AI tools (R6:14), since they have a legal obligation towards the society to correctly grade the students with pass or fail (R6:65). Respondent 7 wanted to alter their examination and add a whole AI examination where students are forced to use AI (R7:28). Respondent 5 explained that examination forms is an area where they haven't really reached an agreement of how it is to be carried out. The respondent

mentioned that this year they had to carry out an examination where the students had to write using pen and paper. R5 further explained that this was not a success and they have been reached with feedback from students explaining that they by default felt accused of being cheaters when carrying out tasks. However, the institution has not yet found a solution of how they should come to a mature solution to the examination approach (R5:22). Respondent 2 has also altered their course to some extent to hinder irresponsible use of AI tools. They mention that before they had a reflective essay that was part of their course but because the respondent now cannot tell whether AI has been used or not they replaced the essay with a problem solving task where the use of AI can't be applied to help the students (R2:37).

4.2.4.3 Transparency

Furthermore, transparency was one of the aspects that many of the respondents mentioned being important (R1:102; R2:85; R4:6;38; R5:22). They explained that the communication between writer and reader (or student/teacher) had to be clear in order to give a fair assessment (R2:26).

> *"[...] it's ethically what needs to be done so you should communicate when you have used it for what you have used it [...]"* (R2:85).

Furthermore, R2 mentioned the need for course activities where the students explicitly are asked to use AI tools. They also mentioned that there should not be too restrictive policies because the teachers are responsible for showcasing how AI can be used and therefore encouraging the use of AI in certain course elements (R2:81). R1 claimed that the author is responsible for what has been handed in, and did not agree with the transparency between author and reader, since the author still can fool the reader on what has been generated (R1:16). R5 did not believe that there is a need for transparency between teachers and students all the time. Respondent 5 explained that in order to give a fair assessment of a student's work, there is a need to know what or if AI tools have been used, but the teacher does not have the same responsibility towards students (R5:43). Respondents P_R1 and R4 disagreed with this view and mentioned that the transparency goes both ways. Students shall be transparent towards teachers and teachers should be transparent towards their students regarding how AI has been used (P_R1:24; R4:81). At the institution of P_R1 they have incorporated a such called AI contribution statement:

> *"This AI contribution statement is very important. If we do not have it then the student essentially has no means to account for their use of AI."* (P_R1:24).

Respondent 3 admitted that they themselves are not particularly transparent with their use of AI, but said that this is something that they maybe should be (R3:53). Instead the respondent was so used to previous copyright rules regarding content that when they now can use AI to generate their own material they haven't really thought about crediting that (R3:53). R4 gave an example of an article that was written with AI tools and purposely published to demonstrate the capabilities of AI tools in academic papers:

> *"I also read a text that someone at [Name] wrote where he wrote a fake research article with the help of AI and where he himself said that yes, if this had come to be reviewed by me, I might not have noticed that it was cheating. "* (R4:47).

R2 claimed that there is a concern to credit the correct author, since they do not know if the product is done by a student or AI tool (R2:26). R3 raised concerns that a degree from a university starts to become worthless if everything that is produced comes from AI tools (R3:28).

Another aspect mentioned by some respondents was the fear of students cheating with AI tools (R4:79). However, they believed students are cautious about using these tools because they are unsure how to use them correctly (R4:36). R2 expressed both agreement and disagreement with this perspective, explaining that while students may be irresponsible when using the tools, they are typically exploring them rather than intentionally cheating (R2:65). R3 argued that many teachers get stuck trying to first fix the problem of students cheating with AI tools, and because of that lack further motivation to use it themselves (R3:28).

4.2.5 Training

The findings illustrated a diverse range of experiences and perspectives from the educators regarding AI training initiatives within academic settings and how they affected their AI integration. The results varied from those who have actively participated in university-led introductions of AI, to others who seeked more specialised, self-directed learning opportunities. R2 explained that they have attended some workshop events where the focus has been on the research theme, however they have not participated in any training events where the focus has been to increase their own ability of using AI tools (R2:39).

R1 and R4 explained that they have participated in some training and also an introduction initiated from the university that informed them on what AI is and the general underlying technology. The introduction was held by more knowledgeable people within the field (R1:12, R4:8). At this first introduction meeting they were mostly encouraged to inform and explore for themselves on how AI works (R1:12). The training that was offered were offered in the form of online workshops, online webinars, and R2 explained that they got to try out some tools and discuss the utilisation with other teachers and receive some tips and tricks (R1:90). R4 further mentioned that most of the workshops focused on giving a general overview rather than providing specific, hands-on training. Respondent 4 would prefer workshops that offer practical examples and allow the participants to try things out themselves (R4: 32) . In line with this explanation, R1 specified that the training they desire involves being provided with concrete examples of how AI can be utilised across various use cases. This approach would enable them to more easily apply these examples directly to their own scenarios (R1:34). R7 mentioned a meeting with other teachers where they were shown AI tools and examples, but felt it was not comprehensive enough to teach them the foundations (R7:65).

R5 and R7 reported that there might have been some workshops available provided by the university but that they have not had the chance to participate (R5:24;R7:30). Instead both took action themselves and attended online courses. These courses had a focus on deep learning, AI and also on prompt engineering (R7:30). The reason why they attended their own courses was explained as follows:

> *"I need to learn it myself first. So of course it provided me with this kind of base, the background, so I can transfer it to students. [...] So it was certainly not only helpful, it was necessary. I mean, without that you cannot really, I think that's the challenge with people who would like to implement. I mean, you cannot really implement without being certain about it."* (R7:32).

