PERCEIVED INFLUENCE OF ARTIFICIAL INTELLIGENCE ON EDUCATIONAL LEADERSHIP'S DECISION-MAKING, TEACHING, AND LEARNING OUTCOMES: A TRANSCENDENTAL PHENOMENOLOGICAL STUDY

by

Mousa Abduljaber

Liberty University

A Dissertation Presented in Partial Fulfillment

Of the Requirements for the Degree

Doctor of Philosophy

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APPROVED BY:

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Abstract

The purpose of this transcendental phenomenological study was to understand and describe the perceived influence of Artificial Intelligence (AI) on educational leadership's decision-making, teaching, and learning outcomes as revealed by educational leaders at a group of secondary public schools in the Middle East. The theory guiding this study was the distributed cognition theory, as it shows the dynamics of human cognition and AI cognition, making it possible to understand the perceived influence of AI. As the study reflected on AI's past, present and, future, the central question that focused on this study is: How do educational leaders perceive the influence of AI on educational leadership decision-making, teaching, and learning outcomes? To establish how educational leaders perceive the influence of AI on educational leadership decision-making, teaching, and learning outcomes, a transcendental phenomenological approach was used to study the perceptions of educational leaders at a group of schools located in the Middle East. Transcribed individual interviews, focus group interviews, and a survey comprising 15 participants was conducted to collect data describing the perceptions of educational leaders. As the study reflected on AI's past, present, and future, it used a descriptive analysis underpinned by reduction, imaginative variation, and textual descriptions to show the perceptions of educational leaders about AI's on educational leadership's decision-making, teaching, and learning outcomes. There were four themes that emerged during data analysis: Critical thinking, decision-making, ethical concenrs, and grading and feedback. Emerging themes were analyzed using NVivo data analysis software. Overall, educational leaders perceived that AI would play a crucial role in the educational environment, impacting both themselves and the students.

Keywords: artificial intelligence, distributed cognition theory, educational leadership, critical thinking, decision-making

Dedication

Some of the fastest and slowest years of my life have been the ones I have had while pursuing my PhD. Even though I thought I would never be able to get past the challenges I faced, but managed to make it happen. I give thanks to the Lord for all of his blessings in my life and on this trip. I dedicate these pages to you, along with everything that follows. I could not be who I am today or where I would be without your touch, wisdom, and intervention. I am grateful that you gave me the strength I needed when I didn't have it on my own and trusted me with this journey. I never once would have imagined this before you put it in my heart. I will always cherish this testimony, and to be at this place seems incredibly spiritual.

Lastly, I want to express my gratitude to my dedicated wife, who has always stood by me. I will always remember our conversation in which I informed you that I wanted to pursue this dream, and you immediately said, "Go for it." I'm excited for the years to come when we can spend quality time together, create lasting memories, and expand our family. I appreciate your tolerance of me while I followed my dream.

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I can never express how much gratitude I feel for you, Dr. Eshelman, but know that I am sincerely grateful for your mentorship, insight, and direction along this journey. I appreciate you agreeing to act as my chair. Every email, conference call, question, and comment I received helped me become a better writer, learner, and researcher. You being my chair meant that I had someone interested in seeing me reach my full potential as well as succeed. I'm grateful that you did that for me and that you encouraged me to reach my full potential.

Lastly, I am grateful that Dr. Rogers is a member of my committee. Throughout this process, you have been such a good influence. Thank you so much for your involvement; without you, none of this would have been possible!

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List of Abbreviations

Artificial Intelligence (AI)

Career-based Technical Education (CTE)

Institutional Review Board (IRB)

Intelligent Tutor Systems (ITS)

Microsoft Teams (MS Teams)

Pedagogical Agents (PA)

Sustainable Development Goals (SDGs)

Teaching Assistants (VirtualTA)

CHAPTER ONE: INTRODUCTION

Overview

Wang (2021) indicated that artificial intelligence (AI) would automate at least 40% of educational leaders and teachers' tasks, yet only 12.5% were comfortable using AI (Xue & Wang, 2022). AI gained traction among teacher leaders during the Covid-19 pandemic (Lee & Han, 2021). The number of teacher leaders enrolled in AI-driven educational solutions grew twelvefold in 2020 compared to 2019, demonstrating teacher leaders' tendency to lean towards AI solutions and away from traditional educational approaches (Pantelimon et al., 2021). AI became pervasive in education and was used by schools and institutions of learning to enhance the quality of teaching, learning, and decision-making. The unprecedented rise in the use of AI in education related to the need to compensate for learning loss during the pandemic, indicating how AI was perceived positively (Ko et al., 2023). The rise of AI use in learning institutions when only 12.5% of educational leaders and teachers were more comfortable with it was paradoxical. The overreliance on AI affected students' learning behavior differently (Ko et al., 2023; Shaikh et al., 2022; Sok & Heng, 2023; Tawafak et al., 2022). Overreliance on AI allowed teacher leaders to understand the learning needs of individual learners, making it possible to make educational leadership, teaching, and learning decisions that favored the needs of individual students (Sok & Heng, 2023). AI-enabled decisions were associated with effective instructional strategies for teaching and learning environments for learners, critical for stimulating critical thinking among learners (Kasneci et al., 2023; Su & Zhong, 2022; Zhai, 2023). Equally, it was argued that overreliance on AI negatively influenced students' critical thinking (Bozkurt et al., 2023; Mhlanga, 2023). Students no longer use their minds to solve problems because AI automatically generated responses (Mhlanga, 2023). Students' tendency to

prioritize AI in completing assignments or solving problems undermined the development of their critical thinking skills (Kasneci et al., 2023). For example, students who tried to finish assignments in the last minutes of the deadline tended to use ChatGPT to create their work without using their thinking abilities. The habit limited students from using their analytical and thinking skills, which eventually made them poor critical thinkers. Since critical thinking skills played a critical role in students' academic and professional success, overreliance on AI might have led to other negative consequences, such as poor decision-making in their daily lives and a lack of creativity and innovation in their professional lives (Sok & Heng, 2023). Given the pivotal role played by critical thinking skills in students' academic and professional lives, it was essential to understand and describe how educational leaders perceived the influence of AI on the development of student's critical thinking skills. This chapter provided a historical, social, and theoretical background, the problem statement, purpose statement, significance of the study, research questions, and summary regarding AI in educational leadership's decision-making, teaching, and learning outcomes.

Background

Learning institutions increasingly used AI to enhance the quality of teaching, learning, and decision-making (Ahuja et al., 2023; d'Orville, 2020). The growing interest of institutions of learning in using AI could be traced across the years (Ng et al., 2023). Even before the outbreak of recent adversities such as the Covid-19 pandemic, the education sector globally confronted challenges such as inefficient handling of data, lack of effective teaching and learning tools, and slowed data augmentation to support efficient decision-making (Prahani et al., 2022). Digital education supported by AI had been instrumental in enabling learning institutions to address these challenges. In addition, AI allowed learning institutions to stay on course toward realizing

sustainable development goals (SDGs) amid the shocks caused by the COVID-19 pandemic (Singh et al., 2023). Institutions of learning today use AI to support and curate their digital teaching tools, learning solutions, and decision-making mechanisms, not as a short-term solution to compensate for learning loss during the pandemic period but as a secure and long-term solution to inefficiencies in teaching, learning, and decision-making (Baidoo-Anu & Ansah, 2023). AI allowed educational leaders to make better decisions informing the nature of teaching strategies and learning support resources to adopt to realize better learning outcomes for learners. Amid the progressive AI use among educational leaders, discourses regarding the potentiality of AI to negatively influence students' critical thinking were pervasive across the educational sectors (Mohammadkarimi, 2023).

Historical Context

Studies on AI use in education had recently increased (Chen et al., 2022). In the first two decades of the 21st century, AI education-affiliated articles rose steadily, indicating AI's high attention and appeal in education (Chen et al., 2022). In their analysis of AI publications in education covering half a century, Bozkurt et al. (2021) established that the number of AI publications in education steadily rose in the second decade of the 21st century. A sharp increase in AI-affiliated publications in education was witnessed between 2018 and 2019 (Chen et al., 2022). Bozkurt et al. (2021) projected AI education-affiliated publications to rise further due to the long-standing rise. The exponential rose in the use of AI in education during and after the Covid-19 pandemic attracted more scholars investigating AI in education than in any other field (Crompton & Burke, 2023). For instance, publications exploring AI in education rose 2-3 times in 2021 and 2022, the number of previous years, since 2016, contributing to making education

the most common field with AI-affiliated publications (28%), followed by computer science (20%) (Crompton & Burke, 2023).

The history of AI in education could be traced back several decades back, when Sidney Pressey invented the first teaching machine in 1924 (Namatherdhala et al., 2022). The machine worked to help learners find the correct answers to multiple-choice questions. Against this background, other machines were invented to support teaching and make learning more efficient. For instance, Skinner's teaching machine was created in 1954, marking the second step of AI in education (Namatherdhala et al., 2022). The Skinner machine embraced the idea that the human mind tends to change in response to external influences. Skinner's machine filled black spaces in areas students failed to answer correctly. The machine would ask another question if the student answered the question correctly. Such early efforts of using AI in education involved instructing or helping students answer questions correctly. Introducing or providing hints to students was to stimulate their critical thinking abilities. With the advent of improved technologies in recent years, the scale of AI usage in education had broadened. Systems that are as effective as human tutoring had been developed (Chen et al., 2020). The power of AI underpinned by algorithms had led to the development of equipment and devices that are so intelligent that they did not need to train for the next step (Injadat et al., 2021). Due to the high scalability of algorithms, extensive data sets had been augmented, leading to the development of AI technologies that improve the efficiency of teaching and learning.

Today, AI innovation in education had evolved from idealized laboratory applications to real-life learning with more complexity (Guan et al., 2020). In addition, companies that developed educational technology had created an individual adaptive learning system that had allowed schools to provide personalized learning services and an aided teaching system that had

made classroom environment management, assessment, and grading possible (Tilak, 2020). Due to technologies' interoperability and algorithms' ability to augment large data sets, analyze, and generate insights, Pantelimon et al. (2021) argued that AI technologies had been built to make school management and administration decision-making more effective and efficient.

Social Context

The perception of AI in education in society had evolved (Tilak, 2020). Initially, society viewed AI in society with a lot of skepticism and uncertainty. In the early stages of AI integration in education, educational stakeholders had feared its influence, leading to skepticism (Schiff, 2021). Some stakeholders had been concerned that AI would replace human educational leaders and teachers (Chan & Tsi, 2023). The prospect informed their delayed support for AI integration in education. Chen et al. (2022) had established that people had been against AI in education and other sectors because they had perceived automating jobs would lead to massive displacement and dismissal of people from their jobs. This had been based on the inherent thought that the role of education is to create jobs (Chen et al., 2022). As such, people had perceived that introducing AI in education was unnecessary as it would undermine the very essence of education. In their quantitative survey of sectors affected by AI, Espina-Romero et al. (2023) showed that jobs in the educational sector had been among those affected by AI. The perception of the negative influences of AI in education and proof of AI's potential to cause job loss and displacement had been responsible for the uneven support it had received from society (Zhu et al., 2020).

The negative perception of AI in education had also been fueled by the belief that it dehumanized the learning environment (Kassymova et al., 2023). AI tools that supported teaching, learning, and decision-making in schools did not have human characteristics (Aberšek

et al., 2023). Instead, these tools were more like robots. The effect of using such tools had been that, with time, they could make students lose their social and emotional attributes, hence becoming dehumanized (Culp, 2020). The dehumanization aspect of AI had undermined the development of students' critical thinking skills (Bozkurt et al., 2023). Critical thinking entails considering the human social and emotional attributes in solving a problem (Bozkurt et al., 2023). As with human teacher leaders, concerns had also been raised about AI tools' inability to win students' trust and respect (Kaya & Bulut, 2022). Students may have taken AI tools less seriously because they may have failed to display some vital human characteristics. In addition, society and educational stakeholders had questioned AI algorithms' bias, fairness, transparency, and accountability (Reiss, 2021).

Amid this skepticism and negative perception, AI had equally been received with excitement, given that it had demonstrated its potential to enhance the learning experience, personalize education, and provide additional support to teachers and school administration (Kelly et al., 2022). AI systems currently used in schools and institutions of learning were perceived to be intelligent in almost all areas, including emotional and external aspects of humans, in that during problem-solving, they switched appropriately between different types of intelligence (Flogie & Aberšek, 2022). Educational stakeholders increasingly acknowledged AI systems' ability to be aware of the socio-emotional environment of individual students and proactively execute human touches to address the student's emotional needs. AI was a support system for emotional intelligence (Kaur & Sharma, 2021). The recently developed dynamic AI could capture and evaluate human non-verbal cues such as facial expression, tone of voice, and posture and subsequently react appropriately to derived human emotions such as anger, fear, or happiness (Kaur & Sharma, 2021).

Theoretical Context

The theory that guided this study was the distributed cognition theory. The distributed cognition theory, which emerged in the 1990s, postulated that cognition is not confined to an individual's brain as earlier thought (Hutchins, 2020). Cognition was seen as distributed across individuals, artifacts, and the environment (Hutchins, 2020). Various scholars had investigated the appropriateness of the distributed cognition theory. Aarset and Johannessen (2022) investigated the distribution of cognition informing the designing of an AI system for adaptive learning. The study concluded that designing AI systems for adaptive learning should consider internal cognition and external interaction processes between the learner and the expansive learning environment. An AI system for adaptive learning should have followed human teacher practices whereby human teacher leaders considered both the students' internal cognition and behaviors about the external environment. However, the scale to which AI systems should support adaptive learning should have been massive to overcome the challenges human teacher leaders faced. Chen and Huang (2021) recognized that the teacher no longer influenced learning at that time. Focus had significantly shifted toward the learner in what was described as adaptive learning or student-centered learning (Xue & Wang, 2022). Sajja et al. (2023) argued that AI systems such as Virtual Teaching Assistants (VirtualTA) directed learners to relevant resources based on their strengths and learning needs, enabling them to develop a deeper understanding of the subject, independent learning, and critical thinking skills. VirtualTA had created an interactive and engaging learning environment, reducing the cognitive load on students by providing easy access to information and facilitating knowledge assessment (Sajja et al., 2023). Easy access to information and knowledge assessment opportunities enabled learners to think critically. In addition, VirtualTA generated quizzes and flashcards that stimulated students'

critical thinking. Nalbant (2021) argued that AI had a huge potential to enhance learning. Supporting adaptive learning effectively required expanding the vision and taking a more holistic view of learners' cognition, which included the whole learning environment, which was possible mainly through AI for adaptive learning. Human teacher leaders had not been able to transcend the expansive learning environment so that learners had been subjected to understanding their cognition (Bolander et al., 2023). AI for adaptive learning utilized cognition within the learning environment and cognition distributed across the extended learning environment, which had been crucial in establishing and spreading awareness regarding learners' abilities, strengths, and weaknesses. Availing learners with distributed awareness of the learning environment prepared them to engage in critical thinking (Sajja et al., 2023).

The core argument for AI use in education had rested on the belief that educational leaders have a more holistic view of learners' cognition when using AI (Chen et al., 2020). AI had allowed educational leaders and teachers to understand internal and external interaction processes associated with learners, allowing them to develop programs to address students' individual learning needs (Kim et al., 2022). The collaboration between teachers and educational leaders has improved the quality of learning outcomes (Kim et al., 2022). Learning outcomes, in this case, refer to better critical thinking skills for learners (Ibna et al., 2022). Educational leaders and teachers sensed a more significant loss of control over students' learning needs when using traditional teaching approaches that had broadly leveraged their cognitive abilities, which had been limited, to establish the learning needs of every student (Lameras & Arnab, 2021). Educational leaders and teachers had not been able to utilize cognition within the learning environment and cognition distributed across the extended environment because their cognition had not matched AI's (Siemens et al., 2022). To understand students' minds and extended

learning environments toward making appropriate decisions to improve students' learning outcomes, educational leaders and teachers had required the support of AI (Luckin et al., 2022). As the learning environment has become vast and more complex, educational leaders and teachers had continued using AI to understand students' learning needs, develop appropriate teaching methods, and make proper decisions to improve learning outcomes (Sushama et al., 2022).

Seo et al. (2021) had explored the influence of AI on students and teachers in online learning. The study argued that interactions had been essential in realizing successful online learning. Apart from supporting personalized teaching and learning, online learning powered by AI has allowed educators to mediate challenges experienced by learners in the learning process. Educators had been able to intervene and help learners experience personalized learning because AI has helped them augment individual learners' challenges or shortcomings. Xue and Wang (2022) used the distributed cognition theory to underscore the need for AI for education and teaching. The study found that 52.1% of teachers had thought that AI had been beneficial to the professional development of teachers. However, the study did not explicitly shown how teachers had perceived the influence of AI on educational leadership decision-making, teaching, and learning outcomes.

Through AI technologies, cognition load has been reduced by providing simple and cognitive task systems, such as intelligent tutoring systems, which had been able to assess large volumes of data sets and ascertain and represent learners' knowledge to inform the required tutoring approaches or alternatives (Kuleto et al., 2021). Humans had not been able to process large volumes of data the way AI had. This has made AI appropriate in supporting decisions regarding learning and teaching activities in school. However, humans had been able to be

integrated into a decision-making loop involving large volumes of data to realize effective solutions to the learners' educational needs. Studies had envisioned AI to improve teaching, learning, and educational decision-making (Kuleto et al., 2021; Seo et al., 2021; Wang, 2022). However, these studies have not provided the lived experiences of educational leaders and teachers regarding AI use in teaching, learning, and decision-making. This study had given the lived experiences of educational leaders in using AI in educational leadership decision-making, teaching, and learning.

Problem Statement

The problem was that educational leaders' overreliance on AI technology negatively influences students' critical thinking (Sok & Heng, 2023). Given the convenience of using AI, students may used this technology to complete assignments or coursework without using their critical thinking skills. Overreliance on AI had been argued to influence students' development of critical thinking skills negatively (Bozkurt et al., 2023; Dieterle et al., 2022; Kasneci et al., 2023; Mhlanga, 2023; Sok & Heng, 2023, Zinchenko et al., 2022). Bozkurt et al. (2023) speculated that AI overreliance could undermine critical thinking since AI models learn from each other, causing singularization in the diversity of information. Zinchenko et al. (2022) argued that relying heavily on AI technologies could lead students to depend on them overly. The result could make students lazy and eventually undermine their critical thinking skills. Dieterle et al. (2022) argued that it is unethical for educators and students to make decisions informed by AI technologies without training on using and interpreting them. With knowledge of AI technologies' background and working principles, it became easier for students to think critically.

Jamal et al. (2023) recommended that medical educators incorporate digital literacy and critical thinking awareness in the curriculum to prepare students to thrive in AI environments by

understanding how to develop critical thinking skills. Encouraging students to question and analyze information provided by AI helps improve students' critical thinking. On the other hand, Park et al. (2021) argued that AI does not outrightly reduce or increase students' critical thinking skills. The study claimed that coaching and encouraging students to apply AI ethically can improve their critical thinking (Park et al., 2021). Bozkurt et al. (2023) argued that AI technologies can potentially manipulate the educational landscape. AI models controlled or trained by others transmit the same manipulation in learning, teaching, and decision-making. AI models that support all aspects of learning, teaching, and decision-making, including critical thinking and problem-solving, are formularized to address only limited aspects of the educational landscape (Kim et al., 2022). On the contrary, Ali et al. (2021) showed that AI can allow students to think critically to identify fake information or misinformation. The existing literature on digital media literacy equipped students with knowledge that enabled them to think critically about what they saw online (Ali et al., 2021).

Purpose Statement

The purpose of this transcendental phenomenological study was to explore and describe the shared experiences of 15 educational leaders at a group of schools in the Middle East in their interactions with AI, specifically focusing on how AI influenced their decision-making, teaching, and learning outcomes. At that stage in the research, the perceived influence of AI on educational leadership decision-making, teaching, and learning outcomes was generally defined as learning, teaching, and decision-making outcomes associated with AI, such as critical thinking, student-centered learning, and learner-centered decisions. The theory guiding this study was the distributed cognition theory, as it showed the dynamics of human cognition and AI cognition, making it possible to understand the perceived influence of AI. Educational leaders

had been encouraged to embrace AI in education (Camilleri, 2023). Xia et al. (2022) showed that educational leaders used AI to support student learning, teaching, and administration. In student learning, educational stakeholders used AI to make decisions informing the nature of personalized tasks and monitor student progress in adaptive tasks. Personalized tasks informed by AI allowed educational leaders to improve students' critical thinking skills. Educational leaders increasingly used AI to identify personalized learning tasks to improve students' critical thinking skills because they acknowledged that they were essential in the 21st century (Ibna et al., 2022). In addition, educational stakeholders encouraged educational leaders to allow AI in teaching and learning because AI-based instructions helped students learn critical thinking skills (Ibna et al., 2022). In teaching, educational leaders used AI to provide adaptive teaching strategies.

Significance of the Study

The goal of AI in education was to enhance the learning experience, optimized teaching approaches, and improved educational outcomes for students and educators (Chen et al., 2020). However, critical thinking was an important learning outcome in AI usage in teaching, learning, and decision-making. Some studies had argued that AI improved students' critical thinking skills (Kasneci et al., 2023; Su & Zhong, 2022; Zhai, 2023). On the other hand, concerns had been raised about the propensity of AI to influence the development of students' critical thinking skills negatively (Bozkurt et al., 2023; Dieterle et al., 2022; Kasneci et al., 2023; Mhlanga, 2023; Sok & Heng, 2023; Zinchenko et al.,2022). Given that critical thinking skills were integral in allowing students to learn other skills, it is essential to understand and describe how educational leaders perceived the influence of AI on the development of students' critical thinking skills. Understanding and describing educational leaders' lived experiences regarding AI's influence on

students' critical thinking skills was essential because AI is an evolving technology; hence, it was tracked to provide up-to-date insights to enhance the theoretical, empirical, and practical perspectives.

Theoretical

The study aimed to contribute to literature focusing on the distributed cognition theory. By understanding and describing how educational leaders perceived the influence of AI on the development of students' critical thinking skills, it became possible to construct distributed cognition. First, the study showed how educational leaders used AI to optimize distributed cognition in a joint cognitive learning environment, which required feedback from students and the extended learning environment. The distributed cognition feedback covered aspects related to students' learning needs and learning abilities as well as the state of the students and the extended environment to inform appropriate educational leadership decisions.

Second, the study explored to contribute to educational leaders' teaching, learning, decision-making areas, and prospects for using AI to distribute cognition through cognitive offloading. Cognitive offloading entailed delegating thinking tasks to AI tools or technologies (Grinschgl & Neubauer, 2022). Today, people overly relied on AI technologies or tools to support their daily work and learning. For example, many people used AI-enabled smartphones or smartwatches to track environmental or body metabolism changes and make informed decisions. In such instances, individuals delegated cognition to smartphones or smartwatches and refreshed their knowledge by reviewing the smartphones or smartwatches (Armitage, 2020). The present study focused on educational leaders to show how they offloaded information to AI tools and technologies and refreshed their cognition by accessing knowledge and insights provided by AI tools and technologies. The present study also aimed to provide insights into how AI

technologies and tools empowered educational leaders via offloading so that they could deploy AI's cognition and insights strategically instead of relying on memorized facts or information.

Third, the present study sought to contribute to the theory by finding new ways educational leaders communicated with different parts of the learning environment (Armitage, 2020). In this case, the learning environment encompassed the school or learning institution and its collaborators. Grinschgl and Neubauer (2022) indicated that AI saved individuals' internal cognitive resources by distributing task demands into the environment. The study sought to determine how educational leaders leveraged AI to protect their internal cognitive resources. This study's theoretical part explained how educational leaders used AI to generate learning, teaching, and decision-making reflections.