Respondent 7 continued and argued that people are still very reluctant and they did not be-lieve that training can create a big enough change in people's mindset towards the use of AI (R7:67). One interesting perspective emerged from R3 when asked about if they had received any training:

> *"Very little. I have held some myself around at different institutions and talked to teachers and talked about what I think they should think about and what I think will happen in the future"* (R3:34).

One training moment that R2 noticed being efficient was when their students had a seminar when they only used AI tools where they saw examples of how AI can be used (R2:20). R2 further explained:

> *"And they were also asked to provide what kind of prompts. And they were ask-ing, and then I saw, what is all possible? So I couldn't imagine how much can actually, what can tweak and tune it towards this."* (R2:20).

However, only respondent 5 reported that training was available but they chose not to partici-pate. They have also not completed any additional training regarding AI. The respondent be-lieved that their existing knowledge was sufficient at the time and noted that the training pro-vided primarily aimed to explain how generative AI functions and its underlying technology, similar to what many other respondents have mentioned. However, the respondent expressed interest in training specifically tailored to how AI could be integrated into their educational setting, indicating a desire to participate if such educational opportunities were available (R5:24). R6 reported that they have not participated in any training or workshops but instead they participated in a general meeting for teachers (R6:24).

4.3 Internal Dimensions

4.3.1 Ability

Respondent 3 reported that their backgrounds as a programming teacher contributed to their early engagement and hands-on experimentation with AI technology. They believed that their general fascination with the tool has led to them experimenting more than the average teacher (R3:21). In line with this P_R1 mentioned that their technical background has made it easier for them to assimilate new technologies, which encouraged them to experiment more exten-sively with AI tools (P_R1:16). R7 explained that their previous knowledge of AI has helped immensely for increasing their ability of successfully using AI. They mentioned that they have understood the basic mechanics behind traditional AI which allowed them to understand what should be done in order to increase the performance of AI tools (R7:12). They also dis-cussed that lack of this general understanding might hinder other people from using it:
> *" I think that's why there are not that many people using it or like worried about adapting it because they didn't have any background knowledge about the traditional part of AI."* (R7:12).

R5 expresses an impressive amount of knowledge regarding the underlying AI technology:

> *"I could in principle build my own (AI), I understand the transformer models and attentional-mechanisms and such. The structure that AI is build upon, and because of that I am pretty technological friendly"* (R5:10).

Furthermore, R5 emphasises the ability as something that is necessary and a low ability to use AI tools can lead to teachers losing competitive advantage (R5:57).

Regarding the general ability of utilising AI tools, R5 considered themselves average and noted that other teachers are better at, for example, creating prompts (R5:10). R4 explained that their ability is very low and that they are currently trying to learn the technology as it is being integrated into some of their projects (R4:14). They also mentioned that the only AI tool that they have tried is the free version of ChatGPT (R4:12). R6 explained using AI tools in a subject where they possess a lot of knowledge, to quickly put together a lecture to present in a good way (R6:10). Additionally, R6 mentioned that their curiosity of how AI works has further increased their use of AI (R6:12). R2 has tried to use AI tools and claimed to understand all principles but not all ticks to improve their performance using the tool (R2:12;16). Furthermore, R1 reported that the ability of prompting effectively was an area where they had a lack of knowledge which made them hesitant of using AI:

> *"I am not good enough at prompting. I can't get anything sensible out of it [...] I'm not good enough at using it. I think it is better if I just think for myself because then it goes faster"* (R1:6).

The respondent also reflected on their role as a non-expert and emphasised the importance of continuing to learn and adapt in order to increase their ability and current use (R1:51). R7 believed that no technical background was needed for integrating AI:

> *"So, I don't think they need technical knowledge, but I think that we need this, transfer this general knowledge about what it is, how it works, and how to work with it, you know, like prompting, evaluating."* (R7:34).

However, R3 reported that previous knowledge within a specific field was a key factor in facilitating how well one's ability would be to use AI. The respondent explained that if one does not have expertise in a certain domain then one would not be able to use the AI in that specific field (R3:23;38;69). On the other hand, R5 explained that one's ability to use AI at the foundation is determined by one's technical ability (R5:14).

4.3.2 Cognition

Many respondents mentioned aspects of their work where they believed an AI tool could be beneficial. For example, Respondent 4 noted that using AI to generate exam questions could be useful. However, due to their field being very specialised the AI's outputs have not met the required standards (R4:6). R2 explained that until they saw the potential of AI, more specifically through the creativity of their students, they did not know what was possible to achieve with AI (R2:75). Respondent 3 explained that they primarily use AI once they find an area where it is applicable and where AI would facilitate the work (R3:6;11):

"It can help me with boring tasks, like coming up with assignments or generating calendar events from a list of dates and times. It can also assist me when I know what I want to say but don't really feel like formulating it, and it's quite useful for translation as well." (R3:9).

Furthermore, R5 explained that one's AI integration is determined by openness towards using the technology in general. R5 continued and explained that if one feels comfortable using AI tools then they are going to continue using it, but if they only focus on the delimitations of the tool that may only focus on its issues (R5:14). R3 explained that there are several areas where AI could be helpful, however they did not feel like implementing it because of various reasons such as not finding a good interface and then they gave up on it. They further explained that they often continued doing what they have always done because that is all they can bear (R3:17). R5 observed that the acceleration of writing facilitated by AI tends to divide students: those who are already relatively skilled at writing benefit greatly, while those who struggle with written communication may become more reliant on AI as an obstacle, hindering their learning of writing skills (R5:22).

R1, R2, and R4 envisioned AI tools capable of a variety of tasks to enhance educational processes. These tasks included accurate exam grading, schedule automation, data pattern analysis, email responses and result registration (R1:40;43;45;49;77; R2:10; R4:40;63;65). R2 explained that for education they are looking forward to the development of services where AI can be used. However they themselves will not be pushing for this (R2: 61).

4.3.3 Ethical Challenges

There are different ethical challenges that the respondents believed were important. One important aspect highlighted by R1 was the necessity for educators retaining the responsibility over student grading, rather than to fully give this responsibility to an AI tool. (R1:8;38). R2 mentioned that AI systems are not ready for grading and ethical grading can at the moment only be done when they are grading themselves (R2:53). Furthermore there colleges have discussed that giving credit to the real author is difficult since it cannot be traced:

> *"And then colleagues were, as I said, some of them were saying, yeah, but this means we need to give the credits to the author of the text. And this is impossible because we can write ChatGPT, but this is also not the real original author. "*(R2:28).

R7 described concerns regarding AI's ability to produce fake data which can lead to problems, however these are problems that have existed even before generative AI tools (R7:40):

> *"So, it opens up, you can fabricate data, basically, as a scientist or as a researcher. Of course, it opens up these ethical issues, and I'm pretty sure it's already happening, at the moment. But, the thing is, like, didn't it happen before Chat-GPT? It did also. I mean, people fabricated data before, you know, like, they faked interviews before. So, I mean, I think, I don't think it's an AI problem."*(R7:40).

R4 agreed that in research the data produced must be authentic (R4:36).

4.3.4   Trust and Fears of AI

Some of the respondents mentioned that the trust in AI's ability was low. R1 and R3 both discussed that they currently do not trust the integration of AI in full automated examination assessment (R1:41, R3:47). R1 explained that they would lose control over the assessment and because they are the ones responsible, AI does not at the moment save enough time for it to be implemented (R1:41). Respondent 3 explained that AI assessment probably will be valuable in the future. However, R3 raised concerns regarding approving grading done by AI tools as grading is a legal practice and at the moment they do not believe it saves enough time and as they still need to check if it is all correct (R3:47; R3:49). R2 had no fears of using AI tools due to an understanding of ML and AI algorithms (R2:18).

The respondent further elaborated that it is difficult to ensure that an AI tool can produce a good assessment and mentioned that maybe AI at the moment can only be used for assistance to point out flaws (R2:43). R3 reported experiencing AI hallucinations, where the tools added wrong references and facts (R3:28). R5 explained that they do not fully trust in what the AI have written and that they always fact check the outputs (R5:47). R7 had a similar view of it, but explained it from a student perspective, where the respondent believed that students do not fully trust what the AI generates, but the time saved outweighed the risk of hallucinations (R7:49). R7 further added that the risk is not hallucinations, instead it is that students do not develop domain knowledge. R6 believed that it is important to be critical of the source origin, and believed that if a user is not careful, they might not learn anything (R6:6;38). Lastly, R7 expressed concerns about investing in AI tools, fearing that a better technology might emerge afterward (R7:57).

Additionally, R2 reported that they do not feel afraid of AI tools replacing them in their work (R2:8). R3 and R5 agreed with this, claiming that AI tools will help those that already work in education, but believed that in the future, maybe teachers might be replaced (R3:73). R5 believed that:

> " [...] I won't take your job, but it will be a person who knows AI that takes your job. So, I believe that if you educate yourself now and are hostile to AI, given that it is such a strong productivity accelerator, you will end up competing yourself out of the job if you don't know these tools." (R5:57).

Additionally, R1 and R5 both highlight concerns about student inequality rising in education. R1 points out that the ability to afford private lessons creates unfairness even in free education and observes that some students are exceptionally skilled at prompting. R5 was worried that wealthier students may gain significant advantages over less affluent students, aggravating inequality. This issue is being actively discussed (R1:98; R5:53).

5 Discussion

This chapter delves into a detailed discussion of our research findings on the dimension affecting teachers' AI readiness. We will explore how these dimensions are affected by comparing our findings with previous research. Furthermore, we will identify gaps in existing research.

5.1 Utilisation in Education Today

5.1.1 Utilisation in Education

The empirical data revealed a wide range of ways in which the respondents have used AI in education. Since this thesis focuses on AI readiness in higher education, understanding how teachers utilise AI tools in their daily work is important to understand. To our surprise most respondents immediately referred to generative AI, despite the questions being designed in a way that allowed for reports of various types of AI tools. Lim et al. (2023) described generative AI as a significant component of AI technology and Kasneci et al. (2023) claimed that generative AI is the most popular type of AI, which explains the respondents' focus on this particular technology. All of the respondents acknowledged utilising AI to some extent, however there was a clear difference in the extent of use and the findings revealed three distinct categories in which educators are currently using AI. Some reported minimal personal use (R1; R4), some had moderate use of AI (R2; R3; R5; R6) and some had extensive use (P_R1; R7).

While it is important to recognise the broad applications of AI in education, the empirical findings suggest that teachers have not yet integrated AI into their assessments. This reluctance arises from their fear of losing control, as they are responsible for ensuring the accuracy and reliability of the assessments. Furthermore, the empirical data indicated that using AI for assessment still does not save enough time to justify full implementation (R1; R3). This finding directly contradicts the literature, which suggests that AI already is capable of serving as a grading assistant and save time (Alqahtani et al., 2023). Additionally, AI can be used as a tool for personalised learning, as suggested by Al Darayseh (2023). This was supported by multiple respondents, who believed that AI can be used for personalised learning to address students' individual needs. However, none of the respondents reported that personalised learning had been applied. Additionally, the findings indicated that while respondents have utilised AI chatbots, there were no examples of the utilisation of intelligent tutoring systems. This suggests a difference between AI's practical use compared to the described potential in the literature (Al Darayseh, 2023), it could also demonstrate a potential underutilisation of the broader benefits of AI in education as demonstrated by Celik et al. (2022).