Empirical

An unprecedented rise in the usage of AI in educational contexts characterized the last decade (Ahuja et al., 2023). AI technologies became part of learners' and educators' everyday lives. The rapid increase in the usage of AI in educational contexts followed the hype associated with its ability to augment and learn processes quickly. Following the rise in the use of AI, various studies investigated what to expect as learning and teaching institutions continued to adopt it in supporting their activities. Ibna and Oteir (2022) recommended that teacher leaders guide students in using AI to prevent them from using it in ways that could undermine the development of their critical thinking skills. Chan (2023) argued that AI might lead to a decline in students' critical thinking as they increasingly relied on it to solve problems. Chan and Lee (2023) argued that some educational stakeholders believed that overreliance on AI could harm students' critical thinking. The potential for AI to negatively influence students' critical thinking influenced some universities to ban the use of AI in teaching and learning in their academic

programs. For example, Chan (2023) indicated that 8 out of 24 universities in the UK Russell Group declared the use of AI in teaching and learning in its academic programs misconduct. Other universities worldwide rushed to review the use of AI in their educational programs to ensure the development of critical thinking skills among learners was not interfered with (Wood, 2023). Bozkurt et al. (2023), Chiawa (2023), Dieterle et al. (2022), and Zinchenko et al. (2022) predicted AI would enhance the learning experience, optimize teaching approaches, and improve educational outcomes, including students' critical thinking for students and educators. The current study gathered evidence from the lived experiences of educational leaders to show the perceived influence of AI in educational leadership decision-making, teaching, and learning outcomes, including students' critical thinking skills. The current study was an empirical study that aimed to address the relationship between AI and students' critical thinking skills and how educational leaders perceived the influence of AI on educational leadership decision-making, teaching approaches, and learning strategies that influenced the development of students' critical thinking skills. AI was an evolving technology. Understanding AI's usefulness and influence on critical thinking required consistent tracking of emerging trends and developments regarding its use. This study provided up-to-date empirical evidence regarding AI's usefulness in educational leadership's decision-making, teaching, and learning.

Practical

Various studies had hypothesized that overreliance on AI in educational contexts could be problematic in improving teaching and learning outcomes and the quality and efficiency of decision-making. For instance, Cukurova et al. (2020) postulated that with its ability to automate repetitive and monotonous tasks, AI in education can help students and educators avoid cumbersome tasks through standardization. Overreliance on AI may be problematic to students

as it may reduce their critical thinking skills (Sok & Heng, 2023). Given the convenience of using AI technologies such as ChatGPT, students used them to complete assignments or answer questions without using their critical thinking skills. Overrelying on AI had been argued to undermine the development of essential skills, including critical thinking skills, among students (Kasneci et al., 2023). The present study aimed to understand and describe the perceived influence of AI on educational leadership decision-making, teaching, and learning outcomes. Educational leaders used the insights from the present study to regulate students' use of AI to limit its threat to developing critical thinking skills.

Research Questions

To understand the perceived influence of AI on educational leadership decision-making, teaching, and learning outcomes, it was essential to understand educational leaders' perceptions regarding AI's influence on their decision-making while implementing educational leadership, teaching, and learning activities. Describing and seeking an understanding of the perception of educational leaders about the influence of AI on educational leadership decision-making, teaching, and learning outcomes required research questions that sought answers essential in clarifying how educational leaders perceived the influence of AI on educational leadership decision-making, teaching, and learning outcomes. The following research questions helped provide insights regarding the educational leaders' perceptions of the influence of AI on educational leadership decision-making, teaching, and learning outcomes.

Central Research Question

What are the experiences of educational leaders in utilizing AI in educational leadership decision-making, teaching, and learning outcomes?

Sub-Question One

What are educational leaders' experiences with AI and distributed cognition, particularly concerning their involvement in educational leadership decision-making, teaching, and developing suitable learning environments?

Sub-Question Two

What are the educational leaders' experiences with the application of AI in education and its relation to the quality of teaching and the development of effective learning environments? environments?

Sub-Question Three

What are educational leaders' experiences with AI and its influence on the development of critical thinking skills among students?

Definitions

1. *Algorithms* - These are rules or instructions designed through computer programming that automate educational tasks and solve complex educational problems (Mahesh, 2020).
2. *Apriori* - Apriori is an iterative algorithm that profiles a candidate by calculating the specific length of an item collection associated with a candidate to produce frequent item sets of the candidate (Singh et al., 2021).
3. *Educational leadership decision-making* - These processes factor educational beliefs, values, and previous experiences in making decisions that allow educational activities to progress (Wang, 2021).
4. *Eightfold Robot* - Robots that make decisions based on rubrics and standards informed by individuals or team goals (Nathan et al., 2023).

5. *Gradescope* - This web-based tool grades students' work and provides flexible feedback regarding their abilities (Amos et al., 2021).
6. *Ideal algorithm* - Ideal algorithm is an AI algorithmic framework that makes predictions based on bounded rationality, considering only available data while ignoring external factors affecting outcomes. (Loftus et al., 2022)
7. *Intelligent Tutor System* - An educational technology that helps students or learners acquire knowledge and skills using intelligent algorithms that learn about their learning needs and instantiates the required approaches and principles to address them (Ashfaque et al., 2020).
8. *Interoperability* - is the ability of different systems, devices, or software applications to communicate, exchange data, and work together effectively (Bouzerzour et al., 2020).
9. *Ivy tool* - This is an interactive visualization tool that can monitor the behavior of a student or an individual (McMillan & Padon, 2020).
10. *K-Nearest Neighbours* - This machine-learning algorithm classifies tasks based on their nearest neighbors (Cunningham & Delany, 2021).
11. *Leverage* - This means using something to maximize advantage (Chen et al., 2020).
12. *Perception* - Refers to how people regard, understand, or interpret AI (Chounta et al., 2022).
13. *Perceptron algorithm* – The Perceptron algorithm is an AI algorithm that separates data points from different classes to identify patterns and make predictions (Tsai et al., 2020).
14. *Skepticism* - Refers to casting doubt towards claims, arguments, or beliefs. Skepticism involves questioning and critically examining ideas and information instead of accepting them without scrutiny (Schiff, 2021).
15. *Supermind* - Refers to a group of individuals acting together intelligently (Cook et al., 2021).

16. *Supra-individuals* - Refer to individuals who possess superior cognitive properties compared to others within a group (Hutchins, 2020).
17. *Tableau* - It is a data visualization software that allows users to analyze and visualize data from different sources (Batt et al., 2020).
18. *Virtue ethics* - This approach to ethics treats morality as the central asset that shapes society (Reiss, 2021).

Summary

AI in education emerged as a concept that garnered significant scholarly attention in recent years. While studies demonstrated the positive impact of AI in education, concerns arose regarding its potential to diminish students' critical thinking, posing significant challenges that could deter AI adoption in education. Ethical and regulatory efforts in the field may need to prioritize addressing current AI issues in education over future concerns to ensure a balanced approach. This chapter presented the background of the problem, highlighting the urgency and necessity for a comprehensive study to determine whether the identified AI challenges are exaggerated or pose a substantial threat to AI integration in education.

CHAPTER TWO: LITERATURE REVIEW

Overview

AI in education received significant scholarly attention recently (Nah et al., 2020). Studies have explored how different educational stakeholders, including educational leaders and students, leveraged AI data augmentation, analysis, processing, and intelligence abilities to improve educational leadership decision-making, teaching, or learning outcomes. Equally, studies raised significant AI setbacks, derailing its comprehensive adoption in educational leadership decision-making, teaching, and supporting learning activities. This chapter reviewed studies on AI in education to understand the current state of knowledge, identify gaps, and contextualize the research. The chapter encompassed an illustration of the distributed cognition theory and its relevance to the present study, a review of the application of AI in education, AI affordance in education, the influence of AI on educational leadership decision-making, setbacks of AI on educational leadership' decision-making, and a chapter summary.

Theoretical Framework

According to Wang (2021), the distributed cognition theory stated that cognitive processes are not solely linear. Cognitive processes occurred beyond the human mind, whereby cognition considered information and details dispersed across people, environments, social spaces, artifacts, and the evolving time (Wang, 2021). During the 1990s, Edwin Hutchins developed the theory of distributed cognition. Edwin Hutchins sought a more stable theoretical problem-solving treatment in actual work situations. According to Hutchins (2020), distributed cognition holds that humans had limited cognitive resources, making automated technology necessary to spread awareness. Hutchins (2020) indicated that people worked in environments characterized by a distribution of mental labor. Cognitive labor in such environments did not act

independently of each other. In one way or another, cognitive work interacted with others to create a meaningful or complete workplace. Learning shifted from individual learning to collaborative learning to overcome the limited nature of the human working memory. While learning new information or performing complex tasks, individuals experienced cognitive load. The need to overcome or bypass the challenge of cognitive load influenced individuals to embrace collaborative learning, postulating that individual knowledge could be applied to collaborative learning.

Against this background, Hutchins (2020) argued that creating a meaningful and complete workplace environment required mediating between multiple distributions of cognitive labor to overcome the limitations of the human mind. This mediation process required human interaction, leading to supra-individuals' emergence (Hutchins, 2020). Supra-individuals possessed superior cognitive properties than others within a group (Hutchins, 2020). Supra-individuals were responsible for mediating data and outcomes from various sources of cognitive labor to improve the overall operations of an organization or institution. However, multiple studies investigated supra-individuals' viability in mediating cognitive labor distribution. Some studies argued that the ability of human interactions to mediate cognitive labor was limited (Bignetti, 2021; Rezaei et al., 2021; Secchi & Cowley, 2021). Rezaei et al. (2021) demonstrated that supra-professional competencies in managing workforce interactions required technology, especially regarding remote interactions. The study postulated that supra-individuals must meet the threshold needed to mediate human interactions on an expanded scale and remotely, especially regarding the rigidity of the mind and the requirements of managing big data. Secchi and Cowley (2021) showed that treating individuals as supra or the starting point of sociological thought yielded a one-sided or unsatisfactory view or understanding of society or phenomenon.

The human mind could not efficiently process the complex human psyche, societal structure, and human history at all times or for extended periods (Bignetti, 2021). Rezaei et al. (2021) showed that supra-individual attempts to augment outcomes of the division of cognitive labor only sometimes led to structured aggregation of individual cognition. Structured aggregation of individual cognition depended on how organized the division of cognitive labor was among members (Bignetti, 2021).

In analyzing an individual's memory storage and retrieval abilities, Ortega-de San Luis and Ryan (2022) established that restabilization of the memory or memory retrieval only opened for a few hours in what is referred to as the "reconsolidation window," During this window, different interventions might weaken or strengthen the original memory. Ortega-de San Luis and Ryan (2022) also illustrated that information allocation to the memory was characterized by competition between eligible neurons during memory encoding. For instance, memory traces among suitable neurons may compete to control a person's behavior during retrieval. As such, the study postulates that mediating distributed cognitive labor through human interaction can be unreliable in supporting effective decision-making. In demanding work environments, it became challenging for the human mind to comprehend everything due to daily interactions with people and material equipment. Making sense of cognitive interactions between the present and the past was crucial for understanding culture and finding solutions to problems (Arnseth & Solheim, 2023). Zhang et al. (2021) suggested linking the present with the past helped humans make better decisions. However, these interactions imposed a cognitive load that exceeded human capabilities. Colom et al. (2022) proposed a computational architecture with high storage and retrieval capacity to address this limitation. The distributed cognition theory aligned with this idea and paved the way for adopting AI in education to overcome human cognition limitations.

This study was positioned to significantly contribute to the distributed cognition theory by delving into the intricate dynamics of the complete learning environment. By doing so, it sought to offer a comprehensive understanding and description of how educational leaders perceived the influence of AI on educational leadership decision-making, teaching, and learning outcomes. This research aimed to illuminate the multifaceted interactions between educational leaders and AI technologies by exploring distributed situational awareness. It aimed to uncover how these leaders harnessed AI tools to enhance their decision-making processes and influence the quality of teaching. Additionally, it investigated how AI contributed to creating effective learning environments and its role in fostering critical thinking skills among students.

Related Literature

Multiple studies on the influence and potential of AI in education had been conducted. These studies provided various perspectives on AI's influence on education. The influence argued by previous studies encompassed the positive and negative influences of AI in education. Other studies explored the promises and projections of AI's future influence on education. This section explored the extent of knowledge about the influence of AI on educational leadership decision-making, teaching, and learning outcomes and the missing links or available gaps, informing the need for further research. The review synthesized previous studies' findings to address the literature's limitations and gaps.

AI is a multifaceted field that encompasses developing computer systems and algorithms capable of performing tasks that typically required human intelligence. These tasks included problem-solving, learning from data, natural language understanding, and pattern recognition. AI had found applications across various domains, extending beyond education. In non-educational settings, AI had played a transformative role in healthcare, finance, manufacturing, and more

sectors. Its applications range from diagnostic medical tools and financial risk analysis to autonomous vehicles and industrial automation. Understanding AI's diverse applications beyond education was pivotal for grasping its potential influence and adaptability in different contexts, including educational leadership decision-making, teaching, and learning outcomes. This knowledge was foundational for exploring how AI could contribute to educational leadership and student learning experiences.

Applications of AI in Education

Previous studies explored the use of AI in educational administration, learning, teaching, and assessment. Xia et al. (2022) emphasized the importance of investigating the role of AI in integrating administration, learning, teaching, and assessment for effective educational leadership decision-making. The study established that AI led in connecting administration, learning, teaching, and assessment toward realizing informed educational leadership decision-making. Ouyang and Jiao (2021) identified three paradigms of AI application in education. The first paradigm highlighted using AI to guide learners through knowledge representation models. Chusni et al. (2022) postulated that knowledge representation models enhanced students' critical thinking skills. The second paradigm focused on AI's role in supporting collaborative learning. Alharbi et al. (2022) argued that collaborative learning developed students' critical thinking skills. The third paradigm emphasized AI's ability to empower learners by allowing them to take charge of their learning. Ibna Seraj Oteir (2022) showed that allowing students to identify and create their learning paths contributed to developing critical thinking skills. Ouyang and Jiao (2021) recommended future research to examine the influence of AI on pedagogy and teaching methods. The study also emphasized the importance of iterative development of AI in data-driven actions and personalized, learner-centered learning to advance AI in the educational

sector. Schroeder et al. (2022), in their investigation of the influence of AI-generated courseware, found that AI-generated courseware promoted student engagement, leading to better learning outcomes. Schroeder et al. (2022) also established that AI-generated courseware allowed teachers to monitor and identify students struggling with course content. However, the study did not investigate the influence of AI-generated courseware on educational leadership's decision-making, teaching, and learning outcomes..

AI Affordances

Teng et al. (2022) demonstrated that AI had the potential to analyze data and deliver a better understanding of the concept under inquiry. The data-driven decision-making model proposed by Teng et al. (2022) had a performance ratio of 97.62% and a decision-making level of 95.51%. Jaiswal and Arun (2021) argued that teacher leaders used AI technologies, such as recommendation systems, to make decisions. The ease with which AI made decisions allowed teacher leaders to have more time to assess and enhance the development of critical thinking skills in students (Jaiswal & Arun, 2021). Kung et al. (2023) postulated that ChatGPT could undertake comprehensive reasoning to support effective decision-making. ChatGPT could complement human cognitive effort to realize practical critical thinking (Kung et al., 2023).

Wang (2021) established that AI could help educational leaders make decisions regarding streamlining teaching and improving learning outcomes. AI tools such as chatbots provided educational leaders with data that allowed them to make informed decisions regarding the learning needs of the students. For example, chatbots engaged with learners in real-time, collecting data regarding their learning needs. Educational leaders used data provided by such AI tools to profile students' learning needs and subsequently inform the degree of personalized learning required by the students. Clancey and Hoffman (2021) showed that AI technologies,

such as intelligent tutoring systems, could predict students' learning needs. Educational leaders depended on such predictions to make informed decisions regarding teaching and learning approaches that could lead to improved learning outcomes, such as critical thinking skills. Wang (2021) also pointed out the viability of AI to support decision-making processes in the administration of learning and teaching processes.

Wang (2021) indicated that AI would automate at least 40 percent of educational leaders' and teachers' tasks today. Cox (2021) argued that AI could reshape the modes of providing instructions to learners by making instruction provision efficient and giving educational leaders and teachers enough room to align learning instructions to the individual needs of learners. The study showcased how AI could revolutionize classroom management tools by making personalized learning possible. Holmes and Tuomi (2022) showed that AI could help educational leaders and teachers with customized instructions to address the individual learning needs of every student. Xhomara (2022) argued that personalized learning could contribute to developing students' critical thinking skills.

Similarly, AI received equal attention in education leadership. Wang (2021) projected that educational leaders would adopt AI as they increasingly became more competent in utilizing it for more complex decision-making tasks. Having been used in classroom activities such as instruction provision, Wang (2021) argued that it was just a matter of time for school administrations and management to use AI in decision-making. Chiawa (2023) indicated that educational management was a complex task. Educational management was a sophisticated task characterized by multifaceted fields requiring various skills and knowledge. Realizing effective educational management required considering leaders, teacher development learners' welfare, assessment, budgeting, and resources needed to realize positive learning outcomes. With the

limited human cognition, Chiawa (2023) hypothesized that learning institutions would have no option but to turn to AI to address complex decision-making tasks, especially those associated with the demanding learning and teaching needs of contemporary education. Ghamrawi et al. (2023) found that AI could enhance the quality of teacher leadership by making it possible for educational leaders and teachers to personalize teaching, develop curriculum, automate administrative tasks, and engage in professional development.

Adopting AI in education had become a habit or a custom for most people as AI had been considered revolutionary (Nemorin et al., 2023). AI supported with big data could provide students with individualized learning experiences. Colleges, universities, and other educational institutions could leverage the potential of AI to improve their processes if they tried new approaches to utilizing AI (Chan, 2023). AI's accessibility and affordability had brought hope for learning institutions such as colleges and universities to improve the quality and efficiency of learning and decision-making processes (Stone et al., 2022). Limna et al. (2022) provided reasons for AI education and its recognition from learning and teaching institutions. The study indicated that AI was favored in education for increasing productivity, making personalization of learning possible, and making learning and administration more flexible as decisions could be quickly made to support proactive action. Nemorin et al. (2023) showcased that the small degree of AI implemented in learning and teaching institutions today provoked what might be possible when AI use was intensified in education. The study postulated that even though schools or learning institutions may not access fully effective AI technologies in the next few years, adopting AI could set a course in that direction. AI-driven education platforms and apps gave educational leaders and teachers opportunities to holistically engage with learners, allowing them to understand the needs of their learners. Understanding learning needs guaranteed the

development of critical thinking skills among students (Park et al., 2021). Baena-Rojas et al. (2023) argued that robot teachers were favored to help solve the problem of the shortage of teachers, which had become a global issue. The study argued that schools and other education stakeholders positively perceived robot teachers since mood changes, anger, and tiredness did not limit them to humans.

Different positions had been made regarding the ability of AI to support students' critical thinking. Ibna et al. (2022) argued that AI could trigger students into critical thinking. AI-based instructions promoted open-mindedness and self-confidence in students, enabling them to improve their critical thinking skills (Ibna et al., 2022). However, AI technologies in education to date, other than simulations, game-based learning, and virtual reality, could not support the development of critical thinking skills in students because they focused more on basic levels of learning, such as memorization (Bates et al., 2020). AI did not allow the development of higher-order skills in students, which were critical for critical thinking and problem-solving (Bates et al., 2020). Ibna et al. (2022) argued that enhancing students' critical thinking skills required educational leaders and teachers to have advanced thinking skills, technology engagement skills, and socio-emotional engagement skills. Equally, Bates et al. (2020) argued that most educators believed developing critical thinking skills in a digital age required a more learner-centered and constructivist approach. Kasneci et al. (2023) argued that AI simplified the acquisition of information, enticing students to forego conducting their investigations, hence undermining the development of critical thinking skills. Kasneci et al. (2023) recommended that educational leaders raise awareness of AI limitations and incorporate critical thinking activities into teaching and learning to help students develop these skills.

Influence of AI on Educational Leadership Decision-Making

A review of related literature projected the positive influence of AI on educational leadership's decision-making, teaching, and learning outcomes. Schools and institutions of learning adopted AI in teaching, learning, and decision-making because they proved to be more efficient than humans. AI use in education decision-making was evident in administration (Chen et al., 2020). Educational leaders used AI to perform administrative tasks that consumed much of their time to make decisions quickly. AI was a decision support system that enabled educational leaders to make decisions efficiently..

Improved Decision-Making

Several studies, such as Conati et al. (2021), Jaiswal and Arun (2021), and Teng et al. (2022), examined the influence of AI on education. Conati et al. (2021) conducted a case study on intelligent tutoring systems, investigating the application of AI in supporting human decision-making using multimodal data. The study explored predictive and transparent AI models to enhance decision-making processes. The study emphasized the need for educational institutions to adopt AI technologies alongside human intervention for effective decision-making. Jaiswal and Arun (2021) found that educational teacher leaders used AI systems to gain insights into students' performance to inform them about customizing their teaching methods. Correspondingly, Teng et al. (2022) investigated the usage of AI in making strategic decisions within higher education institutions. The study showed that AI allowed higher education institutions to make strategic decisions efficiently.

Wang (2021) asserted that decision-making was the foundation of educational leadership. Owing to the significance of decision-making in educational leadership, educational leaders aspired to find proactive and effective ways to come to conclusions that yielded the best possible outcomes for learners and all educational stakeholders. With the advent of AI, educational

leaders had a window through which they could streamline their decision-making processes. Wang (2021) postulated that AI could make better decisions than a combination of school leaders and organizational members. Given the projected limited biases of AI technology in educational leadership decision-making, studies recommended the need for educational leaders to use AI in decision-making (Chen et al., 2020; Wang, 2021). AI reduced bias by following preset rubrics and benchmarks in generating data instead of humans, who might be influenced by assumptions, preconceptions, prejudice, or experience (Chen et al., 2020). AI in educational leadership decision-making presented superior qualities to human power, making it easy to make informed and comprehensive decisions (Sadiku et al., 2022). Wang (2021) explored human thinking toward decision-making, arguing that humans were prone to making biased decisions, especially how the human brain picked sides based on assumptions, preconceptions, or past experiences without considering existing realities. In addition, humans found it challenging to analyze incoming information and balance the functionality of the attention, memory, motivational, cognitive, and emotional systems. Wang (2021) argued that such biases or challenges could not happen with AI. AI embodied enormous computational power to aggregate large data sets, analyze them, and generate evidence-based decisions. With this ability, studies recommended that educational institutions adopt AI in decisions. However, they must complement it with human intervention because human judgment was superior to AI in making value-based moral decisions (Xiong, 2022).

The most important aspects of educational leadership involved making effective decisions for the organization's growth (Wang, 2021). In addition, the educational leaders' ability to nurture the relevant stakeholders' participation in the decision-making process determined the educational organizations' success. The rise of emerging technologies and their connection to

effective decision-making attracted the attention of many researchers, with some exploring the role of AI in educational institutions' decision-making (Buçinca et al., 2021). For instance, Infinite School utilized AI to automate tasks such as testing and grading in the student portal. The institution also used the Ivy tool to plan recruitment campaigns through collected data regarding potential candidates. An Ivy tool was an interactive visualization tool that could monitor the behavior of a student or an individual (Chen et al., 2021).

The educational leaders' collaborative decision-making theme was evident in the literature. For instance, Wang (2021) sought to investigate the contribution of AI to educational leaders' decision-making models. The findings revealed that school administration might encounter complex problems, such as the design and execution of school policies and procedures and the hiring of teachers, which required an extra budget and time to tackle. However, Wang (2021) noted that adopting AI-powered robots such as Eightfold and Ideal could speedily sort applicants' resumes, track applications, and identify more qualified applicants. Eightfolds were robots that made decisions based on rubrics and standards informed by individuals or team goals (Nathan et al., 2023).

On the other hand, Ideal was an AI algorithmic framework that made predictions based on bounded rationality, considering only available data while ignoring external factors that could affect outcomes (Nathan et al., 2023). The ability of such AI technologies to quickly analyze the applicants' qualifications made it easy for the school principal to decide on the qualified candidates. Therefore, AI technology significantly saved time and resources that would have otherwise been consumed in the lengthy decision-making procedures during the teachers' recruitment. These findings were supported by Supriadi et al. (2021), who established a link between AI technology and improved decision-making among. These authors illustrated digital

assistants AI used to automate educational leaders' tasks such as assessing job candidates' body language or word choice, making it easy for the school principal to select the most suitable candidate from the job interviews.

Academic experts reiterated the importance of collaborative decision-making in the educational process. The emergence of AI and its potential to enhance fast and effective decision-making made the technology quite critical in educational leadership (Alam, 2021). The findings by Wang (2021) matched those of Alam (2021) on the improved collaborative decision-making AI brings. The author noted that educational leaders utilized AI algorithms to quickly source and process large amounts of data to support teachers in successfully adopting the planning cycle to boost educational programs and practices. For instance, the K-Nearest Neighbors algorithm has been used to predict technological changes in educational programs, allowing educational administrators to implement necessary measures in preparation for the changes. For example, Egalia, a Sweden-based school, successfully utilized the K-Nearest Neighbors algorithm to predict the shift from physical to online classes. The data enabled the school administrator to make data-informed decisions regarding resource allocation towards the online student and teacher portal. Supriadi et al. (2021) reported that Egalia School was among the first schools that ensured the continuity of studies during the COVID-19 pandemic.

Prinsloo's (2020) findings aligned with the findings of Wang (2021), especially concerning how AI aids in making informed decisions. Wang (2021) affirmed that AI possessed abilities that allowed educational leaders to have appropriate real-time results to make binding decisions. With the ability to collect, process, and analyze massive data sets in real-time or near real-time, AI could allow teachers to channel their time into other necessary activities to improve teaching and learning outcomes. With school leaders prioritizing data-driven and evidence-

informed decision-making, struggles with combining, analyzing, and realizing accurate results for better decision-making were common in schools. School or educational leaders encountered complex situations when compounded with the analysis of numerous data sets, generating data-driven, evidence-informed decisions that became unattainable. This was about the inability of school leaders, as humans, to maneuver complex organizational systems that demanded enormous cognitive capabilities. Wang (2021) emphasized the shortcomings of human capabilities by arguing that school leaders' cognitive capacities were finite and could be limited in supply. Jarrahi et al. (2022) agreed with the analogy by claiming that executing cognitive functions involving complex data sets or tasks in the human brain was metabolically expensive. Given that cognition was a finite resource, subjecting it to intensive data analysis toward reaching data-driven, evidence-informed decisions undermined the brain's ability to make better decisions in subsequent decision-making processes. In addition, education leaders encountered new information and insights each day. Meeting and holding further information in memory limited the brain's cognitive ability. In the long run, this approach to decision-making often took a toll on education leaders.

Jarrahi et al. (2022) postulated that educational leaders could leverage the potential of AI technology to overcome the challenges they faced in analyzing big chunks of data toward making data-driven, evidence-informed decisions. AI had been backed to solve this challenge courtesy of its superior computational and analytical capabilities. Wang (2021) indicated that AI embodied excellent capabilities for handling big data sets toward delivering data-driven, evidence-informed decisions with room for increasing computational and analytical capabilities to handle the ever-growing data due to the growing demands for quality education geared toward realizing transformational and instructional leadership as well espousing the values of justice,

care, equity, due process, care, empathy, compassion, and critique in school environments. In addition, AI technologies promoted educational leaders' decision-making regarding budget and resource allocation. According to Salamzadeh et al. (2022), the Perceptron algorithm could identify administrative departments that required increased or decreased capital and resources. For example, the perceptron tool could establish that more funds were needed to hire teachers and fewer funds for research and development in a given financial year. Therefore, educational administrators became in a position to make informed decisions regarding budget and resource allocation. Chiawa (2023) argued that AI helped educational managers and leaders effectively budget and manage a school's financial resources. Education managers and leaders opted for AI because it was open to fatigue-related setbacks. AI algorithms worked without restrictions, allowing educational managers or leaders to access insights critical to making informed decisions.

Improved Teaching and Learning Outcomes

The learners were the essential stakeholders in the education process. Therefore, educational leaders must devise structures and systems that enhance students' teaching and learning outcomes. AI's potential to improve teaching and learning outcomes had attracted the attention of some researchers who had delved into the connection between the two variables (Yilmaz, 2021). Chen et al. (2021) sought to determine the effect of AI technology on instruction and learning. The study provided a case example of US-based educational institutions whose teachers utilized the Gradescope AI technology to grade the learners' assignments and provide instant feedback, leading to improved teaching and learning outcomes such as better grades and high student satisfaction. A similar study by Yilmaz (2021) revealed that Gradescope helped educational leaders curb exam cheating by enforcing time limits and concealing test questions.

The purpose of reducing exam cheating was to ensure students developed critical thinking skills in solving problems in the 21st century (Yilmaz, 2021). The author reported a 75% satisfaction rate for teacher leaders using Gradescope in testing and grading the learners' results. Chen et al. (2021) reiterated that educational leaders should provide funds to acquire the AI grading system, such as the Gradescope, for improved teaching and learning outcomes.

Similarly, Vincent et al. (2021) reiterated that AI technologies such as the Apriori algorithm could be used as automatic data-tracking software to improve administrators' understanding of teachers' and students' needs as they generate association rules for teachers' and learners' data. The authors claimed that educational leaders could utilize the Apriori tool to identify areas where teaching was impractical or the subjects in which the learners struggled. In addition, the Apriori tool helped educational leaders to understand the students' learning disabilities as it compared learning disabilities and their peers' learning progress. Therefore, educational administrators established measures to address the highlighted problems, like initiating individualized learning programs. These findings matched those by Yilmaz (2021), who discovered that educational leaders might utilize AI-generated data to identify the student's learning behaviors, such as difficulty in solving complex mathematical problems or answering comprehension questions, thus adopting necessary interventions like self-paced programs. Yilmaz (2021) provided an illustration of college principals using AI-generated data from the students' database to identify learners from poor socio-economic backgrounds for grant provision. The author noted that such initiatives might improve the students' teaching and learning outcomes.

In addition, AI made personalized learning possible (Chiawa, 2023). In most cases, learners were not always at the same level in comprehending coursework or related learning

activities because of their unique abilities (Minn, 2022). Personalized learning allowed educational institutions to teach learners according to their needs (Davies et al., 2020). AI could create personalized learned paths based on the individual needs and preferences of the students. Chang et al. (2022) showed that personalized learning significantly improved students' critical thinking. Othman (2023) indicated that educational leaders or teachers could use AI-powered chatbots to provide students with special needs hints or support structures that guided their learning processes. AI chatbots could also help students engage in activities outside the classroom (Othman, 2023). Chatbots provided instructional guidelines to students with special needs, enabling them to participate in activities outside the classroom (Jaiswal et al., 2021). Educational leaders or teachers could leverage the power of AI by using it to customize their teaching methods, curricula, and methods to align with the needs and preferences of each learner. Ibna Seraj and Oteir (2022) argued that AI instructional approaches could improve students' critical thinking.

AI could also support adaptive learning and learning analytics—Taylor et al. (2021) associated adaptive learning with enhanced critical thinking skills. Joshi et al. (2021) indicated that adaptive learning and teaching were equally important aspects of education. AI enabled educators to develop adaptive learning in line with the individual needs of learners. AI allowed educators to establish pedagogical agents (PA) to aid students in adapting to learning processes. With the inherent capabilities of AI, educators could change curriculum tasks and complex teaching tasks or create interfaces depending on the individual needs of the learners. Raj and Renumol (2022), in their synthesis of adaptive learning technologies, indicated that adaptive learning dynamically adjusted to the individual's abilities or skill attainment by providing course content it was sure they could handle. Through AI, adaptive learning technologies understood the

dynamic needs of learners, informing them to develop individual learning programs that supported learners' engagement to maximize their potential. With the demanding educational needs in contemporary society, adaptive learning had become necessary for coping with the increasing complexity of problems that required solutions. Joshi et al. (2021) affirmed adaptive learning as an essential resource in enhancing the quality of education as it primarily focused on learners' behaviors, achievements, and learning preferences. For example, educators could use intelligent tutor systems with adaptive training to enable learners to solve complex tasks independently. Mousavinasab et al. (2021) asserted that it could support adaptive learning about learners' emotions and behaviors and identify a learning style specific to every learner that enabled them to adapt to the learning environment.

Equally, Naujokaitienė et al. (2020) associated learning analytics with improved students' critical thinking skills. Learning analytics helped educational leaders assess students' course learning outcomes. Guzmán-Valenzuela et al. (2021) established that educational leaders and institutions could use learning analytics to develop insights about student's performance and progress regarding the learning process to know areas to provide support to enable students to succeed. Wang et al. (2023) agreed with the ability of AI to support decision-making through learning analytics. The study argued that AI algorithms could make decisions by referring to domains of knowledge that encompass learners' background knowledge, knowledge level, and motivation, and the specific features of learning activities such as questions, feedback prompts, and recommendations. Salas-Pilco et al. (2022) pursued how AI supported decision-making in managing teaching and learning activities in schools and teaching and learning institutions. The study established that AI supported decision-making with the help of data mining technologies. Data mining made knowledge-based systems and decision support systems possible where data

mining techniques developed content that highlighted the behavior of learners in tandem with acceptable or preferred teaching and learning standards to ensure decisions were made in the best interest of the learners.

Various studies had indicated that AI could help promote critical thinking among students. Jaiswal Arun (2021) argued that using AI tools gave educational leaders and teachers more time to evaluate students' critical thinking skills. However, the study collected its data from educational experts and vendors. Though the study presented an optimistic view of the influence of AI on educational leadership's decision-making, teaching, and learning outcomes, obtaining data from educational leaders would have provided a holistic view of the value of AI in educational leadership's decision-making, teaching, and learning outcomes. Qadir (2023) argued that technology could be used to promote critical thinking skills. The study argued that technology could promote critical thinking skills under direct instruction. For instance, computer simulations were appropriate alternatives that allowed educational leaders and teachers to cultivate critical thinking skills in students. Cooper (2023) also examined the influence of AI, particularly ChatGPT, in education. The study indicated that ChatGPT could improve students' critical thinking when used responsibly. The study's only limitation was that it collected data from media studies. The present study collected data from primary respondents directly affected by AI usage in the educational environment.

Shin (2021) postulated that AI had the potential to promote critical thinking skills. The study examined AI's attributes that enabled it to support critical thinking. However, the study did not investigate how AI was perceived by its primary users. Zhai (2022) argued that AI could improve learning outcomes, including critical thinking skills among learners. However, the potential of AI was undermined by the inability to prepare teacher leaders for AI-enabled

education and the lack of policy directives for sustainable development. Liang et al. (2021) investigated the role of ICT integrated with AI in supporting critical thinking in young pupils. The study found that AI gave teacher leaders opportunities to facilitate the cognitive activities of their pupils. Even though AI solutions were relatively rare, Holmes Tuomi (2022) asserted that some educational establishments had used them for years. For instance, new classrooms in the United States were equipped with AI technologies to make personalized learning more effective. Cities such as Chicago, New York, and Washington DC had adopted AI-powered technologies in new classrooms aiming to help teachers and educational leaders in school to provide instructions responsive to learners' abilities and assess their skill levels daily using algorithms that targeted specific learning content and subject learners to varying instructional modes based on their learning needs and preferences (US Department of Education, 2023). The use of AI in teaching and learning had also become increasingly visible in China (Xin & Ruppar, 2022). For example, Beijing University provided its students with intelligent speech recognition systems that instantaneously converted instructor's verbal communication into subtitles on a large screen. Other countries were also increasingly adopting AI technologies to ensure that teaching and learning institutions treated students fairly by using AI-powered tools to tailor the coursework to learners' needs and preferences (Aggarwal, 2021). For example, some countries had allowed schools and learning institutions to use AI to teach learners with spelling difficulties and attention deficit hyperactivity disorder (ADHD).

Use of AI to Streamline Meetings

An additional approach in which AI enhanced the learners' outcomes included educational leaders' use of AI technologies to streamline meetings in which the relevant stakeholders discussed students' learning problems. Rospigliosi (2023) reiterated that some

educational leaders had used AI technologies such as ChatGPT to streamline meetings by summarizing meetings' minutes, thus deriving the stakeholders' insights for enhancing the learning processes. For instance, educational leaders might have used insights from ChatGPT-summarized meetings to address the learning materials and resources shortage, like increasing budget allocation for acquiring such materials.

Moreover, AI technologies also enhanced the teaching and learning outcomes by enhancing the educational leaders' ability to address the learners' deviance and inappropriate behaviors, thus improving the school's discipline. Rospigliosi (2023) illustrated the educational leaders' use of the tableau tool to identify patterns in students' behavior and provide visualizations that enhanced the administrators' choice of the best remedial measures to correct the indiscipline at the college level. The tableau tool may also have offered recommendations that the educational leaders could adopt to improve the overall school discipline. Stark and Hutson (2021) argued that physiognomic AI could infer people's character, capabilities, and social status based on physical and behavioral characteristics. Teacher leaders would have used physiognomic AI to understand students' mental capacities toward providing student-centered learning in teaching and education. In addition, teacher leaders would have used physiognomic AI technologies, such as remote proctoring technologies, to detect cheating and suspicious behaviors among students (Silverman et al., 2021).

Setbacks of AI on Educational Leaders' Decision-Making

The adoption of AI in education came with its share of setbacks. Previous research indicated that AI in education disrupted the value of traditional teaching, learning, and decision-making methods, leading to a renewed emphasis on human intelligence to support critical thinking and effective decision-making. These setbacks shadowed AI's tendency to improve

educational leadership's decision-making and promote students' critical thinking. The section derived insights from previous literature to present setbacks that justified existing contestations regarding the influence of AI on educational leadership's decision-making, teaching, and learning outcomes. Such contestation informed the need to study how educational leaders perceived AI's influence on educational leadership's decision-making, teaching, and learning outcomes.

Some studies disputed the potential of AI to realize efficacy in educational leadership decision-making. For instance, Farrell et al. (2022) discussed the ability of AI to support effective educational leadership by reiterating that AI integration might result in distorted decision-making based on the AI design. The author claimed that there was a high likelihood for the AI decision-making processes to fail to reflect the desired organizational outcomes, especially when the AI was poorly designed. The findings revealed that not all AI technological forms generated positive effects regarding educational decision-making. For instance, the Ideal algorithm might have generated misleading data for educational leaders regarding recruitment processes since it was trained on resumes submitted by male applicants. As a result, the Ideal recruiting tool might have generated data that demonstrated bias against female applicants (Wang, 2021). Sallam (2023) argued that ChatGPT could generate inaccurate content that could present negative consequences. The primary concern when ChatGPT caused inaccurate content was that it led to incorrect decisions (Sallam, 2023). According to Wang (2021), AI required thorough scrutiny before educational leaders could adopt the technology into the institution's decision-making system. As a result, the authors recommended that educational leaders decide which processes should employ human decision-makers to avoid disrupting the decision-making structures within the educational institution

Ethical Concerns

AI may not have understood learners' emotions, making it challenging to meet the emotional needs of such students (du Boulay, 2022). In addition, assigning AI to perform tasks that involve students' welfare may have backfired due to their intricate nature (Ng et al., 2021). The complexity of meeting the intrinsic needs of learners also cast doubt on the efficacy of AI in education (Lim et al., 2023). Furthermore, potential disruptions from external actors may have undermined the effectiveness of AI in education (Córdova & Vicari, 2023). Consequently, there was a need to ensure that the integration of AI in education was done responsibly and ethically (Kooli, 2023).

AI evoked ethical concerns regarding its inability to reflect significant virtues valued by society. Adamas et al. (2023) argued that AI could not guarantee virtue ethics. Virtual ethics were unguaranteed because only a portion of datasets that were representative of society were used to create algorithms that supported AI technologies, making them susceptible to biases and, subsequently, unable to reflect society's ethical virtues (Akgun & Greenhow, 2021). Previous studies indicated that AI in education was characterized by biases, influencing schools to postpone its adoption. Tippins et al. (2021) established that AI-based tools and technologies raised ethical concerns around bias, interwoven with privacy and fairness concerns. Kassymova et al. (2023) demonstrated the propensity of AI to elicit privacy and fairness concerns in education by arguing that there were no reliable mechanisms that guaranteed users' safety of their personal information and data. The recent headline news and debates regarding data breaches and the security of stakeholder data and information had made schools more aware of AI's damage vis-à-vis its benefits before adopting it (Dieterle et al., 2022). While AI could be designed to augment cybersecurity practices, experts argued that it could also be used offensively to increase attempts to bypass security.

Chiawa (2023) agreed with the findings of Wang (2021) and Krupiy (2020) by arguing that bias and discrimination were some of the most significant challenges of AI application in education leadership decision-making. Unlike other studies, Chiawa (2023) explored how AI in educational leadership decisions was associated with bias and discrimination. Chiawa (2023) indicated that AI algorithms could replicate and amplify existing biases and discrimination, increasing inequality and injustice in the education sector. Surveys conducted in the past regarding the propensity of AI to cause bias and discrimination had turned positive. For instance, Amazon suspended using AI in hiring employees because it perpetrated gender bias in recommending hiring because men made more applications than women (Amazon, 2023).

Other concerns had been raised regarding the efficacy of AI in educational leadership decision-making. Chiawa (2023) cited more transparency and interpretability as major concerns against adopting AI in educational leadership decision-making. Lack of transparency and interpretability may have arisen from the complex structure of algorithms, making it difficult for non-experts to understand. Wang (2021) agreed with Chiawa (2023) by arguing that educational leaders and teachers found evaluating and identifying potential errors or biases of AI challenging due to the complex structure of algorithms. With such obscurity, stakeholders in the educational sector could have found making informed decisions based on AI challenging. Huang (2021) conformed to this analogy by arguing that educational leaders' and teachers' knowledge of algorithms' functions may have been limited since they lacked expertise. Sharma et al. (2021) also established that AI tools must have been trained in a specific environment to yield desirable results. Failing to prepare AI tools in environments where they were supposed to find, collect, clean, and curate data made it challenging for educational leaders to utilize end data to make decisions.

AI and the Influence on Student's Critical Thinking

The increasing consciousness of the importance of critical thinking among students was responsible for the slow pace at which learning institutions embraced AI (Benvenuti et al., 2023). Institutions of learning were mindful of the importance of critical thinking in supporting effective decision-making. Zhang Chen (2021) argued that critical thinking skills could be used to make decisions and solve problems. Critical thinking skills enabled students to generate and select alternatives, restate problems, and prioritize goals. Since problems and goals were morally binding, it was difficult for technology to promote critical thinking among students. In their investigation of the influence of ChatGPT on the values of nursing education, Abdulai and Hung (2023) found that ChatGPT could not enable nursing students to solve nursing problems that demanded critical thinking and personal judgment, even if the ChatGPT technology was designed to learn, reason, or mimic human cognition. For the inability of ChatGPT to enable students to solve problems, Hung (2023) proposed the need for educational leaders to encourage students to prioritize analyzing and evaluating information, synthesizing knowledge from various sources, and applying their understanding against relying on ChatGPT interpretations to make decisions. On the other hand, Abdulai and Hung (2023) emphasized the need for nursing students to undertake contextualized and individualized decision-making to address patients' unique needs and nonlinear health circumstances.

In their investigation of the development of educational leaders' professional competence, Sutiani (2021) argued that critical thinking was a crucial factor in increasing the quality of education. However, many people, including educational leaders, had to acknowledge that critical thinking was natural. Despite the knowledge of the need for intensive mental activities in driving critical thinking, many people remained skeptical of this cognitive process that should be

natural, goal-oriented, and controlled. In describing educational leaders' professional competence, which was critical in improving the quality of education, Benvenuti et al. (2023) highlighted self-competence as one of the significant professional components a teacher must have. Self-competence entailed adequately understanding one's social and professional environment and mastering technologies to overcome experienced disruptions. Self-competence was a considerable resource that underlined educational leaders' professionalism.

Nevertheless, many educational leaders and teachers needed to pay more attention to it at the expense of technologies they deemed capable of generating relevant insights for decision-making. Pizzi et al. (2021) asserted that the primary concern raised against AI technology was that it undermined sustainable value creation and lowered human control. Seo et al. (2021) found that educational leaders were worried that relying too much on AI technology might compromise the ability of students to learn independently, think critically, and solve problems. Human educational leaders and teachers ignored their abilities and delegated most teaching tasks to artificial teacher leaders. AI-powered education needed models that stimulated critical thinking in students by exposing them to methods. In their investigation of the application of ChatGPT in medical, dental, pharmacy, and public health, Sallam et al. (2023) argued that a significant limitation of ChatGPT application was its potential to suppress the development of critical thinking skills. Educators became overly reliant on ChatGPT or other AI technologies to the extent that they failed to integrate active learning and independent activities in instructions, which were crucial for stimulating critical thinking among students. Wang et al. (2023) emphasized the problem of overly relying on AI technology by arguing that the technology could potentially lower an individual's professional skills, especially when human thinking was highly required. The practice where educational leaders overly relied on AI technology may degrade

their professional skills. Consequently, students who depended on such degraded skills tended to develop poor critical thinking skills.

The Cause of Students' Overreliance on ChatGPT and Its Effect on Critical Thinking

Abdulai and Hung (2023) argued that overreliance on ChatGPT caused a gradual reduction in critical thinking, wisdom, intuition, and practical judgment among students. ChatGPT made students lazy because it automatically generated answers or information. Students no longer thought through simple problems because they no longer applied critical thinking. The setback presented profound implications in training students for real-life problem-solving tasks and challenges. For example, effective decision-making, as in clinical settings where nursing students had to make sound judgments, required students to think beyond available data and information by including intuition, wisdom, tacit knowledge, and personal experiences (Tam et al., 2023). Park et al. (2021) emphasized the need to coach students on how to use AI in ways that could promote critical thinking. While comparing the effectiveness of teacher-written and AI-generated instructions for elementary students, Gattupalli et al. (2023) argued that teacher-written instructions encouraged students to think as they offered hints that allowed them to differentiate various aspects of learning. Teacher-written instructions were shorter, embodied a more friendly language, and were supported by visual and graphic images, animations, and gifs. These were critical in building a growth mindset in students that allowed them to persist in solving learning problems.

On the other hand, Gattupalli et al. (2023) argued that AI-generated instructions were text-heavy, making it challenging for students, especially at the early stages of mental development, to analyze and generate viable insights. Equally, Hicke et al. (2023) pointed out that AI discouraged critical thinking among students. The newly developed large language

models allowed students to generate information effortlessly. Relying heavily on AI supported by large language models negatively affected students' critical thinking and problem-solving skills (Kasneci et al., 2023). Large language models associated with AI simplified the process of acquiring answers or information, making students susceptible to laziness, which lowered their interest in conducting their research and developing their conclusions or solutions (Kasneci et al., 2023).

Eysenbach (2023) argued that after examining the latitude they had extended to AI technologies such as ChatGPT, many educators had become concerned about their potential to make students lazy, where they wrote research articles or essays automatically without understanding the content. Since AI technologies automatically created essays or wrote research articles, students did not see sense in employing their cognitive abilities to research, organize ideas, and write compelling essays or research articles. Ahmad et al. (2023) established that overreliance on AI technology limited an individual's brain's thinking capacity. As a result, individuals who overly depended on AI technology were susceptible to low thinking capacity. This development deprived individual intelligence and intelligence-seeking behaviors, making them more artificial. Simultaneously, the development starved the human brain's thoughtfulness. With thoughtfulness and intelligence, it became easier for individuals to think critically and problem-solve. Against this background, educators increasingly emphasized the value of human teacher leaders in influencing students to develop critical thinking skills. Formosa (2021) argued that AI technology threatened human autonomy, especially regarding how it undermined the human capacity to perform tasks they were skilled in or believed they could do. This elicited a knock-out effect, which demoralized or deprived humans of happiness and fulfillment. It also made humans lazy in all aspects that required thinking. Such an influence faced more than just

specific people. It also faced individuals in the education sector. Ahmad et al. (2023) indicated that teachers and students who used AI technology to complete tasks or assignments tended to develop laziness and interrupt thinking over time. Progressive addiction to AI technology and the resulting laziness tendencies and interrupted thinking undermined students' critical thinking.

AI technology was increasingly becoming a vital tool for decision-making in learning institutions. Technology helped educational leaders to make what they perceived as appropriate or informed decisions. Ahmed et al. (2023) argued that institutions produced large data volumes. For them to become more efficient by making good use of the large volumes of data they generated, institutions were adopting AI technology and reducing the involvement of humans in handling or interpreting data. In doing so, institutions harnessed more benefits and used less time to make data-backed decisions. However, the institutional pursuit of data-backed decisions had been accompanied by overwhelming human biological processes that lowered human cognition abilities. In addition to making humans lazy in critical thinking, Zinchenko et al. (2022) argued that AI technology had been associated with the fake production of realities. Students often became victims of AI technology manipulations, especially in how they made references or reflections to AI manipulations without considering other factors. Bozkurt et al. (2023) asserted that using AI as a teacher exposed individuals to many forms of manipulation. The downside of this development was that children or users of AI technology only got to see what they liked or what the technology constructed for them. Users of AI technology did not get to see other thoughts. This limited thoughtfulness as the information required to support critical thinking needed to be improved. In addition, AI technology as a teacher contributed to developing illusory ideas that polarized society. Imaginary ideas did not help critical thinking, which led to problem-solving.