One other interesting aspect that emerged from our result was that none of the respondents reported that their university actively pays for subscriptions of AI tools. However, some reported that AI tools were integrated in their work package, while others used their own funds to pay for subscriptions. Only one of the respondents mentioned that there was an active discussion on implementing paid subscriptions for everyone in their department (R7). This

indicates that the universities still need to discuss digital universal access to AI tools (Gill et al., 2024).

5.1.2 Teacher-AI Collaboration

The existing literature identifies three types of AI hybrids: automation, augmentation, and assemblage (Rai et al., 2019; Leyer & Schneider, 2021). Parts of the literature have focused on the augmentation aspect, where AI tools assist humans rather than replacing them. Similarly, our observations indicate that the collaboration between teachers in higher education and AI tools is primarily characterised by augmentation. The utilisation reported in the results suggests a focus on tool augmentation in favour of tool automation (Leyer & Schneider, 2021).

This perspective suggests a trend towards integrating AI to enhance teaching, rather than substituting educators or automation, and AI is viewed as a partner rather than a replacement. This aligns with Celik et al. (2022), who emphasise the need for teachers to understand how to effectively use AI to augment their capabilities. To our surprise, the empirical data suggested that AI has not yet been incorporated into any existing technologies throughout the institutions, excluding the AI tools integrated by their work package deliverer. This could be attributed to various reasons, but one aspect could be that the integration process is complex and the user loses interest, something that R4 explained in the results.

Luckin et al. (2022) explain that in order to effectively utilise AI tools, teachers must understand how their expertise can be augmented by these tools. Surprisingly, the results demonstrated that teachers sometimes perceive themselves as superior to AI tools or believe their subjects are too complex for AI to provide meaningful assistance. This narrative contrasts Jeon and Lee's (2023) observation, which showed that AI tools alone cannot enhance education, the collaboration between AI and human experts is essential for maximising the tools' potential. However, our findings indicated that one teacher's perspective aligns with Jeon and Lee's (2023) observations, emphasising the crucial role of human expertise in effectively leveraging AI tools (R7).

5.1.3 AI in Research

Our findings confirm that AI tools, more specifically generative AI has been used for research and it has been used to generate ideas and redefine text, techniques that Fui-Hoon Nah et al. (2023) demonstrated in the literature. Additionally, the findings confirm that in research, educators have used generative AI to assess the quality of the paper once their own text has been written (Sarker et al., 2024).

Sarker et al. (2024) mentioned that AI has been used in research to speed up the peer review process of papers. However, our findings do not confirm this narrative. Susarla et al. (2023) and Dwivedi et al. (2023) explored the application of generative AI tools in research and found that generative AI tools can be used to generate ideas and drafts in the initial research stage. Based on our empirical findings, AI has been used to boost the creativity of the writing process and it has also been mentioned that AI has been used to validate if the research purpose fits within a specific outlet, which surprisingly has not been discussed in the literature.

The empirical data suggests that using Generative AI in research can lead to less content-rich studies that fail to offer new contributions. This concern is also reflected in the literature. Susarla et al. (2023) point out that Generative AI tools are trained on existing literature, which limits their ability to generate novel ideas and instead leads to outputs based on well-established knowledge. Further, our results suggest that due to community concerns, AI should be used to assist individual researchers rather than becoming a permanent fixture in the research community.

5.2 External Dimensions Influencing AI Readiness

As indicated by the findings, the respondents receive a degree of support from institutional or higher-level management. However, when considering the broader external dimension, teachers have limited support for utilising and integrating AI tools into their work. Although respondents express a belief in AI's potential, there still remains resistance at the organisational level, as can be seen through lack of policies or guidelines, limited continuous training, and a general indecisiveness regarding AI integration. Yin et al., (2024) argue that people who are part of organisations with higher degree of AI readiness are more likely to believe in AI's potential. However, our results stand in contrast to this narrative as some respondents have reported a belief in AI's potential.

5.2.1 Top Management Support

The findings related to top management support were diverse. Some respondents reported feeling support from their university or institution, while others felt they were left to manage the integration of AI on their own. The empirical findings suggested that many introductions about AI were held to inform the teachers, but after that some have felt a lack of top management support, something that has been found to be negative for ensuring the skills and knowledge of AI technologies (Rahiman & Kodikal, 2024).

The respondents that reported a strong support emphasised the correlation between proactive support from management and positive influence on integration of AI, something that confirms previous claims made by Landa et al. (2023). Such leadership not only mitigated resistance but also enhanced engagement and commitment among faculty members, thus fostering an adaptive and innovative educational environment (Jöhnk et al., 2021). Further, R1 and R7 emphasised the positive impact of supportive leadership on AI integration. R1 believed that the university's proactive stance and responsibility in informing staff about AI tools are important, going in line with Alsheibani et al. (2018) findings that a lack of top management support can lead to failures in implementing innovative technologies.

The empirical findings showed that top management has been quick to raise AI discussions. This fast action has changed the roles of higher education teachers, who now need to think about how AI integrates within their teaching. However, even though these changes happened quickly, our findings does not suggest that teachers are feeling stressed or resistant to them which contradicts previous literature (Frick et al., 2021). Instead, the lack of guidance leads to educators feeling a vacuum where the acceptable, appropriate and responsible use in some cases is still very unclear. The findings also suggest that when teachers lack the proper guidance and tools from their institutions, the implementation process tends to be prolonged (Hu

et al., 2023). Further, the findings did not suggest that the government or private sector have provided the universities with resources or funding (Kohnke et al., 2023).

To our surprise, the findings suggest that even though top management support can empower a culture of knowledge sharing, teachers within higher education are still likely to share their knowledge with each other regardless of the level of support from upper management. This contradicts Uren and Edwards (2023) who claimed that top management support is necessary in order to foster a knowledge sharing culture across the organisation. Instead it was found that the higher education sector is an environment where knowledge sharing already is present.

Despite different levels of support and resources at their disposal, many educators proactively engaged in discussions, presentations, and peer education to enhance their understanding and application of AI tools. This collaboration and knowledge exchange highlight the resilience and initiative of educators in the higher education sector where educators continued to seek ways to enhance their understanding of AI and how it could be applied.

5.2.2 Policies and Guidelines

Our findings underscored the importance of developing precise policies tailored to specify both acceptable use for teachers and students (Fowler et al., 2023). Some respondents noted the absence of specific AI guidelines which led to them relying on broader ethical standards and existing policies already in place. This indicates a reactive rather than proactive stance from the higher education leaders regarding AI policies. Instead of the creation of new policies, our findings show that existing policies have been stretched to regulate AI use without considering the new challenges posed by these technologies. This goes in line with previous research indicating that there is still a lack of clear guidelines which can inform the teachers (Ng et al., 2023). There has also been indications within the findings that these AI initiatives fall on the leaders of the entity instead of the individual teacher (Jöhnk et al., 2021). Moreover, the findings showed that teachers are currently not heavily regulated from their institutions with AI policies and regulation, allowing them to be innovative with the technology. This is consistent with what Gupta and Baskar (2020) conclude, connecting heavy regulations with an unwillingness to adopt technology.

The discussions held by educators with students about the responsible use of AI tools suggest an attempt to fill the policy void through direct engagement. However, this approach, while beneficial, may lack consistency and depth, potentially leading to varied understandings and applications of AI across different student groups and disciplines. Furthermore, the quick regulation of student use of AI versus the self-regulation by educators underscores a disparity in oversight that may affect academic integrity.

Additionally, the results show that some respondents claim that policies from the research community regulate their AI use. None of the respondents mentioned that the European Union has created AI policies that regulate their use (Mirbabaie et al.,2022).

5.2.3 Academic Integrity

Our findings confirmed the concerns regarding AI tools having the potential to compromise academic integrity, aligning with previous fears expressed by Gill et al. (2024) and Pisica et al. (2023). The concern apparent in the empirical data regarding students' irresponsible use of AI tools are not unique issues, they reflect the well-documented discussion in previous research that have highlighted significant issues of accountability and authorship in the era of AI integration (Burkhard, 2023; Pisica et al., 2023). Additionally, the empirical findings showed a range of attitudes towards dealing with academic integrity among educators ranging from scepticism and fear to a more practical and integrated approach. According to Kajtazi et al. (2023) higher education has been forced to reconsider how examinations are conducted. The findings support this claim and suggested that some teachers have moved towards creating assignments that incorporated the use of AI. This shows a proactive strategy that incorporates AI's potential while addressing ethical issues. This approach is similar to what Cotton et al. (2024) suggest, advocating for new types of exams to prevent AI misuse.

In line with this, the results presented a clear conflict between stopping AI misuse and encouraging its proper use. For example, Respondent 5's reversion back to pen-and-paper exams was meant to prevent AI cheating, but instead made students feel that they by default were guilty of cheating when using AI tools. This shows how hard it is for teachers to find the right balance. This supports the argument of Fowler et al. (2023) that overly restrictive rules could hinder the innovative use of AI. This challenge has been recognised, as our findings suggest that many teachers have realised AI cannot be ignored. The incorporation of AI-specific academic quizzes, as implemented by R3, represents a proactive measure to educate students on the ethical use of AI, thereby reducing the risk of misconduct through ignorance. This aligns with Burkhard's (2023) emphasis on the educator's role in creating effective AI usage strategies.

Transparency emerged as a critical theme in both the literature and the empirical data. Burkhard (2023) as well as the findings stressed the necessity of clear communication regarding AI use in academic work. The introduction of AI contribution statements, as practised by P_R1, exemplifies an institutional effort to enhance transparency and accountability, thereby safeguarding academic integrity, confirming Bansal et al. (2024) concerns. However, the scepticism expressed by R1 about the effectiveness of such statements indicates a need for ongoing dialogue and refinement of these measures to ensure they are both practical and effective.

R3 also raised concerns regarding the university degree losing value due to the heavy integration and production from AI tools. This concern has previously been raised by Cotton et al. (2024) who emphasises the need of ensuring academic integrity to make sure that the educational program is not discredited due to wrongful assessment.

5.2.4 Training

From our empirical findings it became evident that while some initial steps have been taken to introduce educators to AI, there remains a gap in the delivery of training that is tailored to the practical needs of educators. Ng et al. (2021) suggested that teacher's professional development through training is necessary for updating skills and knowledge on AI. Despite the clear need for ongoing professional development, our findings report that the training provided has

been more introductory and less focused on enhancing teachers' ability. However, some respondents have recognized the necessity of professional development. These educators have instead taken proactive steps and sought training outside of their institutions to feel that they are up to speed in the digital transformation.

The results primarily point to the fact that higher education has failed to incorporate practical exercises that allow educators to get hands-on experience and interact directly with AI tools. This hands-on approach, as suggested by the findings, can enhance understanding and confidence in using AI and provide educators with examples of where and how AI can be used in educational settings. This finding is consistent with the suggestions from Luckin et al. (2022) that training programs should offer more than just general AI courses, focusing instead on comprehensive learning experiences. However, this is still something that higher education evidently has failed to incorporate as our findings suggested that only general AI introductions and information seminars have taken place. There has also been suggested in our findings that provided training might not have been enough to change the mindset of educators regarding AI use. However, the findings show that it is still of importance to empower educators AI ability and knowledge, going in line with Celik et al. (2022).