The negative influence of AI technology on students' critical thinking was also studied based on the interpretation divide that it created. First, Dieterle et al. (2022) argued that educators and students needed to be included in understanding how AI technology and its underpinning algorithms analyzed data. Educators, students, or other users of AI technology only cited data provided by AI technology to justify decisions made. By staying out of the loop regarding how AI technology analyzed and interpreted data, educators and students were denied access to aspects that could stimulate critical thinking. Some educators and students needed to gain knowledge of interpreting AI technology-generated data. This missing link made it challenging for educators and students to think critically (Kohnke et al., 2023). Secondly, people with knowledge of AI technology functionalities regarding data handling might have been inert because they knew how to interpret data. However, they might have needed to know when or how to apply it (Ahmed et al. (2023). This equally needed to be improved in their critical thinking. Thirdly, AI technology undermined critical thinking among students and educators by routinizing interpretation procedures. This occurred when educators or students applied interpretation procedures without thinking through to establish whether it was the correct procedure for the situation in context because they had routinized the interpretation procedure. Reutilization of this kind limited students and educators from engaging in critical thinking. In addition, educators and students might have developed critical thinking skills while using AI technology when they knew how it interpreted data but needed more proficiency regarding its interpretive technique.

Further Issues with AI Use Regarding Critical Thinking

Other risks of educators' and students' usage of AI regarding critical thinking arose from either the limitations of the human mind or human confirmation bias (Dieterle et al., 2022).

Limitation of the human mind happened when educators or students knew something at one point but had forgotten it because they had yet to apply it. The sophistication associated with AI exposed students and educators to many instances of fragile knowledge due to the numerous data points involved that, in most cases, were limited in their application (Ahmed et al., 2023). Given the high degree of fragile knowledge, students and educators could not engage in AI-informed critical thinking (Nazaretsky et al., 2022).

The need for more emphasis in curricula regarding the essence of critical thinking in the age of AI contributed to a deteriorating essential thinking culture. Zhai et al. (2021) argued that although many people, including educators, knew the value of critical thinking, only a few practiced it. The adoption of AI by schools and institutions of learning made it hard for educators and students to practice critical thinking because it conveniently allowed them to solve and seek tasks efficiently. However, the tendency for AI to lower critical thinking habits among educators and students elicited a new approach to handling AI applications in educational settings. In considering the negative influence of AI on critical thinking and the benefits of AI in the educational setting, ways were suggested to improve critical thinking within the realms of AI application. Plebani (2023) emphasized the need for schools and institutions of learning to redesign the use of AI to stimulate critical thinking in students. For instance, the study indicated that developing computational thinking through robotics could help promote critical thinking in students. Currently, efforts to use AI to stimulate critical thinking are limited to laboratory experiments (Zhai et al., 2021). The intelligent virtual laboratory hinted to students, allowing them to solve complex laboratory experiments and learn from their mistakes progressively (Zhai et al., 2021). Equally, Tlili et al. (2023) emphasized the need for students to indulge their human intelligence when using AI technologies such as ChatGPT. While AI may require much technical

information, given the integration of large language models, it required students to have asking competence, realized through critical thinking, to realize the best results. While investigating the role of AI in medical education, Dave et al. (2023) argued that educators and students needed to design assignment questions to prioritize critical thinking skills rather than allow them to complete tasks quickly.

The Lack of Human Touch, Moral Ingenuity, and Data Privacy Concerns

Wang (2021) associated using AI in educational leadership decision-making with losing personal touch. Even though various advances had been incorporated into AI that allow it to real human emotions through facial expression or body language, Wang (2021) argued that such advancements could not show compassion or empathize with the challenges of others. Chiawa (2023) referred to the lack of personal touch in using AI in educational leadership decisions, marking it as dehumanization. Due to the lack of touch, AI has been viewed as a technology with a high propensity for irrational decisions about educational leadership decision-making. For educational leaders to realize better decision-making outcomes, Chiawa (2023) recommends that educational leaders strike a balance between the efficiency and effectiveness of using AI and understand the significance of human ingenuity in making moral decisions.

Concerns about data privacy and security breaches regarding AI adoption in educational leadership decision-making had also been raised. (Wang, 2021) indicated that AI in educational leadership decision-making may be targeted by cyber-attackers or unauthorized entry into school databases, undermining the privacy of learners and other educational stakeholders (Wang, 2021). Huang (2023) argued that the threat to the privacy of the information of learners and other stakeholders arises from the fact that leadership decision is made through accessing large amounts of data, including learners' personal information and the personal information of staff

and faculty members. Holmes et al. (2023) asserted that cyber attackers or people with ill-motive may target AI tools in education to get hold of high-value data associated with it, especially regarding learners' private information, to undermine the stakeholders' trust and confidence.

Another setback of using AI in educational leadership decision-making was that AI-generated decisions may run against moral-based decisions. Educational leaders arrived at moral decisions using a guide underpinned by values and what society considers morally right to navigate complex issues associated with decision-making (Flogie & Aberšek, 2022). AI technology could not make such moral decisions because moral values could not be reduced to data points (Wang, 2021). For educational leaders, embracing moral values was paramount, especially in promoting cooperation and equality in schools by prioritizing values of justice, due process, care, critique, community, and profession. With moral values as the foundation of decision-making, adopting AI in educational leadership decision-making may encounter resistance from educational stakeholders until the issue whereby AI leadership decisions ran over moral-based decisions is resolved. Xiong (2022) mirrored the aspersions of Wang (2021) by arguing that using AI in leadership decision-making might pose some challenges, especially in ethical and moral decision-making. Unless leaders changed their stance regarding ethical and moral stands, it may took longer for learning and teaching institutions to embrace AI as a tool for leadership decision-making. The incidences of AI conflicting with morals and societal values in decision-making may derailed the adoption of Al in educational leadership decision-making.

The Link Between AI and ICT Competence

ICT competence was crucial in the practical usage of AI in decision-making and critical thinking among educators and students (Benvenuti et al., 2023). ICT literacy enabled students and educators to analyze the quality of the interpretations generated by AI. Educators who knew

how AI functioned could create instructions that cultivated critical thinking in students (Lee et al., 2023). Some studies argued that there was an indirect link between teachers' and administrators' use of AI and improved teaching and learning outcomes. For instance, a study by Yuting et al. (2022) sought to establish a connection between AI and teacher leaders' information and communication technology (ICT) competence. The study found that educational leaders supported the adoption of AI in educational settings ICT because of the perceived competency they derived from it, especially regarding how AI helped them quickly identify appropriate teaching and learning requirements.

Fernández-Batanero et al. (2022) observed that teacher leaders' ICT competence improved teaching and learning outcomes through better grades, such as problem-solving and critical thinking skills. For instance, educational leaders may have allocated resources towards acquiring the Smart Teacher AI-based self-learning that allowed teachers to develop ICT skills such as video conferencing, thus enhancing content delivery. These findings also pointed toward important aspects of educational leadership since the principals provided funds for AI technology acquisition. Yuting et al. (2022) claimed that improved ICT competency, such as the ability to coordinate online project work, online testing, and grading using AI tools like Gradescope, usually boosted content delivery and positive teacher-learner interactions, which was critical in educational leadership's decision-making. In addition, AI-supported ICT enabled educational leaders to save time in decision-making. It collected and analyzed data on behalf of educational leaders, allowing them to make decisions quickly. Therefore, AI played a crucial role in the instruction and learning processes and consecutively resulted in improved teaching and learning outcomes such as enhanced instructor-learner interactions and academic performance.

Summary

Literature had shown that AI brought a transformational change in education. AI optimized distributed cognition to make sense of learning systems. Educational leaders using AI received feedback from the learner and the extended learning environment because AI's cognitive abilities were spread across the entire learning environment. Through AI, educational leaders made sense of interactions between students' cognition and the cognitive environment, allowing them to make informed decisions toward improving teaching and learning outcomes. Educational leaders delegated their cognitive tasks to AI technologies and tools because they saved their internal cognitive resources. Instead of using their cognitive resources, they relied on AI to make sense of the external learning environment and used it to streamline teaching, learning, and leadership functions. AI enabled educational leaders to provide quality learning environments and make strategic decisions critical to realizing better teaching and learning outcomes for learners. However, more information was needed about the overall influence of AI on educational leadership decision-making, teaching, and learning outcomes as perceived by educational leaders. The limitation of the literature was that it needed to provide educational leaders with a holistic view of the influence of AI on educational leadership decision-making, teaching, and learning outcomes. The literature had focused on AI's distinct changes and contributions in educational leadership decision-making, teaching, and learning outcomes. The changes and contributions were highlights that had shown AI's abilities, potential, and drawbacks that needed to clearly describe how educational leaders holistically perceived the influence of AI on educational leadership decision-making, teaching, and learning outcomes. In addition to the benefits and promises of AI, the study considered overreliance on AI technology and how it negatively influenced students' critical thinking to establish how educational leaders holistically

perceived the influence of AI on educational leadership decision-making, teaching, and learning outcomes.

The implication of critical thinking concerns raised by the literature was that it inferred that overreliance on AI limited students' critical thinking. Chan and Tsi (2023) found that AI prevented students from critical thinking. Students would instead use AI that provided effortless ways to solve problems rather than engage their intellectual and mental abilities. In addition, Chan and Tsi (2023) established that human teacher roles were irreplaceable. Human teacher leaders possessed unique abilities such as creativity, emotional intelligence, and personality that AI could not replicate or replace. The present study sought to contribute to the literature by describing the perceived influence of AI on educational leadership decision-making, teaching, and learning outcomes for 15 educational leaders at a group of schools in the Middle East. Secondly, the present study provided insights into how AI should be used in education to protect the development of students' critical thinking skills.

CHAPTER THREE: METHODS

Overview

The purpose of this transcendental phenomenological study was to explore and describe the shared experiences of 15 educational leaders at a group of schools in the Middle East in their interactions with AI, specifically focusing on how AI influenced their decision-making, teaching, and learning outcomes. The study used the qualitative transcendental phenomenological method to investigate the lived experiences of educational leaders. The chapter discussed the research design, questions, site, participants, research plan, positionality, interpretive framework, philosophical assumptions, researcher's role, procedure, data collection, data analysis, data synthesis, ethical considerations, and permissions. These sections and subsequent subsections were explained below.

Research Design

The present research employed a qualitative study with a transcendental phenomenological approach. The transcendental phenomenological approach was used to explore the perceived influences of AI on educational leadership's decision-making, teaching, and learning outcomes. The transcendental phenomenological approach allowed for an inquiry into and examination of the participants' experiences regarding a subject or phenomenon (Pilarska, 2021). This approach originates from traditional philosophical assumptions about phenomena that have evolved over centuries. Edmund Husserl is credited with significantly contributing to the evolution of the transcendental phenomenological approach by explicitly defining it in the early 20th century (Pilarska, 2021).

Contrary to positivism's absolute focus underpinned by objective observation of external reality as argued by traditional philosophical assumptions, Edmund Husserl considered and

prioritized people's perceptions or lived experiences informed by their consciousness as the object of study (Pilarska, 2021). According to Edmund Husserl, no assumptions, deductive reasoning, deductive logical procedures, or psychological speculations should form the object of study. Instead, the focus should be on what individuals or participants provide during the study.

Therefore, using the transcendental phenomenological method positioned the research at a vantage point to identify the perceived influence of AI on educational leadership's decision-making, teaching, and learning outcomes. The qualitative transcendental phenomenological method set the research on a path to access in-depth insights about the phenomenon under study. The method helped the research gather the participants' lived experiences regarding the influence of AI on educational leadership's decision-making, teaching, and learning outcomes. The lived experiences captured by this transcendental phenomenological method accurately revealed the perceptions of educational leaders regarding the influence of AI on educational leadership's decision-making, teaching, and learning outcomes.

Pilarska (2021) argued that handling lived experiences using the transcendental phenomenological approach is akin to evidence or proof collected by a natural scientist who discovers a dimension of reality previously unknown to individuals. Using the phenomenological approach allowed the researcher to access and use genuine and inner evidence provided by the participants. The researcher relied on the participants' input and revelations by describing their lived experiences and reflecting on how they perceived the influence of AI on educational leadership's decision-making, teaching, and learning outcomes. In addition, the transcendental phenomenological method put the researcher in constant inquiry, where the researcher's biases and preconceptions were analyzed and neutralized (Heinämaa, 2021). Using the transcendental phenomenological method in this research, the researcher stood apart, disassociating their

subjectivity or bias to inform how educational leaders perceived the influence of AI in educational leadership's decision-making, teaching, and learning outcomes.

Research Questions

Delving into the lived experiences of educational leaders regarding the use of AI in educational leadership, teaching, and learning outcomes required the researcher to employ research questions. The purpose of the research questions was to seek how educational leaders perceived the influence of AI on educational leadership decision-making, teaching, and learning outcomes. The research questions encompassed the central research question and sub-questions. The central research question identified the issue that this study sought to address. The sub-questions provided a focused and deeper inquiry into the issue this study aimed to address. The following research questions sought answers to how educational leaders perceived the influence of AI on educational leadership decision-making, teaching, and learning outcomes.

Central Research Question

What are the experiences of educational leaders in utilizing AI in educational leadership decision-making, teaching, and learning outcomes?

Sub-Question One

What are educational leaders' experiences with AI and distributed cognition, particularly concerning their involvement in educational leadership decision-making, teaching, and developing suitable learning environments?

Sub-Question Two

What are the educational leaders' experiences with the application of AI in education and its relation to the quality of teaching and the development of effective learning environments?

Sub-Question Three

What are educational leaders' experiences with AI and its influence on the development of critical thinking skills among students?

Setting and Participants

This section illustrated the sites where the research would be conducted and the study participants. The site entailed the context where the study was shown. The context embodied knowledge and resources that illustrated or described the influence of AI on educational leadership decision-making, teaching, and learning outcomes. On the other hand, participants were human subjects who participated in the study voluntarily. The participants for this study were educational leaders who provided feedback showing how they perceived the influence of AI on educational leadership decision-making, teaching, and learning outcomes.

Site

The site for the study was a group of secondary schools in the Middle East. The schools offered career-based technical education (CTE) in English at the secondary level and encompassed established secondary learning programs in engineering, aviation, health, and computer science. The Middle East was suitable for this study because many schools across the Middle East had taken digital learning to a higher level by introducing teaching, learning, and decision-making through AI (Aneela, 2023). The high AI adoption and use across schools in the Middle East followed government emphasis on digital innovations to prepare for future challenges. Countries such as the UAE emphasized schools to adopt and use AI to make it the most prepared country for AI. Saudi Arabia funded schools to adopt AI to create more sustainable societies.

The site entailed three schools, namely Sade School, Amr School, and Adnap School, in Ajal Academy, a group located in the Middle East. The given names were pseudonyms. Ajal Academy boasted of excellent educational staff qualified to lead the educational process of young learners while ensuring the achievement of the school's mission and vision. Each school had one principal, two vice principals, ten department heads, four counselors and social workers, and almost 100 teachers. The participants for this study came from educational leaders handling students between Grades 6-12. The school's administration consisted of teacher leaders who used data to lead or drive instruction. In addition, the school's educational staff consisted of teachers who used AI to instruct learners. Periodically, the teacher leaders assessed the quality, efficiency, and effectiveness of AI instructions by interacting with learners and teachers and participating in teaching.

Ajal Academy provided high-quality education to students, incorporating international educational standards and curricula. The group of schools encompassed grade 6 to grade 12 levels that focused on educating and shaping future generations (Aneela, 2023). More importantly, the group of schools provided teaching and learning services through AI. The teaching and learning services also included laboratories for AI. Over 5,000 students in those schools had studied using AI since last year (Aneela, 2023). The group of schools' AI use conformed to the digital educational system emerging in the Middle East. The study was conducted in the Middle East. The research focused on AI use in a group of schools. The group of schools had a great diverse teacher and leader population. The students were only local citizens. During 2023-2024 school year, The group of schools teacher demographics by race were: 72% White, 27% Black, and 1% Hispanic. The teachers and leaders ages in these schools were: Less than 30 year’s old – 15%, 30 to 50 year’s old – 65%, 50 to 55 year’s old – 15%, and

55 and up – 5%. In addition, 55% of these schools teachers and leaders were male and 45% were female.

Participants

The study participants included 15 educational leaders from a group of three schools in the Middle East using AI in teaching, learning, and decision-making. Educational leaders are educational professionals or administrators who exert, perform, direct, or influence interpersonal and group dynamics in teaching and learning environments to realize common or shared teaching and learning goals (Rodríguez-Feria et al., 2023). The participants were educational leaders with experience of at least two years of educational leadership and teaching with at least one year of experience using AI in teaching and decision-making. The sample comprised individuals aged 25 years and above, male and female speakers of English, with at least a Bachelor's degree in any education-related discipline. Even though there is no age variance in the way people leverage prior knowledge for learning new information (Brod & Shing, 2022), using 25 years and above participants was critical in bringing a holistic view of the perceived influence of AI since such participants may have used or interacted with traditional teaching, learning, and decision-making methods, and thus would provide well-informed responses of the perceived influence of AI on educational leadership decision-making, teaching, and learning outcomes. The total sample consisted of 15 participants. There were around 100 teachers in each school. They taught Mathematics, Biology, Chemistry, Physics, General Science, Art, Physical Education, Computer Science, Arabic, Islamic Studies, and English.

Recruitment Plan

The participants for this study came from educational leaders handling students between Grades 6-12 using AI in teaching, learning, and decision-making from the group of schools. The

study aimed to recruit 15 participants. The recruitment plan entailed generating contacts with the educational leaders. As the researcher, I communicated directly with the administration of the group of schools via email (See Appendix K) three months before the commencement of the study. The plan was to reach out to 50 potential participants and recruit 15 participants after obtaining IRB approval, inviting them to support the study. I solicited interest from the administration by highlighting the benefits it could derive by contributing to the study. For example, the administration could use the study findings to improve educational leadership decision-making, teaching, and learning outcomes. The researcher worked with the group of schools' administration to identify potential participants. The researcher used the criterion sampling method to identify potential participants. In this case, the potential participants were all educational leaders employed across the group of schools. The group of schools' administration was a reliable gatekeeper of potential participants. The group of schools' administration provided details of the potential participants regarding their educational leadership roles. The researcher examined the list and details (See Appendix M) provided to affirm or select potential participants relevant to the research objectives. The researcher used email addresses provided by the group of schools' administration to reach out to the potential participants, in this case, educational leaders. Through email, the researcher sent the recruitment letter (See Appendix B) and welcome letter (See Appendix C) introducing the study, its purpose and aim, and study requirements, including their personal and professional credentials, to the potential participants and guaranteed the security of their personal information and data.

The researcher conducted a screening exercise (See Appendix M) after establishing contact and identifying willing participants through their feedback. The researcher used inclusion and exclusion criteria to identify educational leaders suitable to participate in the study.

Educational leaders without at least two years of educational leadership and teaching, at least one year of experience using AI in teaching and decision-making, a Bachelor's degree in any education-related discipline, non-speakers of English, and less than 25 years of age were excluded from the study. The attrition process led to a sample of 15 participants. The researcher shared consent forms (See Appendix D) approved by Liberty University's Institutional Review Board (IRB) with the potential participants via email. The researcher clarified any issues raised or clarification sought by potential participants via email. Willing individuals shared their personal and professional credentials, accompanied by filled and signed consent forms via email for examination and approval.

Researcher's Positionality

What motivated me to study this topic is that recently emerged AI had become a potent tool that could aid educators in making decisions, teaching, and tracking and evaluating learning outcomes. In the past decade, multiple studies had investigated the influence of AI on education (Ahmad et al., 2023; Alam, 2021; Bozkurt et al., 2023; Wang, 2021; Xu & Babaian, 2021). Some studies had investigated the positive influence of AI technology in education; some had the negative influence of AI technology in education. In contrast, others had investigated AI's positive and negative influence on technology. Given that AI technology continued to evolve, it was essential to track emerging trends associated with it to provide up-to-date evidence that followed the perception of integral stakeholders using it in education.

Interpretive Framework

The interpretive framework used in this study was pragmatism. Pragmatism emphasized the investigation's activities, circumstances, and effects more than it does on the antecedent conditions (Wagenaar et al., 2022). The crucial component of the study was the issue being

examined and the questions being asked about this topic, not a concentration on methodology. This approach was perfect for my research because the objective reality of AI in teaching, learning, and educational leadership decision-making could equally be established through human experiences. The influence of AI could not be established once and for all. Human experiences remained critical in shaping the influence of AI in education.

Philosophical Assumptions

The purpose of this transcendental phenomenological study was to understand and describe the perceived influence of AI on educational leadership decision-making, teaching, and learning outcomes for 15 educational leaders at a group of schools in the Middle East. In seeking the perceptions of educational leaders, I did not use any form of speculation, whether scientific, empirical, psychological, or deductive, to inform the inquiry. Instead, I focused on what would be given by the individual educational leaders. Focusing on the inner evidence provided by the participants made the study more reliable. By focusing on what would be delivered by the participants, I was in an excellent position to define their consciousness, which was critical to learning the influence of AI on educational leadership decision-making, teaching, and learning outcomes.

Ontological Assumption

I described things or aspects depending on how I perceived or knew them. My thinking followed my perception or knowledge of a phenomenon or subject under inquiry, making it difficult for me to acknowledge the existence of a reality other than what I perceived or believed was true according to my knowledge. I used this order to describe reality in many instances that occurred in my life. For example, I made political decisions based on how I perceived politicians. I also used my knowledge of a subject or phenomenon to make conclusions. My

tendency to use perception or knowledge has only sometimes led to outcomes representing reality or the accurate picture of a phenomenon or subject under inquiry. To overcome this weakness, I first acknowledged that other people's knowledge and perception can supersede my knowledge and perception. Second, I kept the feedback the participants gave independent of my knowledge and perception about the perceived influence of AI on educational leadership decision-making, teaching, and learning outcomes. This opened me to new knowledge and information about the perceived influence of AI on educational leadership decision-making, teaching, and learning outcomes. Throughout the study, I assumed the role of a learner who needed to learn about the subject or phenomenon under inquiry.

Epistemological Assumption

I believed in multiple realities, each shaped by individual experiences and interactions. These distinct personal realities were constructed through individuals' mental processes to make sense of their unique encounters. This perspective recognized that the meaning and value of these realities were inherently subjective and influenced by individual interpretations and perspectives. Consequently, I acknowledged that other people, too, utilized their mental processes to construct the meaning and value of their realities, resulting in an assortment of diverse and valid perceptions of the world. In this study, I embraced the feedback given by the participants because it authentically revealed how they perceived the influence of AI on educational leadership decision-making, teaching, and learning outcomes.

Axiological Assumption

I strongly believed in the right to privacy. Privacy was a fundamental social value that gave individuals the right to control their personal information, activities, and data and kept them confidential from others. I negatively perceived actions, aspects, or developments that threatened

people's right to privacy. The susceptibility of digital tools to breaches or cyber-attacks undermined people's right to privacy. In this case, I perceived AI in education as a technology that could undermine learners' privacy since it was susceptible to breaches and cyber-attacks, risking students' dignity and lives. Therefore, I perceived AI in educational leadership's decision-making, teaching, and learning outcomes due to this inherent belief. Secondly, as the Bible prescribed, humans must have control over other systems. Super-intelligent AI systems made humans lose control, influencing me to negatively perceive AI in educational leadership's decision-making, teaching, and learning outcomes. To overcome these biases, I approached the research with an open mind to see how others perceived the right to privacy and what it meant for humans to control other systems. This study seeked to determine how educational leaders perceived the influence of AI on educational leadership's decision-making, teaching, and learning outcomes.

Researcher's Role

As the researcher, I am the human instrument for this research. As the researcher, I contacted the research participants via email to inform them of the technologies we used to conduct the interviews, focus group interview and survey. I described and explained the app and the preferred internet speed to the participants. I also communicated the time to conduct the interviews, focus group interview and survey to each participant. During data collection, I ensured that my opinions, views, or experiences did not determine how I interacted with the participants. I communicated with participants respectfully to protect their dignity and developed a positive relationship that made them willing to participate in the study. I ensured that I did not use any bias against any participant during the study. I was sensitive to the language by using words, terms, or word phrases that did not undermine the beliefs or identities of the participants.