5.3 Internal Dimensions Influencing AI Readiness

5.3.1 Ability

A key theme that emerged from the findings was the importance of technical background on educators' engagement with AI tools. Those with prior technical knowledge, such as programming or a foundational understanding of AI technologies reported an enhanced ability to experiment with, utilise and integrate AI tools into their teaching practices. This aligns with the literature, which suggests that technical ability, while not mandatory, significantly facilitates the integration of AI into teaching (Wang et al., 2023; Luckin et al., 2022). These educators are not only more comfortable with the technology but are also more likely to innovate in their teaching methods and experiment with AI tools. The findings also confirmed that even basic knowledge of AI can boost teachers' confidence. In the findings, R7 pointed out that AI knowledge is better than technical knowledge, supporting the literature, which says basic AI knowledge is crucial (Luckin et al., 2022).

Among technical competencies, prompting was the area that most educators identified as a liability in their AI use. The limited experience and struggle with learning AI technology reflect a broader challenge within the educational sector, where the lack of foundational technical skills can be a barrier to effective AI integration (Celik et al., 2022). This in turn can create a competitive disadvantage, as noted by Ng et al. (2023), where educators without AI capabilities may fall behind their more technically able colleagues. However, there were only a few examples within our findings that confirmed AI ability as something that can increase competitive advantage.

5.3.2 Cognition

In the literature, cognition has been found to increase AI readiness among individuals because when an individual understands where AI can be applied to increase their work, then they are more likely to integrate it (Wang et al., 2023). Our findings suggest that educators' willingness to integrate AI often depends on their ability to identify areas where AI can be most beneficial, which aligns with the literature. Respondent 3 exemplified this by indicating that they primarily use AI in tasks where it can facilitate their work, such as generating assignments and managing schedules (R3). This suggests that educators who see clear, practical applications of AI are more likely to integrate it. However, the effective integration of AI also depends on how easy AI is to integrate and the quality of the AI tools available.

For example, Respondent 3 mentioned difficulties in finding user-friendly interfaces, which sometimes led to abandoning the use of AI altogether. Furthermore, our findings suggested that cognition alone was insufficient for sustained AI use, as some educators recognized potential applications but were discouraged by the quality of AI tools. For example, Respondent 4 stopped using AI for generating exam questions due to inadequate output quality. This aligns with Ng et al.'s (2023) suggestion that identifying AI technologies for suitable use cases is of importance, however it underscores the need for AI tools being able to return high-quality results to maintain the engagement.

Ng et al. (2023) suggested that teachers should explore and identify AI technologies that they believe can enhance their expertise. However, the empirical data suggests that the comfort level with AI tools significantly influences educators' continued use. Respondent 5 pointed out that educators who feel comfortable using AI are more inclined to continue using it, while those who focus on its limitations may hesitate. This indicates that confidence in using AI and a positive perception of its capabilities are factors affecting the sustained implementation of AI tools.

Our findings also suggest that the level of expertise influences the perceived benefits of AI. Respondent 7 observed that AI tools are more beneficial for experts than novices, as experts can leverage AI to enhance their work significantly. This perspective aligns with the literature's notion that a deep understanding of AI's capabilities can lead to more effective integration (Wang et al., 2023). Respondent 5 noted that AI accelerates writing for skilled students while potentially hindering those struggling with writing skills, further illustrating the varied impact of AI based on user expertise.

5.3.3 Trust in AI

The internal ethical factor identified in the literature was trust and fear of AI. The findings of this study reveal a general low trust in AI tools, particularly regarding their ability to automate various tasks in higher education. Previous research indicates that teachers' belief in AI's potential and their trust in these systems significantly affect their engagement with the technology (Cukurova et al., 2023). Furthermore, Ng et al. (2023) emphasised that unreliable AI recommendations can affect the teachers performance when they are solely relying on the AI tools. In line with this, the findings suggested that teachers currently do not trust AI to perform automated tasks independently which has led to a limited integration in areas such as AI driven assessment and when AI has been used most of the respondents reported an awareness of reassuring AI outputs. Shahid et al. (2024) identified that anxiety towards an AI tool would

reduce the readiness and willingness. However, the result indicates that *responsibility* and *time reduction* was the reason why the trust in AI tools was low, and thereby goes in line with Ayanwale et al. (2022) instead. This also aligns with Gill et al. (2024), who argued that AI system inaccuracies undermine both their value and credibility. While automated assessment may become feasible in the future, current practices in higher education require legal adherence, placing the responsibility for assessments on educators.

The results indicate that respondents have experienced AI hallucinations, as documented by Loose et al. (2023) and Sursurla et al. (2023), when using AI tools. The awareness of these hallucinations led to an undermining of the teachers' trust in the system, a finding that aligns with observations by Sarker et al. (2024). This awareness protects them from ethical dilemmas that could impact other human beings (Mirbabaie et al., 2022).

Additionally, respondents R2, R3, and R5 did not foresee AI replacing their jobs any time soon due to the continued necessity for teachers in the future. While they acknowledged that processes will evolve, they expressed no fear about these changes. This perspective aligns with the findings of Fundi et al. (2024) but contradicts those of Pisca et al. (2023).

5.4 Implications of Research

5.4.1 Practical Implications

The findings of this study have several practical implications for the integration of AI tools in higher education, providing actionable insights for educators as well as institutional leaders that are looking to integrate AI more effectively. A key area emerging from the current results is the necessity for comprehensive professional development programs that go beyond introductory sessions. Studies such as those by Luckin et al. (2022) have already highlighted the need for AI training among educators, emphasising that it should go beyond general AI courses. However, our study extends this narrative by finding that educators specifically call for more hands-on training that allows them to directly interact with AI tools.