Equally, the essence of avoiding bias was to limit prejudice or preconceived opinions that could undermine the quality of the research. Avoiding bias would also give me a sense of communal grounding. A sense of collective grounding was where a researcher could interact with participants of every stripe with openness and willingness. As a researcher, I encourage the participants to fully participate in the study by offering personal and professional validation. I validated the participants by telling them what they say in an interview is essential. I also validated their contribution to the study by documenting their words or recording their contribution in a digital print. In data collection and analysis, I suspended my knowledge and perception of the perceived influence of AI on educational leadership decision-making, teaching, and learning outcomes. I would only consider the feedback given by the participants to inform the results and analysis.

Procedures

First, the researcher sought permission from the site to perform research using their staff members. The procedure involved initiating a site permission process by emailing Ajal Academy and requesting a signed and stamped site permission request letter. The site permission process started by emailing the principal and the higher management at Ajal Academy the site permission request letter form (See Appendix H). The site permission request letter form (See Appendix H) contained the research topic to provide a rationale for the appropriateness of using Ajal Academy as a research site. Also, the researcher submitted the documents required for the site permission review via email to the principal and the higher management at Ajal Academy to review the site permission request.

Second, once the researcher received the letter and approval from the site, they also sought approval from the Liberty University IRB (See Appendix A) to proceed with the study.

The researcher submitted an IRB application using Cayuse IRB (Human Ethics) at Liberty University to seek and receive an IRB approval letter (See Appendix A). The supporting documents within the IRB application using Cayuse to apply for IRB approval included the consent form (See Appendix D), data collection instruments (See Appendix E, F, and G), non-disclosure agreement (See Appendix L), recruitment materials (See Appendix M), and site permission request letter (See Appendix H).

The IRB approval process also entailed reviewing the site permission process to ensure that the site permission request and requested documents and materials aligned with the Liberty University IRB regulations and ethical practices for protecting human participants and their data. The IRB was the only body allowed to review and approve studies that involved participants outside the institution. Before seeking approval, the researcher ensured the research protocol characterized by the purpose of the study, methodology, participant recruitment plan, data collection methods, data analysis, and other elements of the research plan were well developed. The researcher ensured the research protocol was written before submitting it to IRB for approval. They also provided the research's ethical principles were well-defined and stipulated. The subjects of the research proposal and how they would be protected in light of the research were defined before submitting to IRB for approval. The definition specified the age and gender of the participants, including inclusion and exclusion criteria.

The researcher also described how the study would avoid the possibility of participant coercion and guarantee privacy and confidentiality to the participants. In addition, they developed a consent form (See Appendix D) that was critical in showing the participant's willingness to participate in the research on their terms. In writing the IRB approval research protocol, the researcher partnered with IRB members at Liberty University. Working in this

partnership helped the researcher deepen their understanding of the approval processes and requirements. After writing the research protocol, the researcher submitted the proposal to the IRB website for review. They attached appropriate study instruments, recruitment materials, informed consent forms (See Appendix D), and other necessary documents. Subsequently, they made adjustments as necessitated by IRB until the proposal was approved.

After the research proposal was approved, the researcher emailed the received IRB approval letter (See Appendix A) to the principal and the higher management of the group of secondary schools to start and conduct the study, informing them about the research proposal, its purpose, and benefits and seeking their support to actualize the research. The researcher recruited participants with potential help from the school administration's educational stakeholders with access to potential participants. The school administration provided email addresses to potential participants. The researcher sent an email (See Appendix K) to potential participants explaining the purpose of the study and what to expect when they accepted to participate. The researcher potentially recruited educational leaders who met the study criteria through the school system. To identify the 15 suitable participants for the study, the researcher conducted screening using the inclusion/exclusion criteria (See Appendix I). Those who met the study criteria through this screening process were invited to participate. Subsequently, the researcher obtained consent from the identified participants. They used a consent form (See Appendix D) to ensure that participants knew the risks and benefits of participating in research.

Data Collection Plan

The strategy for acquiring data must be transparent and well-defined at first before becoming flexible as information is obtained. Sampling techniques should be carefully chosen to generate diverse data and be consistent with the employed method. The data collection strategy

for this dissertation was individual interviews, focus group interview and survey. Individual interviews and focus group interview were undertaken before conducting the survey. The justification for this order was that individual interviews offered a comprehensive and detailed understanding of educational leaders' perspectives, experiences, and viewpoints on how AI affected decision-making, instruction, and learning outcomes. Interviewing the participants was also my primary strategy for data gathering. The information gathered from the individual interviews were supplemented and combined with additional information about AI and education that were collected through the survey. Finally, focus group interview allowed for the triangulation of data obtained from individual interviews and surveys to enable participants to discuss and share their views and experiences in a group setting (Tomaszewski et al., 2020).

Individual Interviews

The study employed online individual interviews using Microsoft Teams (MS Teams). MS Teams was a collaboration of platforms developed by Microsoft that allowed communication between end users. MS Teams offered many features that facilitate communication between teams or end users. One important feature was the video and audio calls. I made audio calls to the participants to conduct individual interviews with each participant. I used my phone as a backup to record the interviews. I used Microsoft's automatic transcription to convert spoken interview questions to written or digital format. Questions that were used for individual interview discussions were Standard Open-Ended Interview Questions (See Appendix E).

Table 1.

Individual Interview Questions

1. Please describe your educational background and career through your current position as an educational leader. CRQ

2. How has AI influenced your decision-making as an educational leader? SQ1
3. Describe specific instances where AI has improved student learning outcomes in your school. SQ1
4. Describe how the current AI educational leadership and teaching models differ from the traditional educational leadership decision-making and teaching models. SQ1
5. How does AI influence your professional development? SQ1
6. How does using AI technologies such as ChatGPT in completing assignments and solving tasks influence their ability to think critically? SQ2
7. How does AI allow you to enhance the development of students' critical thinking skills? SQ2
8. Describe any instances where AI tools or technologies have facilitated critical thinking in students. SQ2
9. How do you leverage AI to enhance students' critical thinking skills? SQ3
10. How do ethical concerns related to AI in education affect how you use AI? SQ1
11. How do you see the future of AI in education, especially the potential influence it might have on students' critical thinking abilities? SQ3
12. What else should I know about your experiences with AI in education? SQ1

Focus Group

Moustakas (1994) recommended using focus groups for transcendental phenomenological studies. The online focus group interview took place using MS Teams. I used the audio conferencing features of MS Teams to conduct audio meeting with the participants. I used my phone as a backup to record the audio of the focused group interview. I used MS Teams to collect data from groups about the influence of AI on educational leadership's decision-

making, teaching, and learning outcomes. I interviewed during weekend evenings when most people were free. I used consensus to agree on the most convenient interview time.

The focus group data collection approach employed interviews supported by focus group questions. Focus group interviews was instrumental in this study as they gave the researcher a holistic view and understanding of the perceived influence of AI on educational leadership's decision-making, teaching, and learning outcomes. Akyildiz and Ahmed (2021) argued that the focus group interview technique offered a holistic description of a phenomenon under study. The composition allowed the researcher access to holistic data and insights regarding the influence of AI on educational leadership's decision-making, teaching, and learning outcomes.

The group composition entailed participants with similar characteristics. In this case, one group of 15 consisted of three school educational leaders randomly selected. The researcher emailed this group members about the activity's objective. During the focus group activity, the researcher introduced questions and facilitate interaction between the group members. The researcher provided probes and pauses to shape discussions in promoting the interactions. The focus group interview lasted for 75 minutes on a password-protected MacBook computer. The researcher closed the activity by thanking the groups for their valuable contribution to the research.

The group focus questions seeked to provide a holistic understanding of the perceived influence of AI on educational leadership's decision-making, teaching, and learning outcomes. Unlike interview questions, the focus group questions helped establish the general or diverse experiences of the group to understand the phenomenon under study holistically. Questions that were used for focus group discussions were Standardized Open-Ended Focus Group Questions (See Appendix F).

Table 2.

Focus Group Questions

1. What professional experiences have you had with AI in educational leadership decision-making or teaching? CRQ
2. Describe successful practices in teaching, decision-making, or supporting learning you have used to realize better outcomes. SQ1
3. How does AI influence the development of students' critical thinking skills? SQ2
4. How do you leverage AI to support teaching and learning? SQ1
5. Describe any instances, risks, or challenges associated with AI that affect the development of students' critical thinking skills. SQ3
6. What else should we know about the influence of AI on education? SQ1

Survey

This study ended with a survey, allowing me to see the final reflection regarding the perceived influence of AI on educational leadership decision-making, teaching, and learning outcomes from all the school's educational leaders. I used a survey to collect data for the study. I emailed the survey link to the participants and receive their responses online using Microsoft Forms. Surveys are cost-effective, easy to administer for both small and large groups, provide a safe space for participants to respond to questions, and provide much-needed anonymity and confidentiality to the participant (Brenner, 2020). The researcher could also ensure that the respondents adequately represent the target population. Sending the survey link online by email provided simple instructions and a brief description of the survey process. Questions that were used for the survey were Standard Open-Ended Interview Questions (See Appendix G).

Table 3.

Survey Questions

1. Describe your challenges when using AI in your role performance. CRQ
2. What is our perception of the influence of AI on students' critical thinking? SQ2
3. Describe any challenges or barriers to implementing AI in education. SQ2
4. How has AI enhanced your decision-making processes regarding teaching and learning outcomes? Why or why not? SQ1
5. Please describe how you use AI to support teaching and learning. SQ3
6. What challenges or limitations have you encountered while using AI in effecting educational leadership's decision-making, teaching, and learning outcomes? SQ1

Data Analysis

Data collected via the different methods were analyzed using a descriptive approach underscored by a transcendental phenomenological approach (Moustakas, 1994). The purpose and goal of using the descriptive approach were to realize transcendental subjectivity. Transcendental subjectivity is a state where the researcher's knowledge, biases, assumptions, and preconceptions were constantly checked and assessed to not influence the inquiry and analysis process (Moustakas, 1994). Implementing transcendental subjectivity ensured that the researcher focused only on the lived experiences described by the participants or subjects affected by the phenomenon under study (Busetto et al., 2020). The researcher was able to focus on lived experiences instead of prior knowledge, biases, assumptions, expectations, and hypotheses because of the requirement to assume the position of a tabula rasa. A tabula rasa is where the researcher stands apart or takes a blank slate by not allowing his prior knowledge, biases, assumptions, expectations, and hypotheses to inform the participants' descriptions (Busetto et al., 2020). In analyzing data collected in this research, the researcher used the participants' lived

experiences to understand the perceived influence of AI on educational leadership's decision-making, teaching, and learning outcomes.

Data for the online individual interview questions data for this study were analyzed through the epoch reduction method, imaginative variation, and textual descriptions. Epoch reduction is a bracketing method of analyzing qualitative data (Zahavi, 2021). In epoch reduction, the researcher bracketed off or instead set aside past knowledge and assumptions about the subject under study; in this case, the perceived influence of AI on educational leadership's decision-making, teaching, and learning outcomes. In a phenomenological study, Zahavi (2021) emphasized the importance of bracketing by arguing that bracketing enables the researcher to keep their personal knowledge, experience, and assumptions from interfering with the data analysis process. Items such as theories, previous explanations, and personal views of the researcher were bracketed. In the second data analysis phase, the researcher undertook imaginative reduction. Imaginative reduction entails distilling the participants' descriptions of conscious experience to realize a unified synthesis of essences through free variation (Zahavi, 2021). In carrying out imaginative reduction, the researcher utilized intuition, underpinned by imaginations of multiple variations of the perceived influence of AI on educational leadership's decision-making, teaching, and learning outcomes. Thirdly, the researcher used textual descriptions to capture and convey the depth and richness of the participant's experiences. Textual descriptions entail using the participants' experiences about their first-person perspectives to realize authentic outcomes (Zahavi, 2021). Using textual descriptions kept the researcher in a state where their influence on the research about biases and preconceptions was constantly assessed. In using textual descriptions, the researcher stood apart, preventing their subjectivity from informing the descriptions provided by the participants.

The researcher accurately recorded the discussion for the group's data analysis. The researcher noted the responses given by the group members. While making notes, the researcher highlighted significant points to illustrate where their perception lies. The process of data analysis started immediately after the group discussions ended. The analysis entailed considering words and texts used to generate themes. The researcher interpreted words and texts in their context, examining their strengths in terms of the reactions or feelings they elicited, and struck a balance between detail and conciseness to generate themes that showed how they perceived the influence of AI on educational leadership's decision-making, teaching, and learning outcomes.

The researcher used thematic analysis to analyze data collected by this method for the survey data. Thematic analysis entailed organizing free codes informed by the similarity or patterns of the nature of the respondents' words, sentences, or sentence fragments. The researcher collected and interpreted free codes into descriptive themes, which were used to yield analytical themes. In implementing the descriptive approach, a series of reductions were conducted to make sense of the collected data. The transcendental phenomenological model provided epoch, phenomenological reduction, imaginative variation, and synthesis of meanings and essences as key stages that ensured the researcher prioritized the participants' lived experiences in understanding the phenomenon under inquiry (Busetto et al., 2020).

Epoch was the first stage or reduction that underpinned the transcendental phenomenological model of data analysis. Epoch was commonly referred to as the process of bracketing. Barber (2021) asserted that epoch or bracketing required the researcher to bracket off or keep aside preconceptions, assumptions, previous understanding, and knowledge regarding the phenomenon under inquiry. In this research, the researcher did not allow prior understanding, knowledge, and assumptions, including but not limited to theories, explanations, claims, and

personal views and experiences, to inform the understanding of the perceived influence of AI on educational leadership's decision-making, teaching, and learning outcomes. This ensured the researcher analyzed the collected data as perceived by the participants' consciousness.

Transcendental phenomenological reduction was the second stage in the phenomenological data analysis model (Barber, 2021). Transcendental phenomenological reduction involved considering the lived experiences of each participant individually and developing meanings and essences that arose from them (Barber, 2021). In analyzing the collected data, the researcher read the participants' feedback word-by-word, sentence-by-sentence, and text-by-text to understand their lived experiences from their perspective. The researcher also considered the textual language used by the participants to understand their experiences. Doing so allowed the researcher to deduce the explicit representation of the participants regarding the influence of AI on educational leadership's decision-making, teaching, and learning outcomes.

After phenomenological reduction, Barber (2021) recommended that the researcher undertake imaginative variation. Imaginative variation was whereby the researcher sieved or distilled the conscious experiences of the participants as represented in phenomenological reduction to realize unified essences and meanings. In undertaking imaginative variation, the researcher used his intuition rather than his conscious reasoning to arrive at the essence and meanings of the feedback given by the participants. Intuition allowed the researcher to understand the texts, words, and responses or feedback given by the participants instinctively, stopping him from carrying his understanding and personal views, assumptions, biases, and preconceptions in developing essences and meanings. The essences and meanings underscored themes represented in codes or developed in a process referred to as coding that represented the

participants' perception regarding the influence of AI on educational leadership's decision-making, teaching, and learning outcomes.

Synthesis of meaning and essence entailed gathering different experiences, identifying similarities, differences, and patterns, and combining or categorizing them to develop coherent themes that described the phenomenon under inquiry. In synthesizing meaning and essence, the researcher iterated the meanings and essences developed in the imaginative variation stage. The iteration process involved repetitively evaluating and reviewing the developed meanings and essences to identify patterns, sequences, breaks, and inconsistencies that helped categorize themes and combine meanings and essences in solid themes that addressed the research questions. The strength of using iteration was that it allowed the researcher to identify or establish commonalities or differences between the descriptions, meanings, and essences provided by the research participants (Lemon & Hayes, 2020). Through iteration, the researcher collectively understood the meaning and essence represented in the participants' description of the influence of AI on educational leadership's decision-making, teaching, and learning outcomes. This allowed the researcher to develop patterns, sequences, and categories that underscored the themes of the inquiry process, providing the participants' perspectives regarding the influence of AI on educational leadership's decision-making, teaching , and learning outcomes.

The researcher used NVivo data analysis software to analyze data from online individuals, focused groups, and survey questions. NVivo minimized bias in data analysis and made it possible to efficiently organize, analyze, and visualize data from interviews and surveys. NVivo also allowed the analysis of various data types, including text, audio, and video. The software imported and organized multiple types of data.

The researcher used triangulation via multiple data analysis methods to synthesize data and themes from the multiple methods used to collect data. Triangulation via multiple data analysis methods was a data synthesis technique that required the researcher to converge analysis outcomes or themes of each data collection method (Lemon & Hayes, 2020). The analysis outcomes for each of the data collection methods were never final. They were open to iteration to create coherent bodies of evidence that built themes that answered the research questions (Lemon & Hayes, 2020). In synthesizing each data collection method, the researcher converged the analyses to identify patterns and inconsistencies or breaks. Similar patterns in the synthesis process reinforced individual themes developed in analyzing the outcomes of each data collection method. Inconsistencies or breaks in the findings also helped the researcher deeply understand the participants' lived experiences. Inconsistencies allowed the researcher to avoid or reduce systematic bias, improving the evaluation of the findings. Lemon and Hayes (2020) indicated that triangulation was an iterative data synthesis technique that made it possible to reinforce the credibility of a study.

The researcher used manual coding to identify themes across the analyses. The process entailed identifying and iterating thematic and relational analyses to realize coherent themes that answered the research questions. The researcher identified and repeated the most salient themes to establish a connection. The researcher looked for patterns and relationships to create coherent themes that answered the research questions. The researcher coded the analysis outcomes with similar patterns regarding words, sentence fragments, sentences, or paragraphs. The synthesis was iterative, involving constant comparison. While coding an indicator for a theme, the researcher compared the indicator with previous indicators coded similarly. During this first stage of synthesis, the researcher made necessary adjustments to coding, such as developing new

codes, changing code names, deleting codes, merging codes with others, or moving coded segments from one code to another. In the second stage, the researcher used descriptive coding to establish themes that answered the research questions. Descriptive coding was a technique used to synthesize qualitative data by categorizing and describing it in a systematic and organized manner. The researcher coded information from codes established in the open coding stage. The process entailed grouping and categorizing codes based on similarities and patterns. Related codes were used to form themes that answered the research questions.

Trustworthiness

Research trustworthiness was an essential aspect of any scientific study. My research study satisfied the trustworthiness metrics and strategies pioneered by Lincoln Guba (1985) and subsequent modifications or additions. Trustworthiness ensured that a qualitative study was rigorous enough. Lincoln & Guba's trustworthiness measurements had proven more effective over three decades, hence their dominance. Due to its effectiveness and simplicity, the researcher heavily relied on Lincoln and Guba's methods to measure the trustworthiness of my research. The initial constructs of Lincoln Guba were credibility, transferability, dependability, and confirmability. These metrics' relevance and accuracy have yet to be disputed. However, they had been modified by adding a fifth ethical consideration metric. This paper described how my research methodology utilized these five constructs to guarantee rigor.

Credibility

Firstly, under this construct, I prolonged my engagement with the study participants. Extending my engagement with the study participants allowed me to gain a deep understanding of the participants and their experiences with AI in educational leadership decision-making, teaching, and learning. Prolonged engagement allowed me to build trust and rapport with the

participants. Trust and rapport are fundamental attributes of a successful research exercise. Through trust and rapport, I was able to lead the participants to more open and honest responses about the perceived influence of AI on educational leadership decision-making, teaching, and learning outcomes. Secondly, I persistently observed the feedback about the influence of AI on educational leadership decision-making, teaching, and learning outcomes. Persistent observation allowed me to develop in-depth insight into the trends and patterns of the influence of AI on educational leadership decision-making, teaching, and learning outcomes. Thirdly, I used the triangulation method in data collection, analysis, and synthesis. Using multiple data sources and integrating accompanying feedback during analysis and synthesis validates the findings and enhanced the study's credibility. Using triangulation allowed me to cross-verify the feedback to reduce the risk of biases or errors. Triangulation also ensured that I consider diverse perspectives, resulting in a holistic and comprehensive understanding of AI's perceived influence on educational leadership decision-making, teaching, and learning outcomes.

I implemented a range of trustworthiness methods to ensure the robustness of this study. Member checking was a critical step. I involved the participants in reviewing and confirming the accuracy and representation of their experiences, ensured that their perspectives are faithfully captured. This member-checking process also included iterative feedback loops which addressed any discrepancies or clarifications required. Furthermore, I maintained a meticulous audit trail, documented all research process steps, from data collection to analysis. These detailed records facilitated transparency and allowed for examining the study's progression by an independent reviewer or committee, thus enhancing the study's credibility. Moreover, I subjected my data collection instruments, such as interview questions and survey items, to scrutiny by a research committee or experienced peers. Their input and suggestions contributed to the refinement of the

research instruments, ensured their appropriateness and effectiveness in capturing the desired information accurately.

Transferability

In this case, I ensured that my entire study setting, including the research methodology adopted, data collection, data analysis approaches, and participants' choices, are fully described to be applied in similar studies or that similarities to other studies can be easily identified. Most researchers agree that a comprehensive description of the research study, including the phenomenon under study, research design and settings, methods of data collection and analysis, and others, is highly beneficial in enabling readers and other researchers to determine if the study is similar to others (Pilarska, 2021). Therefore, I comprehensively described my study to foster transferability. I adopted Guba's recommendations of fully describing all the contextual aspects impinging my study. The study's findings presented in a manner that allowed for easy comparison and identification of similarities with other research, increased its relevance to various settings and inquiries. Employed these research-based techniques, the study aimed to offer valuable insights that can be readily applied in diverse educational leadership contexts and related studies.

Dependability

My studies were dependable. The same findings could be observed or recorded if the same study was repeated using specific methods, contexts, and participants. Maintaining rigorous audit trails, a standard practice in qualitative research was also vital. These detailed records chronicled the research process, encompassed data collection, analysis, and interpretation, fostered transparency and enabled independent reviewers or committees to verify the research's dependability. Additionally, the study subjected data collection instruments, including interview

questions and survey items, to a comprehensive review by a research committee or experienced peers. Their input enhanced the quality and appropriateness of the research instruments, increased the dependability of the data collection process (Pilarska, 2021). However, I fully described these processes so that another researcher can repeat the study for any reason, ranging from testing dependability to continuing the study. In addition, I observed ethical guidelines and principles, significantly informed consent, privacy, and good relationships with participants which allowed them to provide authentic feedback.

Confirmability

In this case, I ensured that my study's findings and conclusions are primarily derived from the data collected, not my opinions or predispositions (Pilarska, 2021). I deployed Patton's ideology concerning objectivity by ensuring that the constructs of my study deviated as far as possible from the reliance on human perceptions and skills. To that effect, triangulation is a vital approach I used to enhance the reduction of my biases as the investigator. Moreover, by honestly admitting my predispositions, I improved the confirmability status of my study. Member checking, a well-established research technique, were instrumental in this process. It involved actively engaging participants to review and validate the findings, ensuring their experiences are faithfully represented and aligned with the data. This iterative feedback loop enhanced the confirmability of the research by corroborating the accuracy of participant interpretations.

Ethical Considerations

An essential component of improving a qualitative research's trustworthiness was ethical considerations. I ensured that my study was ethical as much as possible. First, I explained to the participants the full intent of the study and how it would be conducted and allowed them to decide whether to participate. Secondly, I assured the participants that I would follow what I had

explained and how the study would be conducted. If anything changed, I promptly informed them before the changes were implemented. Furthermore, a non-disclosure agreement (See Appendix L) was signed to ensure the participants were protected, honored, and protected from disclosure. Lastly, I ensured that I respected all cultural differences as far as possible.

Informed consent and voluntary participation also helped improve the research's trustworthiness (See Appendix A). Participants gave quality feedback when they willingly accepted to participate in research without coercion. Similarly, informed consent extended adequate information to participants about the requirements of the study, positioning them at a vantage point to share relevant information about the research questions (Pilarska, 2021). I kept the participants anonymous while sharing information regarding the research questions. The anonymity and confidentiality of the participants were preserved by not revealing their names and identities in the analysis of the feedback given by the participants. I assigned codes to participants to establish their identity.

I planned and implemented a comprehensive data storage system that adhered to ethical guidelines and institutional policies to ensure the integrity and reliability of my research. I adopted a NoSQL database by MongoDB to store my data because it was flexible and more suitable for this kind of data. I relied on my laptop as my storage location. This was because my laptop was portable, giving me more room to access data anywhere as long as I had my laptop with me. Secondly, my laptop was secure since I changed my password regularly. Nonetheless, I also backed up my data in Google Drive. For data retention, I set up a policy outlining the duration of data retention and the data destruction methods. I sought the help of data protection agencies to destroy the data after three years.

The research also guaranteed the safety of the research participants, the research setting, the community, and the institution where the study occurred. The IRB required the researcher to protect the participants, research setting, and resources directly or indirectly related to the research. In this research, the researcher ensured that no one was hurt by the study significantly, not beyond minimal risk (Pilarska, 2021). In addition, the researcher ensured that the institution and community where the research took place were not negatively affected in supporting the aims and objectives of the study. This was important because any mishap in handling participants' statements may indirectly reveal their identity.

The researcher avoided physical, emotional, or spiritual harm. Pilarska (2021) indicated that qualitative researchers had a responsibility to ensure that any activity related to the study did not harm the participants. The researcher adopted precautionary measures in this study to avoid harming the participants. Precautionary measures were tailored to avoid emotional stress. For instance, if the researcher foresaw emotional stress, the researcher prepared a counselor to help eliminate the problem. The researcher must keep the participants' cultural beliefs about spiritual well-being the same.

Another important ethical principle for this study was reciprocity. Pilarska (2021) asserted that it was essential for the researcher to create a win-win situation for both parties. While the researcher accessed research data, the research participants should also benefit directly or indirectly from the study. The research could share the study findings with the participants, showing how their input influenced the research and its outcomes. The researcher should also allow the participants to be heard by creating a platform to share their experiences as recipients of innovations, policy creation, or policy changes.

The researcher also dignified research participants. The research treated every participant with dignity regardless of their status, race, gender, position, sexuality, or any other factor (Pilarska, 2021). Approaching participants based on these factors was not only unethical but also undermined the quality and standards of undertaking a qualitative study. While undertaking this study, the researcher created an environment that treated everyone equally regardless of identity or influence. Equally, the researcher showed respect to the research participants. Pilarska (2021) argued that researchers had an ethical responsibility to respect the participants' rights, cultures, and worldviews. In this research, the researcher respected every participant regardless of their literacy level, worldview, or culture.

In addition, the researcher had an ethical responsibility to guarantee privacy to the research participants. In this study, the researcher protected the participants' privacy. The participants were involved in the study at the place and time of their choice. Second, the researcher avoided intruding on the participants' place and time. Third, the researcher kept the participants' identities anonymous. This entailed assigning them pseudonyms to hide their identity. Fourth, the researcher securely collected, stored, and managed participants using encryption and other appropriate measures to prevent unauthorized access. More importantly, the researcher communicated securely with the research participants. Encrypted emails and video calls hid the participant's identity and data.

Permissions

Before conducting the research and applying for IRB approval, the researcher sought permission from the site. I emailed (See Appendix J) the principal and the administration of the group of schools to seek approval and asked for a site permission request letter (See Appendix H) to conduct the study, informing them about the research proposal, its purpose, and benefits,

and seeking their support to actualize the research. After receiving the site permission request letter via email (See Appendix H), the researcher submitted an application and requested approval from the IRB at Liberty University. Once the site permission request letter was received by email (See Appendix H), the researcher applied and sought permission from the IRB at Liberty University. The IRB was tasked with reviewing all information regarding the research project. Formal and operational requirements were often in the custody of the IRB (Köhler et al., 2022). This was about efficient and ethical frameworks of operations. The IRB also ensured that the well-being of the participants was safeguarded. In addition, the IRB was responsible for guarding the research integrity (Köhler et al., 2022). Since the IRB was required to keep the researcher within the scope of these guidelines, it was important to seek permission before proceeding with the study. The researcher submitted formal documents detailing the purpose of the research, its significance, and guidelines to the IRB for review and further directions. Another incident of permission involved seeking the consent of the participants. The researcher shared consent forms with the willing participants via email (Appendix D). The consent forms (See Appendix D) entailed information regarding the research process, information the study sought to share, and guarantees the study provided regarding their rights, especially regarding confidentiality and the right to remain anonymous. In addition, the researcher reached out to the willing participants individually to explain to every one of them the purpose of the study, the data collection process, and the safeguards it provided regarding their anonymity and confidentiality. The researcher encouraged the participants individually to review the consent forms (See Appendix D) again to inform their decision. The research gave the willing participants adequate time, in this case, 24 hours to one week, to review information in the consent form (See Appendix D) before deciding to participate. Signed consent forms from the

willing participants were proof of permission granted to the researcher to proceed with the research.

Summary

The study aimed to understand and describe the perceived influence of AI on educational leadership decision-making, teaching, and learning outcomes. The transcendental phenomenological method aimed to describe educational leaders' lived experiences, illustrating how they perceived the influence of AI on educational leadership decision-making, teaching, and learning outcomes. The study employed individual interviews, focus group interviews, and surveys to collect data describing AI's perceived influence on educational leadership decision-making, teaching, and learning outcomes. Data collected through individual interviews, focus group interview, and survey were analyzed through the NVivo data analysis software.

The data analysis strategy entailed epoch reduction, imaginative variation, and textual description. Data synthesis was underpinned by data triangulation to reinforce the credibility of the study findings. As a research instrument, I avoided bias by bracketing off my preconceptions, prejudice, bias, and knowledge from the study process and outcomes. I believed that another reality other than what I conceived existed. I also held onto the beliefs people constructed based on their experiences and interactions with a phenomenon. My positionality was to track the evolving AI to provide up-to-date evidence on how its influence on educational leadership decision-making, teaching, and learning outcomes was perceived. I employed pragmatism as an interpretive framework as a research instrument because it greatly emphasized lived experiences and empirical observations. More importantly, the researcher upheld ethical practices such as trustworthiness and safety to protect the participants and their data. The study procedure entailed seeking the site's permission to conduct the study from the Ajal Academy Research Department.

The procedure also entailed seeking approval from Liberty University IRB to use the chosen site and to proceed with the study. The approval process encompassed reviewing the study site, participants, research ethics compliance, especially the issue of informed consent and guarantee of confidentiality to the participants' data, and the entire research protocol.

CHAPTER FOUR: FINDINGS

Overview

This study aimed to explore and describe the shared experiences of educational leaders at a group of schools in the Middle East in their interactions with AI, specifically focusing on how AI influences their decision-making, teaching, and learning outcomes. This chapter focused on the background information of each participant in the study. It also outlined the participants' perceptions regarding artificial intelligence in educational decisions, teaching, and learning outcomes. The chapter also presented the study results thematically. The participants' thoughts were presented as direct quotes gathered through focus groups and interviews, promoting a deeper understanding of their voices. This chapter finally explored how the findings address the research questions. It concluded with a summary of the findings and the assessment of whether the collected data addressed each research question.

Participants

Since this study aimed at understanding educational leaders' experiences in applying AI to influencing decision-making, teaching, and learning outcomes, it was important that the participants possess leadership qualities, serve in leadership positions, and be engaged in educational processes. The participants varied in years of experience, with the least having three years and the highest with 30 years of experience. The study recruited 15 participants, comprising 11 males and four females. The participants were recruited through collaboration with the leadership in the selected group of schools. The study participants were required to read and understand the terms of involvement in the study before they signed the informed content form (Appendix D). The characteristics of the participants were described in the table below.

Table 4

Lead Teacher Participants

Participant	Gender	Experience	Education Level	Content Area	Grade Level
Jack	Male	3	Bachelor's Degree	Lead Assessment and English Teacher	6th - 7th
Mohammed	Male	20	Master's Degree	Computer Science Lead Teacher	9th – 12th
Eman	Female	13	Bachelor's Degree	Science Lead Teacher	6th – 8th
Ahmed	Male	30	Master's Degree	Math Lead Teacher	9th – 12th
Danish	Male	30	Master's Degree	Math Lead Teacher and	9th – 11th
Saeed	Male	18	Bachelor's Degree	Math Lead Teacher	10th-12th
Salem	Male	9	Master's Degree	Math Lead Teacher	11th – 12th
Aysha	Female	6	Bachelor's Degree	Lead Librarian	6th – 12th

Participant	Gender	Experience	Education Level	Content Area	Grade Level
Mustafa	Male	15	Master's Degree	Arabic Lead Teacher	9th – 10th
Shamma	Female	11	Master's Degree	Biology Lead Teacher	9th – 10th
Omi	Male	10	Master's Degree	Biology Lead Teacher	11th
Kamal	Male	11	Master's Degree	Physical Education Lead Teacher	9th
Michael	Male	25	Bachelor's Degree	Physical Education Lead Teacher	7th – 8th
Jennifer	Female	11	PhD	Professor in Computer Science	12th
Anthony	Male	15	Master's Degree	Biology Lead Teacher	9th-10th

Jack

Jack is an English teacher with three years of experience who finished his Bachelor's in arts and is currently studying for a diploma in educational leadership. He was responsible for student assessment, setting improvement goals, and evaluating teaching methods.

In the focus group discussion about AI issues, Jack highlighted the challenge of giving AI precise instructions to generate compositions at appropriate reading and vocabulary levels. He also expressed concern that depending too heavily on AI may impede his creativity. Regarding AI's impact on students' critical thinking, Jack was optimistic. He believed AI can assist students with pronunciation, punctuation, and vocabulary, but he maintained that critical thinking can only be assessed through tasks involving presentation, writing, and speaking. Jack used AI as a supporter in producing class activities and assessment materials to enhance student involvement. However, he sometimes felt the need to modify AI-generated content to align it with his voice and personality (Personal Communication, February 4, 2024).

Mohammed

Mohammed is a computer science leader and teacher from the Middle East with a master's degree in education, leadership, and management, and a bachelor's degree in computer science. He had been a teacher for 20 years and a leader for 13 years, exposing him to various technologies. According to his responses to the survey questions, Mohammed appreciated how AI has streamlined his data analysis processes, but he was concerned about the moral dimensions of teaching and education. He pointed out issues such as the impact of automation on jobs, the danger of wrong decisions backed by AI-generated data, and students' misuse of AI tools.

Eman

Eman is the science lead and a teacher with a Bachelor's degree in environmental sciences, specializing in biological analysis and ecosystems. Since 2011, she had been teaching, giving her deep insight into schooling in the Middle East. During the interview, Eman believed that one of the biggest problems with using AI in her profession is associated with "diverse data

resources," meaning that data sources should be trusted and looked at scientifically. She is very positive about AI's influence on decision-making, especially because of its ability to change course content, provide real-time feedback, and check student engagement through interactive learning techniques. Eman point of view was that AI's personalized feedback will enable learners to control their learning, confirming her belief in AI's role in future education.

Ahmed

Ahmed is a mathematics head and teacher with 30 years of experience, holding a bachelor's degree in physics and a master's in applied mathematics. During the interview, Ahmed was enthusiastic about technology's power to enhance education but is cautious about AI's use, fearing it may distract students and impair their education. Nevertheless, in the focus group discussion Ahmed shared that, the proper implementation of AI could contribute to developing students' critical thinking skills by providing them with a more diverse set of problem-solving methods. He believed that AI can encourage students to experiment with different problem-solving methods, thus enhancing their critical thinking skills. Ahmed has used AI in his lesson plans and teaching materials, allowing students to use AI tools during class. While he supported integrating AI into education, he was wary of its complete introduction, fearing it could decrease students' creativity if they rely too much on it. Additionally, Ahmed recognized that AI has weaknesses, especially in creating assignments that meet specific criteria such as the type of question, the type of task, and whether the task is individual or collective.

Danish

Danish is a math lead and teacher with 30 years of experience, making him an expert in the field. With a master's degree in mathematics, Danish had devoted his life to teaching methods and mathematical theories, becoming a major player and a leading figure in mathematics

education. Throughout his professional life, Danish has held many positions, including head of department and curriculum coordinator, demonstrating his experience and leadership abilities in education (Personal Communication, February 4, 2024). According to his responses to the survey questions, Danish was not enthusiastic about integrating AI into teaching and the education sector, as he worried about the biased training data that may result in the production of unreliable information. Despite his doubts, he recognized that AI can be a powerful tool for students' critical thinking if used correctly. Danish was also aware of the cybersecurity and privacy risks associated with AI's use in the education sector. During the interview, he underlined the necessity of secure AI tools for use in schools. Danish believed that AI can improve decision-making by providing personalized learning experiences, although he acknowledges individual differences.

Saeed

Saeed is a veteran math lead and teacher with 18 years of experience. In the focus group Saeed shared that, he dealt with problems associated with AI technology use, especially with students' tendency to be comfortable and their seriousness about new technology. In addition to the previous, students' easy access to synthesized and analyzed information through AI could negatively impact their critical thinking development. He also had doubts about schools' ability to integrate AI in a way that benefits students, as he believed it will be difficult for schools to acquire the required amount of money, considering that some AI apps are expensive, and devices like laptops or iPads would cost a lot. Despite these difficulties, during the interview, Saeed admitted that AI can classify students according to their learning styles and academic levels, as well as track students' performance. He viewed AI as a way to fulfill lesson objectives and

present situations and problems in a way that is easier to understand. However, he emphasized the importance of students using AI responsibly for learning purposes only.

Salem

Salem has a master's degree in mathematics. He had taught maths and led mathematics departments in schools and universities for 9 years. Salem had also worked as an academic quality controller, monitoring students' learning process and guiding teachers and students through challenges. According to his responses to the survey questions, Salem's experience with AI had convinced him that some answers provided by AI need to be revised. According to him, students may need help differentiating between the correct and the wrong answers generated by AI, affecting their academics. Salem explained his concerns with AI in education, saying, some answers could be more accurate. Relying on AI could diminish the ability to think critically. Sometimes, AI can't solve some questions and can get back with long, unnecessary information that wastes time (Personal Communication, February 4, 2024).

In the focus group discussion, Salem appeared convinced that AI mostly affects students' critical thinking capabilities negatively since the students do not need to be involved in much thinking. When asked about the impact of AI on students' critical thinking, Salem explained, "It depends on the way the students are using it, but in the majority of cases, AI has a bad influence on students' critical thinking as they get ready information without the hustle of thinking." Salem also believes incorporating AI in education would be a major challenge because "in most cases, students will use devices to play and not just for education." This can prevent the students from acquiring the full benefits associated with AI.

During the interview, Salem recognized the power of AI in research. He explained that "some historical and literature reviews can be found easily using AI instead of manually finding

recourses or books." This highlights one benefit of AI in education: saving research time. Therefore, Salem confesses that he has been using AI in research, saying, "AI can give answers to the solution with historical facts and applications. AI can generate creative and bright ideas, especially in arts." This underlines the importance of AI in research and education. Despite the groundbreaking contributions of AI in education, Salem has realized that the capabilities of AI could be improved when it comes to leadership decisions. In saying that, "AI can answer some problems but not every problem as some of the qualities of teaching, leadership, and decision-making skills are coming through experience in the work field." This requires the users to understand where to apply the powers of AI and where to make decisions manually.

Aysha

Aysha, a lead librarian with six years of working in the library, has a bachelor's degree in education. She was very much aware of the application of AI in library settings and therefore had a clear idea of the problems and advantages of its usage. According to her responses to the survey questions, Aysha stressed the need to harmonize the different aspects of AI and mentions the tendency of some AI algorithms to be biased. Although Aysha was not only a teacher, she knew the way AI affected students' critical thinking capabilities. She thought that AI can be a great tool for students by giving them information and resources, but overreliance on it may prevent the students from developing their independent analytical skills. During the interview, Aysha pointed out the necessity of having a balance between using AI for information and encouraging students to think critically. Aysha confessed that the use of AI in education was impacted by different issues like privacy, biases in algorithm training, and the objections of stakeholders like teachers. She was convinced that if these issues are overcome, AI could be used to enhance students' performance and teachers' working processes. She emphasized AI's capacity

to deal with a large amount of data, customized the learning experience, provided insights into the student's performance, offered instant feedback, suggested learning materials according to the student's learning style, and helped in creating an adaptive curriculum. In the focus group dicussion, Aysha stressed the fact that the integration of AI technologies should be done attentively with a lot of caution and the ethical issues should be taken into consideration to assure the improvement of the teaching and learning outcomes. (Personal Communication, February 5, 2024).

Mustafa

Mustafa has been an Arabic leader and teacher in the Middle East for over 15 years. During the interview, Mustafa confessed that he didn’t fully understand how AI works. This had been his challenge in using the new AI technologies. Mustafa believed that AI has a high potential to make students' learning easy but at a risk to their cognitive capabilities. Mustafa noted, "It has much potential for helping them make the most of their learning and the risk of blunting their cognitive abilities." Mustafa exhibited strong conviction that the technology will make the information close and easily accessible to the students, reducing their need to think deeply and critically. Mustafa also believed that there is a high possibility that learners abuse artificial intelligence. This had been a major challenge to the implementation of AI in education. Mustafa further explained a "lack of compatibility of many AI apps and platforms with Arabic script." As an Arabic teacher, Mustafa could acquire fewer benefits from AI tools. In the focus group discussion, regardless of these limitations, Mustafa admitted that he had been able to move most of the class tasks into the self-learning domain with the help of AI. AI had also allowed him to get automated and instant feedback regarding students' writings, which had helped him assess students' proficiency and understanding of the Arabic language.

Shamma

Shamma, a Biology teacher in the Middle East with 11 years of experience, has extensive teaching experience and has interacted with a diverse range of students. According to her responses to the survey questions, Shamma acknowledged the importance of AI in education but recognized that it faced challenges in adapting to the classroom environment. Shamma believed that AI could significantly impact education but noted that its implementation in teaching faces challenges such as the need for more human interaction, difficulty adapting to dynamic classroom environments, potential bias and fairness issues, limited understanding of context, and ethical considerations. During the interview, Shamma was concerned that AI might reduce face-to-face interactions, potentially hindering the development of essential interpersonal and communication skills crucial for critical thinking. Despite these challenges, Shamma believed that proper utilization of AI can benefit students and educators. She saw potential in using AI for data analysis to provide teachers with important insights that could guide their interventions and personalized students' learning experiences. (Personal Communication, February 6, 2024).

Omi

Omi, a biology head and a teacher in the Middle East with a master's degree and 10 years of teaching, delivers a lot of information to the study. In the focus group discussion, Omi shared that he had troubles with the use of AI in education, for example, how some data are not enough and of bad quality, the ethical problems such as the possible misuse of the AI, and the need for the AI models to keep learning. According to his responses to the survey questions, Omi was worried that AI in teaching which could be a hindrance to the critical thinking of students, since they may become less active in the knowledge search. Omi also thought about students copying the AI-generated content and the problem of correctly referencing AI-made materials. Although

these difficulties are still there, Omi had achieved its decision-making skills through AI, using it for the analysis of reliable data and adaptive learning systems to tailor the content according to the student's skills and progress. Besides, the AI tool was used by Omi to produce educational materials and to make virtual reality and augmented reality applications for learning more immersive. (Personal Communication, February 7, 2024).

Kamal

Kamal has been a physical education lead and teacher for 11 years. He has a master's degree in physical education. His expertise in the area has allowed him to remain in service for a long time. Kamal had not been experiencing any challenges using AI as a teacher; however, he experienced the risk of affecting his students' critical thinking and creativity.

In the focus group discussion, Kamal shared using AI posed no challenge for me as a teacher; however, when students were asked to complete assignments, the challenge began by tapping into their creativity and critical thinking (Personal Communication, February 7, 2024). Kamal believed there are no limits to what a student can do on AI platforms. Kamal was frustrated that the teachers cannot use the AI to monitor whether students have performed the physical activities and achieved the required outcomes. Kamal explained, "There is no filter of how it is monitored when students are asked to perform certain learning outcomes." Despite this limitation, AI has allowed Kamal to spend little time planning lessons and more time searching the best content for the students. Kamal has also used AI-powered tools "to make questions for exams, research, and engagement." For AI to be more operational in education, Kamal explained that he "Would like to see more of a system of control of supervision for teachers and students to have access to where AI can detect plagiarism." A control system seemed important to him for the AI tools to be effective in education.

Michael

Michael, a physical education lead and teacher in the Middle East with 25 years of experience, was skeptical about the use of AI in education. During the interview, he believed that AI could lead to a reduction in human capital and could be biased in training, making some information unreliable for critical decision-making. Michael was concerned that AI hinders students' critical thinking by presenting information without requiring them to read, understand, and form their own opinions. Despite his skepticism, Michael had used AI tools and found benefits, particularly in improving decision-making and identifying areas for improvement in sports and fitness through personalized learning apps. (Personal Communication, February 7, 2024).

Jennifer

Jennifer, a professor with a Ph.D. in computer science and 11 years of experience as an education leader and administrator, had been advocating for the integration of AI capabilities in learning institutions. According to her responses to the survey questions, Jennifer acknowledged the complexities involved in integrating AI into teaching and research workflows, emphasized the need for careful planning and coordination to align with curriculum objectives and research goals. Despite her advocacy, Jennifer recognized that AI algorithms can be flawed and result in biased outcomes, perpetuating inequalities if not mitigated properly. However, she believed that AI could enhance critical thinking skills by assisting students in solving complex problems and fostering creativity, although she acknowledged concerns about overreliance on AI diminishing critical thinking capabilities. Jennifer had utilized AI-driven analytics tools to analyze student performance data, enabling her to identify patterns, trends, and correlations for instructional decision-making and student support interventions.

Anthony

Anthony, a Master's degree winner with 15 years of experience, in teaching and the leading Biology departments, had met the difficulties of using AI in teaching. During the imterview, he admitted the flaws of AI at the moment and put the importance of proper training for teachers in that regard. Anthony thought that AI had a beneficial effect on the student's critical thinking ability since it helped them in the process of reading research articles and understanding complex material. He had been using AI tools to read textbooks, prepared lesson plans, and came up with questions for classes; hence, they have helped enrich his teaching materials and assessments. Furthermore, AI had supported Anthony in the analysis of student data which had enabled him to find out the trends and the patterns and thus the individual student profiles could be used to provide personalized interventions.

Results

This study aimed to understand the experiences of educational leaders at a group of schools in the Middle East in their interactions with AI and how AI influences their decision-making, teaching, and learning outcomes. Themes and subthemes were clearly identified after analyzing the survey, interviews, and focus group data. This section identifies the themes in the collected data and their associated subthemes. The analysis revealed seven themes and several subthemes. The themes were identified through a thorough and rigorous plan. The researcher first read and re-read the study data to familiarize myself with it; then, the researcher coded the data using NVivo and organized the themes accordingly. Table 5 below summarized the themes and their subthemes.

Table 5

Themes & Subthemes

Theme	Subthemes
Critical Thinking	Enhance Critical Thinking
	Hinder Critical Thinking
Decision Making	Data Analysis
	Effective Decision-Making Through Big Data
Ethical Concerns	Fear of Privacy Breaches
	Students Use the AI to Write Essays
Grading and Feedback	Instant Feedback About Performance
	Provision of Improvement Areas

Critical Thinking

The first identified theme was critical thinking. Most of the participants in the study believed that the use of artificial intelligence in education can affect student's critical thinking in either a positive or negative manner. Some participants confessed that AI can reduce students' ability to think independently since most information is hassle-free. Due to this, they deemed AI a tool that could potentially detriment students' critical thinking. Other participants revealed that AI can improve student's critical thinking capabilities.

Enhance Critical Thinking

The participants were enthusiastic about expressing the AI's capability to enhance students' critical thinking skills. The participants argued that AI allowed for simulation of the class lessons, allowing them to improve students' thinking. During the interview, Kamal with a

smile vividly reflected that AI "Can provide access to, uh, a big amount of information, potentially exposing learners to diverse perspectives and ideas." This kind of diversity and the depth of information provided to the learners create the need to collaborate and discuss among themselves, as experienced by Omi, a biology teacher for 10 years; "Because when they have this information and put it together, discuss and collaborate, it just increases their critical thinking."

The analysis revealed perspectives that AI created personalized and tailored learning experiences among learners. Kamal confidently explained that "AI can enhance critical thinking by providing personalized learning experiences tailored to individual students' needs and abilities." Although AI was perceived to enhance critical thinking positively, Michael expressed the need to ensure that the students use it with self-control and control from the institutions.

> AI will assist in critical thinking, but at the same time, students must not be dependent using AI and ChatGPT, whereby they just copy and paste the information and submitting it as their own.