This study highlights the role of top management support in AI integration as an important dimension affecting teachers' AI readiness. However, the study contributes with new insights as it provides a new perspective on the relationship between top management support and collaborative knowledge sharing. We found that a collaborative knowledge sharing culture was present independently of top management support contradicting previous research (Uren & Edwards, 2023). This does not reduce the importance of top management support as a proactive leadership still was found to mitigate resistance and enhance engagement. Therefore, institutions should not overlook the importance of involving leaders to promote and support AI initiatives to ensure the success of AI integration, as emphasised by Landa et al. (2023).

Moreover, the study emphasises the necessity for additional policies and guidelines regarding the use of AI in education, enforcing the current literature (Fowler et al., 2023). The findings highlight the importance of institutions developing precise policies that specify acceptable use for both teachers and students, particularly in addressing ethical considerations and academic integrity. The study also emphasises the need for universities taking a clear stance on how

they want to pursue AI integration in order to ensure consistent application across the institution and prevent misuse.

5.4.2 Theoretical Implications

This study attempts to make several valuable contributions to the existing body of knowledge on the dimensions of AI readiness and how they influence teachers' ability to integrate AI within higher education. As suggested by Jöhnk et al. (2021), the study contributes to the IS field by separating AI readiness from adoption, researching it as a standalone concept. This offers a new perspective of technology integration research.

Furthermore, the approach of the study sets it apart from previous research on AI readiness in higher education as it incorporates both internal and external dimensions of the phenomena. The findings offer a more comprehensive understanding of the dimensions that influence the integration and effective utilisation of AI tools in teaching practices. This holistic approach also broadens the scope of existing research by demonstrating how personal and organisational elements interact to influence teachers' AI readiness. The study highlights the interconnections between these dimensions and examining them in conjunction revealed that many internal dimensions are significantly influenced by the external. Moreover, by delineating the dimensions of AI readiness, this study provides a framework that can be further improved and used to assess and enhance teachers' preparedness for AI integration.

6 Conclusion

The purpose of this study was to explore the integration of AI tools in higher education by examining the dimensions of AI readiness among educators. It aimed to identify the influencers of educators' ability to effectively integrate and utilise AI tools in their teaching practices. The research used an abductive approach and applied a qualitative method with semi-structured interviews. The research question was as follows:

How does the dimensions of teachers' AI readiness influence the integration and utilisation of AI tools in higher education?

While higher education sectors have been reactive in introducing AI tools to educators, there is a pressing need for more hands-on training with AI tools. Such training should aim to activate teachers to use the available AI tools and demonstrate their various applicable use cases, increase teachers' confidence, their willingness to integrate, competitive advantage and should benefit all teachers not only enhance those with technical background.

Although this study has considered external dimensions of AI readiness, we conclude that the preparedness for AI integration remains largely an individual responsibility. Our findings indicate that ability has a more significant positive influence on successful AI integration than cognition. Despite recognising areas where AI could be beneficial, some teachers have renounced AI integration due to a lack of ability, low trust, and in some cases perceived themself as superior AI tools. This reinforces the need for hands-on training that explicitly showcases AI use cases, inspiring teachers to utilise AI in recognised areas.

We found that top management support is important for encouraging and aiding teachers in AI integration. However, contrary to previous research, our results indicate that top management support is not a necessity for fostering a knowledge-sharing culture. Instead, in the absence of such support, teachers often seek guidance and assistance from their colleagues.

Moreover, higher education has failed to proactively create policies and guidelines for newly integrated AI tools. This has resulted in altered examinations and the stretching of outdated regulations and ethical policies to cover new AI technologies. Currently, the use of AI in higher education does not reflect its potential as suggested in the literature. Instead, it is primarily limited to the use of generative AI because these tools are the most available. Additionally, due to concerns about academic integrity, teachers have been more proactive in regulating students' use of AI than in integrating AI into their own tasks and examinations. This presents a significant challenge, as the integrity and accuracy of examinations must be maintained. Higher education faces the constant challenge of balancing the prohibition and integration of AI technologies. Teachers should tread carefully, with support from the university, as the way they manage AI could provide a substantial competitive advantage for future students.

To conclude, this research has shown that teachers' AI readiness significantly influences the effective integration and utilisation of AI tools in higher education. By focusing on enhancing teachers' ability and cognition through targeted training and supportive policies, institutions can better equip educators for integration of AI into their teaching practices.

6.1 Future Research

The concept of AI readiness is still very much unexplored. Therefore, more studies should aim to further investigate how AI readiness among teachers influence the integration and utilisation of AI in higher education. This study found that a culture of knowledge sharing was fostered independently of top management support. Future research should delve deeper into this and explore the dynamics of knowledge sharing among educators. Understanding how colleagues help each other and share resources can inform strategies to encourage collaborative learning and resource sharing within educational institutions.

While this study applied qualitative methods, future research could adopt a quantitative approach to evaluate the effectiveness of AI training programs. Pre and post-training assessments could be conducted to measure changes in teachers' utilisation and integration of AI tools in their practice. This approach would provide statistical evidence of the impact of different training methods and identify the most effective components of training that enhance the AI readiness. Additionally, it would be valuable to conduct an inductive study aimed at identifying new internal and external dimensions that influence the AI readiness of teachers in higher education. Such a study could uncover previously unrecognised factors that affect the integration of AI tools, thereby expanding the literature on AI readiness.