This means that there is a risk of students avoiding their assignments and dedicating the thinking work to the AI. This way, the students' critical thinking skills could be detrimentally affected. It is, therefore, important to understand that AI had its detrimental abilities on critical thinking.

Hinder Critical Thinking

However, some participants expressed concerns that AI could hinder critical thinking by making information too easily accessible. Ahmed during the survay argued that AI might prevent students from thinking independently, as they may rely on AI for answers instead of engaging in

deep, analytical thinking. This overreliance on AI could lead to a lack of original thought and critical analysis among students.

Decision-Making

Decision-making was an essential skill for teachers and education leaders. The analysis of the collected data revealed decision-making as the second theme. The emerging subthemes under this theme were effective decision-making and data analysis. The participants revealed that AI provides them with insights and guides their decisions. AI also has a high data analysis capability, hence helping leaders understand the effectiveness of their leading and teaching strategies.

Data Analysis

Participants in the study expressed a deep appreciation for AI's capacity to analyze extensive datasets, recognizing its potential to offer profound insights crucial for informed decision-making. For instance, Eman during the survay elaborated on how AI has revolutionized his approach to data analysis and decision-making, particularly in the realm of student performance evaluation. By leveraging AI's capabilities, Eman now received real-time insights into various aspects of student learning, enabling her to identify trends and patterns that were previously obscured. This newfound ability to promptly and accurately assessed student progress and empowered teachers like Eman to intervene proactively, providing targeted support precisely when and where it was most needed.

Effective Decision-Making Through Big Data Analysis

According to the teachers, using AI in education is beneficial in decision-making because it provides in-depth data and information about the students and their performance. Access to information is important in decision-making; the data analysis capabilities had enabled teachers

to enhance their focus on students when making critical decisions. According to Jennifer, "AI plays a significant role in my decision-making as an educational leader by providing data-driven insights and analysis to inform strategic choices." The teachers could examine the best strategy that can be implemented to improve the student's performance. They could simulate different strategies and examine their effectiveness; this ensures the implementation of decisions and strategies relevant to the student's performance. Jennifer's opinion was further supported by Danish who explained that "this data-driven approach can enhance the decision-making process by providing valuable information and supporting evidence based on practices." Through the data analysis, the teachers were sure and confident of the decisions and stances they adopted regarding different education policies. They could implement policies based on the evidence and avoid cases of trial and error.

Ethical Concerns

Participants in the study also expressed concerns regarding the ethics of AI applications in the education sector. The participants noted that students could engage in plagiarism where they do not answer or attempt their assignments but dedicate themselves to AI for completion. There were concerns about students' data privacy as well. The participants were concerned that the students may end up sharing personal information in the AI apps, which can later be exposed through cyber hacking. The AI apps could also target the students to provide their bank account details, which leads to theft.

Fear of Privacy Breaches

The participants often expressed concerns about student's privacy. The students using AI tools must log into the platforms and provide bank details at some point. These details could potentially harm the student. In the focus group a voice of concern Saeed noted that;

> The privacy issue now with using the AI and like introducing the social media, the life and the privacy of the students now became exposed more and more and sharing the personal information became more and more for others.

Several of the respondents expressed this concern. They explained that not all AI platforms are trustworthy; some are being used for phishing purposes, and students can easily fall prey to them.

Students use the AI to Write Essays

There was a common agreement among the participants that AI can lead to dishonesty among the students. The participants expressed concerns that most students prefer to avoid the stress of working through their essays; they would then request the AI tools to prepare essays for submission instead of working on them. Anthony, with deep concern about the possibility of plagiarism opinionated that, "AI can formulate research for you that is similar to nothing out there." Therefore, it takes work to detect plagiarism in such papers. Anthony's concerns were further explained by Omi who noted that the legality of using AI in writing essays is questionable.

> High risk of legalism when students are allowed to use AI because a lot of students who do not want to go through the stress of analyzing data and coming up with their own original work.

There appeared to be a consensus that the use of AI in education can cause immense harm if not controlled. The difficulty in correctly citing essays can lead to a breach of scientific laws. The dependence on AI to complete assignments is also unethical in education.

Grading and Feedback

Another emerging theme was the use of AI in grading student exams and providing instant feedback. The teachers explained that AI-enabled them to mark most students' papers. They could prompt the AI to check the assignments using the marking criteria. The AI also gives teachers feedback about students' performance, allowing them to implement personalized responses to student needs. The teachers can determine the exact area of students' weaknesses, facilitating the implementation of focused response measures.

Instant Feedback About Performance

Most of the participants using AI expressed happiness that the technology can generate instant feedback regarding student performance. According to Shamma, AI "Gives that real-time feedback on our students like we can see they are using it as an effective way to help them think critically." The teachers also explained that the real-time feedback enabled them to save time compared to the previous years before the advent of AI. Shamma during the focus group session went on to argue that "Instant feedback allows me to focus more on the aspect of the teaching itself, facilitating the discussions and the individual learning needs." Shamma vividly explained that she could focus on teaching while delegating feedback generation to the AI tools.

Provision of Improvement Areas

The data analysis revealed that several participants believed AI could guide teachers and leaders on the specific areas that need improvement. Michael joyfully explained that AI "Can give our students instant results, can analyze their performances, and also it can advise them or show them areas in which they can improve." This indicates that the students can use AI to examine their weaknesses and strengths while focusing on improving the suggested areas. Providing this focused feedback can also assist in motivating the students to improve their

performances. Michael added that, "It gives the students instant feedback regarding their results, and it shows them or motivates them on ways in which they could improve their skills." This subtheme also extended to how teachers can use AI feedback in helping students with Eman, noting that "This immediate feedback loop allows us as teachers to understand their strengths and areas for improvement. And facilitate continuous progress and growth." Providing real-time feedback to the students and the capability to tailor the learning strategies makes AI a critically important tool.

Research Question Responses

This study aimed to explore and describe the shared experiences of educational leaders at a group of schools in the Middle East in their interactions with AI and how AI influences their decision-making, teaching, and learning outcomes. The guiding research questions were centered on the experiences of the teachers and education leaders.

Central Research Question

The central research question for this study was, *"What are the experiences of educational leaders in utilizing AI in educational leadership decision-making, teaching, and learning outcomes?"* The participants in the study answered this question, highlighting both positive and negative experiences. The participants expressed concern that AI would negatively affect critical thinking and students' performance since it would deprive them of the opportunity to think independently. However, another perspective addressed the positive impacts of AI, such as supporting decisions and providing real-time feedback that can be immensely helpful to students and teachers. The teachers explained that they faced different challenges while using AI in their roles; these ranged from ethical issues to the fact that AI is limited to some languages.

Sub-Question 1

The first part of the study was aimed at finding out how the leaders of education, who have worked with AI and distributed cognition, faced problems in the areas of: - decision-making on the educational link process - teaching - and developing a suitable learning environment. The results disclosed many important aspects of how AI has influenced educational leadership structures.

Enhanced Decision-making: AI has enabled educational leaders to improve their decision-making procedures by letting them deal with big-data analysis in a fast way and receive instant feedback. This has helped the leaders to make decisions based on the data-driven insights that they have obtained from the data that they have collected rather than the intuition or the limited information that they have. As an example, Saeed enthusiastically stated that AI could be used to analyze the students' data and find the trends that show a student is likely to struggle academically, therefore, it will be possible to intervene early and investigate the causes.

Consulting Measures: Participants like Jack said they use AI tools as consulting tools in the decision-making process of their projects. To illustrate, Jack, a lead assessment English teacher, mentioned that AI has helped him discover the particular elements that he should take into account when assessing and in education outcomes. He said that AI boosts his choice-making by giving him information about the words or the terminology that he can use to describe the specific tasks that are involved in demonstrating leadership, education, assessment, and outcomes.

Tailored Teaching Content: Teachers employ AI technologies to produce teaching materials that are suited to students' requirements. The AI can evaluate and extract information about students' skills, so teachers can find out what the students are good at and what needs to be

improved. The result of this is that teaching content is customized to suit the individual needs of the students, thus, making the teaching strategies more effective.

Establishing Collaborative Environments: The use of AI has facilitated teachers in creating an environment of collaboration where students can talk and share their thoughts and solve problems as a team. The collaborative method of learning improves student involvement and thus the student can achieve a better grasp of the subject.

On the whole, the results show that AI has had a huge influence on educational leadership practices, thus, it has played a great role in decision-making processes, and teaching strategies and also, and it has also been a factor in collaboration in learning environments.

Sub-Question 2

The second part of the research investigates the educational leaders' experiences with the application of AI in education and its connection to the quality of teaching and the development of an effective learning environment. The results reveal how AI has affected the quality of teaching and the learning environment of the students.

Improving Teaching Quality: Teachers have been employing AI to enhance the quality of their teaching which covers the identification of students' weaknesses and strengths. This insight permits teachers to apply teaching techniques that are unique and well-suited for each student. To illustrate, AI assists teachers in designing assessments that are suitable to the student's skill levels and, in this way, the student's performance is being improved gradually.

Developing Effective Learning Materials: Certainly, AI technology has been helping teachers create appropriate learning materials for their students. Thus, the teaching content is made interesting, up-to-date, and appropriate enough for students. AI tools digest the student

data to find out the best content and the most effective teaching methods, thus improving the teaching process.

Enhancing Learning Environments: AI has been the key factor in the development of learning environments that are not only more realistic but also more effective. Virtual and augmented reality are technologies that are utilized to produce interactive learning experiences for students. Saeed brought up this by saying, "AI technology, for instance, virtual and augmented reality, can make learning an interactive and immersive experience. " These technologies make learning more fun and interesting for students, thus, they will remember and understand the material better.

In a nutshell, the results reveal that AI has improved the teaching quality and the creation of effective learning environments. The process of personalizing the education system, the production of individualized learning materials, and the creation of the perfect learning environment are some of the ways AI has improved the quality of education.

Sub-Question 3

The third sub-question of the investigation dealt with the educational leaders' experiences with AI and its role in the training of the student's critical thinking skills. The study of the analysis showed that there were different views on how AI affects the critical thinking abilities of students.

Positive Influence on Critical Thinking: Some of the attendees, such as Eman, thought that AI could be used to boost the level of critical thinking. Eman stated that AI makes this possible by supplying learning experiences that are customized to the specific needs and abilities of the students. The participants contended that AI helps them to determine the areas in which students lack critical thinking skills which in turn, made it possible to design programs targeted

at such deficiencies. Besides, AI's capacity to give students an enormous quantity of information can be the factor that will make students do critical thinking as they are involved in the content.

Negative Influence on Critical Thinking: Contrarily, there are also people, for instance, Ahmed, who have concerns that AI is a barrier that prevents students from developing their critical thinking. Ahmed said that AI can sometimes be a hindrance to the students from the act of thinking independently, implying, "Sometimes it will prevent a student from starting to think on his own. " This view suggests that the use of AI may result in the reduction of the critical thinking level among students, depending on how it is applied.

Mixed Perceptions: In general, the data analysis showed different views on the relationship between AI and the critical thinking of students. Although some of the participants saw AI as a tool that could increase critical thinking by providing students with personalized learning experiences and access to information, others were against AI being used because AI could hinder students' opportunities for independent thinking and analysis.

Implications for Practice: These research findings show the significance of the way AI is included in educational activities so that it turns out to be a tool for critical thinking skills development. Teachers should be the ones who will be able to find the best way to combine the use of AI to improve learning experiences and the chance for students to do their critical thinking. Through the production of AI-oriented learning experiences that motivate critical thinking, teachers will be able to use the advantages of AI in the development of the student's cognitive skills.

Summary

This chapter provided a detailed description of the study participants and explored the themes and subthemes in the analyzed data. The data collected in the study was first read and re-

read to achieve familiarity; it was then coded and organized into seven themes. These were critical thinking, decision-making, ethical concerns, grading and feedback, problem-solving, professional development, and student performance. The teachers and education leaders discussed these themes about the implementation of artificial intelligence in education. The collected data revealed that education leaders had negative and positive experiences with AI. Some perceived that AI would improve critical thinking and student performance, while others still needed to be convinced. The technology was, however, beneficial to education leaders in decision-making, data analysis, and instant feedback. There was a general agreement that the implementation of AI needs to be regulated for better outcomes.

CHAPTER FIVE: CONCLUSION

Overview

This study aimed to investigate and illustrate the perceived influence of Artificial Intelligence (AI) on educational leadership's decision-making, teaching, and learning outcomes as demonstrated by educational leaders. The participants in this study were 15 teachers, 11 males, and 4 females, recruited from a selected group of schools in the Middle East. This chapter will include various sections, including the interpretation of findings, implications for policy and practice, theoretical and methodological implications, limitations and delimitations, and recommendations for future research.

Discussion

The study's data collection was conducted through transcribed individual interviews, focus group interview, and survey to obtain data concerning the viewpoints of these educational leaders. During the analysis of the significant findings from the study, four themes emerged, including (a) critical thinking, (b) decision-making, (c) ethical concerns, (d) grading and feedback. All the themes identified addressed this investigation's central research question and sub-questions.

Summary of Thematic Findings

The main research question in this study was: What are the experiences of educational leaders in utilizing AI in educational leadership decision-making, teaching, and learning outcomes? The answers to this research question were obtained from the experiences of the educational leaders who were the participants in this study. The participants projected their positive and negative experiences of AI applications in education. According to the educational leaders involved, AI positively and negatively influences their decision-making, teaching, and

learning outcomes, providing critical insights in answering the research questions. The participants told of their experiences using AI in schools and how it has influenced their operations and contributed to a shift from the conventional norms of education leaders. Teachers with more work experience could recall the significant impact of AI and how it has influenced their decision-making, teaching, and learning outcomes. Also, the teachers with less experience gave critical insights into their experiences of the impact of AI usage in the education sector. Their experiences also provided data on the effect of AI on the teacher's decision-making, teaching, and learning outcomes.

The study's participants' experiences highlighted their significant concerns over the negative impact of AI application in schools on students' performance and their critical thinking skills. Based on their experiences, these teachers argued that AI usage for educational purposes would deter students from thinking independently. As a result, it will disengage them from applying and effectively utilizing their critical thinking skills, consequently affecting their performance. The biased AI algorithms may also provide students with false information, negatively impacting student performance. Also, students are more likely to rely on AI tools for various educational tasks. The over-reliance on AI tools negatively affects students as students become lazier in completing their tasks independently. The teacher-participants also raised ethical concerns over the usage of AI. One argument postulated was that AI results in dishonesty among students, with students tending to avoid work stress by using AI to prepare essays and perform other tasks instead of individually writing and performing the tasks.

However, AI had positive implications for the education sector from the experiences of these education leaders. Some of the positive impacts of AI identified from their submissions include its support for teaching decisions and offering real-time feedback. The participants also

pointed out that the positive use of AI could improve student's critical thinking processes by allowing them to improve their thinking via tailored and personalized learning experiences. AI could also be used as an alternative problem-solving tool that is more effective in enhancing students' problem-solving skills. The positive implications of AI implied that AI tools could significantly benefit teachers and students. Also, the teacher-participants illustrated the various challenges of using AI in their teaching roles, including the ethical issues of AI in the education sector and its restriction to specific languages.

The first sub-question for this research was, "What are educational leaders' experiences with AI and distributed cognition, particularly concerning their involvement in educational leadership decision-making, teaching, and developing suitable learning environments?" Based on the study's findings, participants noted that AI helped education leaders improve their decision-making by providing immediate feedback and big-data analysis. The application of AI in education, specifically data analysis, had served a significant function in helping education leaders make decisions concerning effective interventions that could be applied to improve student performance. Participants added that AI tools could be used as an early intervention in performing predictive analysis, which assisted in effectively evaluating student data and identifying areas of academic improvement. Also, these tools helped teachers to effectively determine particular elements that should be considered in assessment outcomes. The analysis of the teacher-participant experiences also demonstrated the importance of AI in assisting teachers in forming a collaborative environment where they could effectively engage with the students in discussing and solving identified educational issues. Therefore, teachers who implement AI could use it to develop suitable learning environments that effectively improved student learning experiences and performances.

The second sub-question of the investigation was, "What are the educational leaders' experiences with the application of AI in education and its relation to the quality of teaching and the development of effective learning environments?" According to the teacher-participant's experiences, AI could be used to develop teaching materials. The participants stated that the use of AI in forming teaching materials enhanced the quality of their teaching. It assisted teachers in comprehending the strengths and weaknesses of the students and developing personalized teaching strategies to take advantage of these strengths and address the shortcomings. The participants had also been able to use AI to generate evaluation assessments appropriate to the student's education level. In this regard, AI effectively established quality learning experiences to improve student performance. The teachers noted that AI formed compelling student learning experiences.

The third sub-question investigated was, "What are educational leaders' experiences with AI and its influence on developing critical thinking skills among students?" For this research question, the participants highlighted AI's negative and positive implications on students' critical thinking abilities. Based on the analysis, AI could enhance students' critical thinking by offering tailored learning experiences that meet their learning abilities and needs. If used positively, AI could help students determine their weaknesses in critical thinking and provide practical strategies for addressing these deficiencies. However, the participants also pointed out the dangers of AI on the students' critical thinking capabilities.

In some cases, students over-relied on AI, prevented them from developing independent thoughts and further developing their critical thinking capabilities. Therefore, based on these findings, AI enhanced or reduced students' essential levels of thinking based on its application in the learning environment. The education leaders expressed their concerns over the negative

implications of AI on students' critical thinking. They stated that caution should be taken when using AI for educational purposes.

Implications for Policy or Practice

This research revealed the positive and negative implications of AI usage in educational leadership decision-making, teaching, and learning outcomes based on the experiences of various education leaders from selected schools in the Middle East. The analyzed data provided significant insights into the implications of AI on multiple aspects of educational leadership. Therefore, based on these findings, specific recommendations could be developed for various stakeholders in the education sector.

Implications for Policy

To ensure AI tools were effectively used in enhancing educational leadership decision-making, teaching, and learning outcomes, it was essential to implement various policies to guide AI application in education. Evidence from the data collected points to the importance of implementing policies that support the application of AI in educational settings. Therefore, education policymakers must implement policies that compel training and support education leaders using AI for various tasks. It ensured that education leaders observe the ethical considerations of AI use and are knowledgeable on the appropriate steps in using AI to perform data analysis and provide feedback on student developmental needs. Furthermore, the various learning institutions could be supported by policies that provide adequate funding to enable schools to implement these AI tools effectively. Such policies include allocating financing to enhance the digital readiness of these schools to use AI for various learning processes.

Also, policymakers and education stakeholders should pass policies that solve the ethical concerns of AI applications in the education setting. The main ethical concerns identified from

the experiences of the educational leaders include data privacy and security and algorithm biases. There should be proper guidelines on accessing, gathering, and storing student data within these AI tools when dealing with data security concerns. Also, policies should address algorithm biases by compelling these AI tools to have diversified information for the potentially diverse group of students. This policy initiative ensured these AI tools serve diverse student groups' needs. The policy was crucial in addressing the systemic inequalities in the education sector and providing all student groups, including the disadvantaged groups, could use AI tools. Therefore, education policymakers should form policies that encourage equitable access to AI schools in all schools. It ensured that all students benefit from this technological advancement, irrespective of their background. Addressing the inherent inequalities in the education system should be the focus of any innovation or learning approach implemented in the education system.

Implications for Practice

From the research, various implications for practice could be deduced for the effective implementation of AI in learning environments. While AI tools are beneficial in the education environment, it may be important for educational leaders across various settings to select and implement the appropriate AI tools strategically. Education leaders should consider the AI tools that suit their teaching and learning needs and can positively influence their decision-making, teaching, and learning outcomes. Proper selection and usage of AI tools in education help mitigate AI's negative implications and help education leaders significantly improve their teaching and learning outcomes. Appropriate training and guidance may be important in assisting teachers in effectively using AI to guide their teaching approaches and address students' learning abilities and needs.

Furthermore, since a collaborative learning environment was crucial in enhancing the student's learning outcomes and performance, it may be important to use AI tools to encourage learning collaboration among students. AI tools could be used in activities that enable students to collaborate and share their experiences to improve their learning outcomes. The teachers could use AI tools to establish collaborative learning communities that take advantage of students' strengths while addressing their weaknesses. This was crucial in helping the students collectively deal with their learning challenges while leveraging their potential to improve their learning outcomes and performance. Teachers may also use AI to develop targeted and personalized learning approaches to address each student's weaknesses. Teachers could use AI tools to provide students with feedback on their learning needs and performance, provide them with a learning platform for dealing with their weaknesses, and provide effective recommendations for improving their learning experiences.

Empirical and Theoretical Implications

This study had various empirical and theoretical implications that impacted multiple stakeholders in education and learning environments. Comparing and contrasting the found themes with the theory of other studies was integrated and vital in allowing critical insights to be deduced. The study's ethical and theoretical implications were analyzed individually.

Empirical Implications

This study enhanced the current literature on various paradigms, including AI and critical thinking in an educational context, decision-making, ethical concerns, and grading and feeback. Abdulai and Hung (2023), Hung (2023), and Zhang Chen (2021) integrated that the use of AI in education had a profound implication on students' critical thinking and decision-making abilities and patterns. Critical thinking allowed learners to generate and choose alternatives, restated the

problems, and prioritized goals. Therefore, since critical thinking, decision-making, and objectives were morally binding, it would be challenging for AI technologies to enhance students' critical thinking. In their analysis of the implication of AI tools such as ChatGPT on the components of nursing education, Abdulai and Hung (2023) found that the tool cannot assist nursing students in solving their education problems that demand critical thinking as well as personal judgment, even if the tool is modeled to learn, reason and simulate human cognition. These assertions aligned with the study's findings. It conformed with these investigations that AI tools such as ChatGPT could negatively affect students' critical thinking and decision-making.

Hung (2023) suggested that educational leaders should encourage learners to prioritize analyzing and evaluating information, synthesize knowledge from various sources, and apply their comprehension against depending on the AI tools' interpretations to make decisions. This perspective was also supported by the study of Abdulai and Hung (2023), who emphasized the need for learners to integrate contextualized and individualized decision-making and problem-solving techniques unique to their learning components. The emphasis of these two investigations conformed with the findings of this study. The participants in this study also emphasized the need for the learners to prioritize their analysis, problem-solving, and synthesis of knowledge while using AI tools such as ChatGPT as secondary tools. This would allow the students to reduce the negative implications of AI on their critical thinking while also gaining the advantages resulting from using AI.

On the other hand, the studies by Bozkurt et al. (2023), Chiawa (2023), Dieterle et al. (2022), Wood (2023), and Zinchenko et al. (2022) predicted that AI would be crucial in enhancing critical thinking and ensuring robust academic outcome. According to these studies, AI tools in education elevated learning experiences, improved teaching mechanisms, and

enhanced educational outcomes, including learners' critical thinking. These assertions conformed with this study's findings. This study found empirical evidence that AI would positively impact the educational context, including optimizing learning paradigms and improving students' critical thinking.

This study aligned with the inferences and conclusions of various studies on decision-making in the educational context. The study by Ahmed et al. (2023) established that institutions produce vast amounts of data and thus require robust analysis to make effective decisions. AI technologies reduced human involvement in data handling and interpretations and enhance decision-making paradigms. This could allow educational stakeholders, including teachers, to make informed and evidence-based decisions. This study also integrated the effectiveness of decision-making through extensive data analysis. According to the study's findings, using AI tools in education was beneficial in decision-making since it offered in-depth data, information, and robust analysis approaches of these data concerning multiple educational components, including performance, students' needs, and preferences, as well as effective approaches. This study established that accessing data and information was crucial in decision-making; therefore, AI tools' robust data analysis capabilities have allowed teachers to elevate their focus on learners when making critical decisions. Subsequently, the study found that AI allowed the teachers to develop a collaborative working and decision-making environment that allowed the input of different stakeholders in education, including the students. These discoveries aligned with the findings of different stakeholders.

Theoretical Implications

This study used the distributed cognition theory as a framework for this analysis. This theory suggested that cognitive processes are not solely linear; they occur beyond the human

mind, whereby cognition considers insights and details dispersed across individuals, environments, social spaces, artifacts, and evolving time. Therefore, the theory holded that humans have limited cognitive resources, making automated technology necessary to spread awareness. Learning moved from individual learning to collaborative learning, which aimed to overcome the limited nature of human working memory. In learning environments, individuals experience cognitive load; thus, there was a need to overcome the cognitive load. This prompted individuals to embrace elements such as collaborative learning, establishing that individual knowledge could be integrated into collaborative learning.