Appendix 1 Interview guide

Before each interview, the participants were informed and asked if:
- We are allowed to record the interview
  - The recording will only be held locally and not in any cloud
  - The recording will be deleted after transcribing
- They have the rights to not answer any question if they don't want to
- They have the rights to cancel the interview when they want to
- They can choose to be anonymous or not, if nothing is chosen, they will be anonymous.

Additionally, they were informed about who where are, where we came from and got a description about the subject.

Question nbr	Question in english	Questions in Swedish
1	What is Artificial Intelligence for you?	Vad är artificiell intelligens för dig?
2	Do you use AI in your work today? If not: Are there any areas where you think you possibly can use AI?	Använder du AI i ditt arbete idag? Om inte: Finns det några områden där du tror att du möjligtvis kan använda AI?
2.1 If yes	How do you feel AI has helped you with your work? • task • speed	Om ja: Hur känner du att AI har hjälpt dig med ditt arbete? Uppgift, hastighet
2.2 If yes	Do you feel AI have made your work more difficult or easier?	Om ja: Känner du att AI har gjort ditt arbete svårare eller enklare?
2.3 If yes	What areas do you use it in, and is there any other where you would like to use?	Om ja: Vilka områden använder du det i, och finns det något annat område där du skulle vilja använda det?
2.4 If no	Why don't you use AI today? • lack of top management support • lack of guidelines/instructions • lack of knowledge • fear of AI/ fear of doing wrong	Om nej: Varför använder du inte AI idag? brist på stöd från högsta ledningen, brist på riktlinjer/instruktioner, brist på kunskap, rädsla för AI/rädsla för att göra fel
3	Have you tried to use AI?	Har du försökt använda AI?
3.1 If yes	What types of AI have you explored/used?	Om ja: Vilka typer av AI har du utforskat/använt?
3.2 If no	Why have you not explored the use of AI?	Om nej: Varför har du inte utforskat användningen av AI?
4	How much knowledge do you have about AI?	Hur mycket kunskap har du om AI?
4.1	How would you consider your previous or gained knowledge about AI have contributed to your use?	Hur skulle du anse att din tidigare eller förvärvade kunskap om AI har bidragit till din användning?
5	How is your institution's view of the use of AI?	Hur ser din institution på användningen av AI?

5.1	Why do you believe they are pro/against?	Varför tror du att de är för/emot?
6	How do you regulate AI use?	Hur reglerar du användningen av AI?
6.1	Do you have any policies/guidelines?	Har ni några policyer/riktlinjer?
7	How do you inform colleges/students on how they shall use AI?	Hur informerar du kollegor/studenter om hur de ska använda AI?
8	Have you participated in any training programs focused on AI, and what was their impact on your teaching practice?	Har du deltagit i några utbildningsprogram fokuserade på AI, och vilken inverkan har de haft på din undervisningspraxis?
8.1 If no	Have you been investigating how AI works by yourself?	Om nej: Har du undersökt hur AI fungerar på egen hand?
8.2 If no	What type of professional development do you think is necessary for faculty to effectively use AI in their teaching?	Om nej: Vilken typ av yrkesutveckling anser du är nödvändig för att lärare effektivt ska kunna använda AI i sin undervisning?
9	Are there any other legal restrictions that prevent you from using AI as you want?	Finns det några andra juridiska restriktioner som hindrar dig från att använda AI som du vill?
10	What are the ethical aspects of implementing AI in your work?	Vilka är de etiska aspekterna av att implementera AI i ditt arbete?
11	What's your vision of future use of AI in your work?	Vad är din vision för framtida användning av AI i ditt arbete?
12	How do your students use AI in their work?	Hur tror du att dina studenter använder AI i sitt arbete?
12.1	Are you afraid of them using them irresponsibly?	Är du rädd för att de använder dem ansvarslöst?
13	Do you believe AI can personalize learning, and if so, how have you or would you implement this?	Tror du att AI kan personalisera lärande, och om så är fallet, hur har du eller skulle du implementerat detta?
14	Have you observed any changes in student engagement or learning outcomes attributable to AI tools?	Har du observerat några förändringar i studenternas engagemang eller lärande som kan tillskrivas AI-verktyg?
15	During the last 2 years, do you consider that you, your institution, and your students have the right tool available for successful use/integration/implementation.	Under de senaste 2 åren, anser du att du, din institution och dina studenter har de rätta verktygen tillgängliga för framgångsrik användning/integration/implementering.
15.1 If yes	What have been the key factors?	Om ja: Vilka har varit de avgörande faktorerna?
15.2 If no	What could have made it easier?	Om nej: Vad skulle ha kunnat göra det enklare?
16	Do you believe AI will replace work/change processes, and how in that case?	Tror du att AI kommer att ersätta arbetet/ändra processer, och i så fall hur?
17	Has AI been integrated in any existing educational technologies that you use?	Har AI integrerats i några befintliga utbildningsteknologier som du använder?
17.1 If yes	What challenges have you faced in integrating AI with other educational technologies?	Om ja: Vilka utmaningar har du stött på vid integreringen av AI med andra utbildningsteknologier?

| 18 | What long-term strategies should institutions implement to harness the benefits of AI effectively and stay ready for future advancements? | Vilka långsiktiga strategier bör institutioner implementera för att effektivt utnyttja fördelarna med AI och vara redo för framtida framsteg? |

Appendix 2 AI contribution statement

Tools: Chat-GPT 4, Whisper.

Degree of use:

Whisper has been used when transcribing the interviews, run locally on our computers.

Chat-GPT 4 has been used to get feedback on parts of the text. It has also been used for suggestions on synonyms and sometimes for suggestions on sentence refinement and academic language improvement however, these suggestions were always reviewed to keep the validity and quality of the thesis. It has also been used for translation of quotes from Swedish to English, but this has always been reviewed as well.

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