According to this study's findings, educational leaders started integrating AI tools to optimize joint collaborative and cognitive learning environments. AI tools helped teachers instill student collaboration, allowing them to solve problems easily in these collaborative environments. Through AI tools, teachers could simulate collaborative situations, allowing adjustments of these environments and thus improving decision-making and leadership skills. Through the simulations and evidence-based decision-making, robustly enabled by AI tools, educational leaders' teaching, learning, and decision-making segments are profoundly enhanced, allowing for the distribution of cognition through cognitive offloading. Also, the study contributed to the theory by projecting the various novel mechanisms that educational leaders communicate with different segments of the learning environment. The study's findings outlined that AI allowed for the distribution of multiple tasks and task demands in the learning environment, saving teachers' internal cognitive resources. Educational leaders leveraged AI in multiple ways, including creating collaborative learning environments and instilling problem-solving mechanisms and decision-making. Leveraging AI could imply protecting the educational leaders' cognitive resources.

Table 6

Aspects & Theoretical Implications

Aspect	**Theoretical Implication**
Learning Process	There is a shift from individual learning to collaborative learning, which could have various implications, including addressing the limitations of cognitive load and human working memory.
Role of AI Tools	AI tools assist in facilitating collaborative learning environments. Through collaborative learning paradigms, cognitive tasks can be offloaded from all involved parties.
Educational Leadership Skills	Educational leadership skills, such as decision-making, could be profoundly enhanced through AI paradigms such as data-driven decision-making and simulation integration.
Distributed Cognition	AI could assist in promoting the distribution of cognitive tasks within learning environments. This would enhance cognitive distribution and subsequently optimize learning environments and outcomes.

Limitations and Delimitations

This section highlighted the limitations and delimitations of this study that might have implications for the findings and their application. Limitations are the issues identified by the research methodology or design applied. On the other hand, delimitations refer to the investigation's boundaries on what should be included or excluded. Identifying these

delimitations is crucial in determining what future research could improve on to enhance the study's quality. The identified limitations and delimitations are discussed below.

Limitations

One major limitation of the research was that the recruitment should have considered education leaders handling all students. Only education leaders handling students between grades 6-12 were considered for this research. It implied that the researcher left out other grades that could have provided contradicting or further information on the effect of AI use on educational leadership's decision-making, teaching, and learning outcomes. Also, the study was only limited to the Middle East region, which negatively impacted its generalizability. The study's findings could not be effectively translated to other areas since other regions may have provided different insights on the application of AI to the education system. Therefore, to gain a more general perception, it would have been important to consider diverse perceptions from different regions to enhance the investigation's quality.

Delimitations

The study had several delimitations due to the research method used in this investigation. The researcher utilized the transcendental phenomenological study approach to comprehend and illustrate the perceived implication of AI on educational leadership's decision-making, teaching, and learning outcomes. The transcendental phenomenological approach allows one to inquire and examine the participants' experiences about a subject or phenomenon (Pilarska, 2021). In executing this approach, the researcher utilized a sample of 15 education leaders and teachers from a single geographical area in the Middle East. The teachers were obtained from three schools, Sade School, Amr School, and Adnap School (pseudonyms), all located in the Middle

East. This sample acted as a wider representative group of teachers in other Middle East learning institutions.

Also, the representative sample was limited because the participants selected for this study had to have used AI in their teaching, learning, and decision-making. The researcher only considered educational leaders with at least two years of experience in educational leadership and teaching and at least one year of experience in using AI tools for teaching and educational decision-making. These delimitations were utilized to ensure that the participants used for this study had experienced the phenomenon, which is crucial for the transcendental phenomenological approach to be highly effective. The participants also had to have experienced the phenomenon over some time (1 year) to ensure they had experiences to recall and provide meaningful data for the study.

Recommendations for Future Research

Considering the findings, limitations, and delimitations postulated in the sections above, various recommendations and directions for future research can be suggested. The study only engaged 15 teachers from three schools in the Middle East who have experienced the use of AI in decision-making, teaching, and learning. The sample needed more generalizability as it only included teachers dealing with students from grades 6-12 and the Middle East. Therefore, to improve the accuracy of findings and enhance the generalizability of the study, future studies need to engage participants from various geographical locations and across all education levels. This recommendation will ensure that the research findings are relevant across multiple education levels and geographical locations.

Also, future research should look into the use of AI from a student perspective to gain comprehensive insights into the implications of AI on the education system. The current study

only focused on the education leadership's perspective on the topic, which provides only one perspective. For effective decision-making and policy-making, it is crucial to consider diverse perspectives. Student perspectives are equally important for decision-making, and future research should consider the relationship between AI application in education and student performance. The qualitative studies should explore student's experiences with the use of AI and relate it to their performance in establishing both positive and negative implications of AI usage.

Furthermore, another important area of research that should be thoroughly investigated is the future of AI use in education. Research should consider the various roles that AI is expected to play in the education system. It includes examining the potential use of emerging AI tools in improving learning experiences and their impact on decision-making, teaching, and learning outcomes. Future research should also consider ways AI can ensure equitable access to education across all populations, including disadvantaged groups. These recommendations will ensure that future research provides comprehensive insights into the implications of AI on teaching, learning, and decision-making outcomes.

Conclusion

AI had profound implications for educational leadership's decision-making, teaching, and learning outcomes, as revealed by educational leaders at a group of secondary public schools in the Middle East. Using the distributed cognition theory, the study integrated various paradigms associated with the dynamics of human cognition, AI cognition, and a deep understanding of the perceived implications of AI on education. Based on the study's central question, educational leaders perceived AI to have various implications on educational leadership, including decision-making, teaching, and learning outcomes. Through components such as robust data analysis, the creation of a collaborative environment, and simulations, AI could assist educational leaders in

improving these skills. With the shifting learning environments and approaches, collaborative learning is becoming more crucial. AI paradigms allowed for the profound establishment of collaborative learning environments, allowing educational leaders and learners to derive multiple benefits. Also, AI played a crucial role in enhancing students' critical thinking and problem-solving skills. However, AI had also been projected to limit learners' critical thinking.

In conclusion, educational leaders perceived that AI would play a significant role in the educational environment, impacting both themselves and the students in the classrooms. As AI continued to enhance, its implications would continue to increase, as the emerging themes indicate. In teacher decision-making, AI allowed for cognitive offloading by automating and removing various tasks, allowing educational leaders to focus on other issues and make robust decisions, as the distribution cognitive theory outlines. One key takeaway involved the potential implication of AI on students' educational experiences and performance about AI. The study found that it is pivotal for teachers to develop learning environments that do not prompt students to entirely depend on AI; instead, they encourage the learners to prioritize their individual analysis, problem-solving, and knowledge synthesis while using AI tools such as ChatGPT as secondary tools that reinforce these individualized cognitions.

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Appendix A

IRB Approval Letter

LIBERTY UNIVERSITY.
INSTITUTIONAL REVIEW BOARD

January 4, 2024

Mousa Abduljaber

Re: IRB Exemption - IRB-FY23-24-308 PERCEIVED INFLUENCE OF ARTIFICIAL INTELLIGENCE ON EDUCATIONAL LEADERSHIP'S DECISION-MAKING, TEACHING, AND LEARNING OUTCOMES: A PHENOMENOLOGICAL STUDY

Dear Mousa Abduljaber, Traci Eshelman,

The Liberty University Institutional Review Board (IRB) has reviewed your application in accordance with the Office for Human Research Protections (OHRP) and Food and Drug Administration (FDA) regulations and finds your study to be exempt from further IRB review. This means you may begin your research with the data safeguarding methods mentioned in your approved application, and no further IRB oversight is required.

Your study falls under the following exemption category, which identifies specific situations in which human participants research is exempt from the policy set forth in 45 CFR 46:104(d): Category 2.(iii). Research that only includes interactions involving educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior (including visual or auditory recording) if at least one of the following criteria is met:

The information obtained is recorded by the investigator in such a manner that the identity of the

human subjects can readily be ascertained, directly or through identifiers linked to the subjects, and an IRB conducts a limited IRB review to make the determination required by §46.111(a)(7).

Please note that this exemption only applies to your current research application, and any modifications to your protocol must be reported to the Liberty University IRB for verification of continued exemption status. You may report these changes by completing a modification submission through your Cayuse IRB account.

If you have any questions about this exemption or need assistance in determining whether possible modifications to your protocol would change your exemption status, please email us at irb@liberty.edu.

Sincerely,

G. Michele Baker, PhD, CIP

Administrative Chair

Research Ethics Office

Appendix B

Recruitment Letter

Dear Educational Leader:

As a PhD student in the School of Education at Liberty University, I am conducting research as part of the requirements for a doctoral degree. The purpose of my research is to understand educational leaders lived experiences regarding the influence of AI on educational leadership's decision-making, teaching, and learning outcomes at a school located in UAE. I am writing to invite you to consider participating in my study. In order to participate you must meet the following:

1. Have experienced and interacted with or used AI technologies in effecting decisions regarding leadership in administration, teaching, or learning outcomes at your current school
2. Have been employed as an educational leader (department head) at your current school for the last 2 years

If you agree to participate in this study, you will be asked to do the following:

1. Participate in a one-on-one interview that should last between 30 and 60 minutes.

   You will have the ability to choose your preferred method of interviewing either face-to-face or through Microsoft Teams (MS Teams). This interview will be audio recorded.
2. Participate in an online small group discussion with other educational leaders in this study. You will be asked to join a MS Teams meeting and actively participate with others for between 60 and 90 minutes on a designated date. The small group discussion will be audio recorded. It is your option If you do not wish to be seen on video.

3. Participate to complete an online survey. This should take no more than 15 minutes for you to complete. The survey should be completed by clicking on the link that will be shared by email to you.

   Your name or other identifying information will be collected as part of your participation, but this information will remain confidential. This study will not cost you anything but time. Your participation in this study is optional and voluntary. Feel free to withdraw at any time. You will not be compensated for your participation.

   If you are selected to participate, you will receive a follow-up email with the consent document and instructions to schedule your interview. The consent document contains additional information about my study and should be signed and returned to me in order to schedule the interview.

   Please email me at mfabduljaber@liberty.edu or call me at 00971508368874 if you have additional questions. Thank you for considering this option to participate in my study.

   Sincerely,

   Mousa Abduljaber

   Doctoral Candidate at Liberty University.

Appendix C

Welcome Letter

Dear Educational Leader:

Thank you for your interest in participating in my study. I have attached a consent form that is required for your participation. It must be signed and returned to me before we can schedule your interview. Please sign, scan, and return it to me at mfabduljaber@liberty.edu, or you may type your information directly into the form and attach it to an email. Also, when forwarding your consent form, please let me know which method of interviewing you prefer (MS Teams or face-to-face) and what dates you are available to meet within the next week. Thank you so much for taking the time out of your busy schedule to participate in this study. I look forward to working with you and learning from your experiences!

Best Regards,

Mousa Abduljaber

Doctoral Candidate at Liberty University

Appendix D

Consent Form

Perceived Influence of AI on Educational Leadership's Decision-Making, Teaching, and Learning Outcomes: A Phenomenological study

Mousa Abduljaber

Liberty University

School of Education

You are invited to be in a research study of how educational leaders experience the influence of AI on educational leadership's decision-making, teaching, and learning outcomes at a school located in UAE. You were selected as a participant because you are employed as an educational leader (department head) at your current school for the last 2 years and have experienced or used AI Technologies in effecting decisions regarding leadership in administration, teaching, or learning outcomes. I ask that you read this form and ask any questions you may have before agreeing to be in the study.

Mousa Abduljaber, a doctoral candidate in the School of Education at Liberty University, is conducting this study.

Background Information: The purpose of this study is to understand educational leaders lived experiences regarding the influence of AI on educational leadership's decision-making, teaching, and learning outcomes at a school located in UAE.

Procedures: If you agree to be in this study, I would ask you to do the following:

1. Participate in a one-on-one interview that should last between 30 and 60 minutes.

   You will have the ability to choose your preferred method of interviewing either face-to-face or through Microsoft Teams (MS Teams). This interview will be audio recorded.

2. Participate in an online small group discussion with other educational leaders in this study. You will be asked to join a MS Teams meeting and actively participate with others for between 60 and 90 minutes on a designated date. The small group discussion will be audio recorded. It is your option If you do not wish to be seen on video.
3. Participate to complete an online survey. This should take no more than 15 minutes for you to complete. The survey should be completed by clicking on the link that will be shared by email to you.

   Risks: The risks involved in this study are minimal, no more than you would encounter in everyday life.

   Benefits: Participants should not expect to receive a direct benefit from taking part in this study. However, you may benefit from participating in a small group discussion with other teachers who have experienced the influence of AI on educational leadership's decision-making, teaching, and learning outcomes at a school located in UAE. The field of education may benefit from the results of this study by gaining a better understanding of how teachers experience the influence of AI on educational leadership's decision-making, teaching, and learning outcomes.

   Compensation: This study will not cost you anything but time. Your participation in this study is optional and voluntary. Feel free to withdraw at any time. You will not be compensated for your participation.

   Confidentiality: The records of this study will be kept private. In any sort of report I might publish, I will not include any information that will make it possible to identify a subject. Research records will be stored securely and only the researcher will have access to the records.

   · Each participant will be assigned a pseudonym to protect his/her identity. Interviews will be conducted in a location where others cannot easily overhear.

· Interviews and small group discussions will be recorded and transcribed. Recordings will be stored on a password locked computer for five years and then erased. Only the researcher will have access to these recordings.

· Data will be stored on a password locked computer and may be used in future presentations. After five years, all electronic records will be deleted.

· I cannot assure participants that other members of the small group will not share what was discussed with persons outside of the group.

Voluntary Nature of the Study: Participation in this study is voluntary. Your decision whether or not to participate will not affect your current or future relations with Liberty University. If you decide to participate, you are free to not answer any question or withdraw at any time without affecting those relationships.

How to Withdraw from the Study: If you choose to withdraw from the study, please contact the researcher at the email address included in the next paragraph. Should you choose to withdraw, data collected from you, apart from small group discussion data, will be destroyed immediately and will not be included in this study. Small group discussion data will not be destroyed, but your contributions to the small group discussion will not be included in the study if you choose to withdraw.

Contacts and Questions: The researcher conducting this study is Mousa Abduljaber. You may ask any questions you have now. If you have questions later, you are encouraged to contact him at mfabduljaber@liberty.edu. You may also contact the researcher's faculty advisor, Dr. Eshelman at teshelman@liberty.edu.

If you have any questions or concerns regarding this study and would like to talk to someone other than the researcher, you are encouraged to contact the Institutional Review Board, 1971 University Blvd, Green Hall 2845, Lynchburg, VA 24515 or email at irb@liberty.edu.

Please notify the researcher if you would like a copy of this information to keep for your records.

Statement of Consent: I have read and understood the above information. I have asked questions and have received answers. I consent to participate in the study.

The researcher has my permission to audio-record me as part of my participation in this study.

_____

Signature Date

_____

Signature of Investigator Date

Appendix E

Individual Interview Questions

Open-Ended Interview Questions

1. Please describe your educational background and career through your current position as an educational leader. CRQ
2. How has AI influenced your decision-making as an educational leader? SQ1
3. Describe specific instances where AI has improved student learning outcomes in your school. SQ1
4. Describe how the current AI educational leadership and teaching models differ from the traditional educational leadership decision-making and teaching models. SQ1
5. How does AI influence your professional development? SQ1
6. How does using AI technologies such as ChatGPT in completing assignments and solving tasks influence their ability to think critically? SQ2
7. How does AI allow you to enhance the development of students' critical thinking skills? SQ2
8. Describe any instances where AI tools or technologies have facilitated critical thinking in students. SQ2
9. How do you leverage AI to enhance students' critical thinking skills? SQ3
10. How do ethical concerns related to AI in education affect how you use AI? SQ1
11. How do you see the future of AI in education, especially the potential influence it might have on students' critical thinking abilities? SQ3
12. What else should I know about your experiences with AI in education? SQ1

Appendix F

Focus Group Questions

Open-Ended Interview Questions

1. What professional experiences have you had with AI in educational leadership decision-making or teaching? CRQ
2. Describe successful practices in teaching, decision-making, or supporting learning you have used to realize better outcomes. SQ1
3. How does AI influence the development of students' critical thinking skills? SQ2
4. How do you leverage AI to support teaching and learning? SQ1
5. Describe any instances, risks, or challenges associated with AI that affect the development of students' critical thinking skills. SQ3
6. What else should we know about the influence of AI on education? SQ1

Appendix G

Survey Questions

1. Describe your challenges when using AI in your role performance. CRQ
2. What is our perception of the influence of AI on students' critical thinking? SQ2
3. Describe any challenges or barriers to implementing AI in education. SQ2
4. How has AI enhanced your decision-making processes regarding teaching and learning outcomes? Why or why not? SQ1
5. Please describe how you use AI to support teaching and learning. SQ3
6. What challenges or limitations have you encountered while using AI in effecting educational leadership's decision-making, teaching, and learning outcomes? SQ1

Appendix H

Site Permission Request Letter

Perceived Influence of AI on Educational Leadership's Decision-Making, Teaching, and Learning Outcomes: A Phenomenological Study

Mousa Abduljaber

Liberty University

School of Education

Dear Sir/Madam

My name is Mousa Abduljaber, and I am requesting permission to conduct the study at your site. The purpose of this research is to understand and describe the perceived influence of AI on educational leadership decision-making, teaching, and learning outcomes. The research has been reviewed by the Liberty University IRB and received approval to proceed (Institutional Review Board, 1971 University Blvd, Green Hall 2845, Lynchburg, VA 24515 or email at irb@liberty.edu).

As part of this study, the study site may benefit from the results by better understanding how teachers experience AI's influence on educational leadership's decision-making, teaching, and learning outcomes.

Compensation: This study will not cost you anything but time. Your participation in this study is optional and voluntary. Feel free to withdraw at any time. You will not be compensated for your participation.

Confidentiality: The records of this study will be kept private. In any sort of report I might publish, I will not include any information that will make it possible to identify a subject. Research records will be stored securely, and only the researcher will have access to the records. Each participant will be assigned a pseudonym to protect their identity. Interviews will be conducted in a location where others cannot easily overhear.

Interviews and small group discussions will be recorded and transcribed. Recordings will be stored on a password-locked computer for five years and then erased. Only the researcher will have access to these recordings.

Data will be stored on a password-locked computer and may be used in future presentations. After five years, all electronic records will be deleted.

I cannot assure participants that other group members will not share what was discussed with persons outside of the group.

Voluntary Nature of the Study: Participation in this study is voluntary. Your decision whether or not to participate will not affect your current or future relations with Liberty University. If you decide to participate, you are free not to answer any question or withdraw at any time without affecting those relationships.

The anticipated date to start this research is 6 February 2024. If you allow the research to be conducted in your institution, please complete the information below:

Name of the learning Institution:

_____

Personal responsible for permission:

_____

Signature:

_____

Date:

_____

Appendix I

Inclusion/Exclusion Criteria

Inclusion	Exclusion
Educational leaders	Non-educational leaders
Experience of at least two years of leadership and teaching	Experience of less than two years of educational leadership.
At least one year of experience using AI in teaching and decision-making	Educational leaders with less than one year of experience using AI in teaching and decision-making
Possess at least a Bachelor's degree in any education-related discipline	Educational leaders without a Bachelor's degree or an advanced education level in any education-related discipline.
25 years and above	Education leaders below 25 years
Male and female speakers of English	Male and female non-speakers of English

Appendix J

Permission to Conduct Research

Date: 09, September, 2023

From: Mousa Abduljaber

To: Ajal Academy Administration

Subject: Seeking Permission to Conduct Research

I am Mousa Abduljaber, a Doctoral Candidate at Liberty University School of Education. I am currently conducting research essential for completing my study, focusing on the perceived influence of AI on educational leadership decision-making, teaching, and learning outcomes. Therefore, I humbly request your approval to conduct individual interviews, focus group interviews, and surveys with your current educational leaders to collect data to help complete my dissertation. This research will be conducted in line with the Liberty University IRB, ethical practices of research, and relevant policies, especially regarding human research protections, handling of confidential information, handling of intellectual property, addressing research misconduct, and addressing conflict of interest in research.

I shall be highly obliged if you look into this matter and approve my request.

Best Regards,

Mousa Abduljaber

Doctoral Candidate at Liberty University

Appendix K

Letter of Invitation to Participate in the Research

Date: 02, November, 2023

From: Mousa Abduljaber

Email: mfabduljaber@liberty.edu

To: Ajal Academy Administration

Subject: Invitation to Participate in the Research

I invite you to participate in my study starting in January 2024. The purpose of this study is to understand and describe the perceived influence of AI on educational leadership decision-making, teaching, and learning outcomes. You are eligible to participate in this study if you are willing. I will ask you to answer the interviews and complete the survey, with each exercise taking at most 90 minutes. The interviews and survey will contain questions about the influence of AI on educational leadership decision-making, students' critical thinking, teaching approaches, and learning strategies. Your responses will be anonymous and confidential.

Your participation in this study is completely voluntary. Equally, you have a right to discontinue participation in this study at any time. You may also choose to skip questions you find uncomfortable to answer. Your response to interview questions and completion of the survey will indicate your consent to participate in this study. Feel free to contact me for clarification at your convenience if you have questions.

Best Regards,

Mousa Abduljaber

Doctoral Candidate at Liberty University

Appendix L

Non-Disclosure Agreement

THIS AGREEMENT by and between Mousa Abduljaber, a Doctoral Candidate at Liberty University School of Education, 1971 University Blvd, Green Hall 2845, Lynchburg, VA 24515 and Ajal Academy in the Middle East, a private primary school using AI to support educational leadership decision-making, teaching, and learning, Uriah Circle, UAE, LP 705130.

The parties agree as follow

1. "Confidential Information" shall be defined as that proprietary information, other intellectual property, and/or any and all information, know-how and data, technical or non-technical, concerning software, data and/or other technologies owned or controlled by either party that is transmitted or otherwise disclosed by one party (DISCLOSING PARTY) to the other party to this Agreement (RECIPIENT) orally, in writing, electronically, or in other tangible form that has or could have commercial value or other utility to a party to this agreement, or to any other person or party. Confidential Information also includes all information which the unauthorized disclosure of such information could be detrimental to the interests of the party which owns or controls said information, whether or not such information is identified as Confidential Information.
2. The parties agree that the disclosure hereunder is for the sole purpose of evaluating a possible collaborative research arrangement between the parties in accordance with or using in whole or in part such Confidential Information.
3. The disclosure of the Confidential Information shall be in writing and clearly marked "CONFIDENTIAL," or if orally disclosed, shall be described as "CONFIDENTIAL" when

disclosed and shall be reduced to writing by the party making the disclosure within thirty days of its disclosure.

RESPONSIBILITIES OF THE RECIPIENT

4. The Recipient shall not use any Confidential Information received by a party to this Agreement for any purpose and, especially for the purpose of developing a commercial application using any part of the Confidential Information, other than for assessment, except as provided in this paragraph. Without the prior, written consent of a duly authorized representative of the party making the disclosure, the Recipient shall not disclose such Confidential Information to any third party other than to employees and/or students who are under similar obligations of non-use and non-disclosure and who have a strict need for access to such Confidential Information in order to assist in doing the aforementioned assessment.
5. In consideration of such disclosure, for a period of five (5) years after the disclosure of the Confidential Information, the Recipient agrees not to disclose the Confidential Information to any third party not affiliated with the parties to this agreement by common ownership and then only under similar conditions of confidentiality or use it for any purpose, other than as described in this Agreement, unless the party disclosing the Confidential Information agrees otherwise in writing prior to the disclosure of the information.
6. The party receiving the Confidential Information will disclose it only to those employees, individuals or entities who have a need to know of it as a part of the party's evaluation of the information and those receiving the Confidential Information shall hold such information in confidence pursuant to the terms of this Agreement.
7. In the event that a party receiving Confidential Information shall have knowledge of any breach of confidentiality or the misappropriation of any Confidential Information, that party shall

promptly give notice thereof to the other party. In the event of any violation of this agreement by any party, without limitation to any of the other remedies to which it may be entitled by law, the aggrieved party may be entitled to injunctive relief and to payment of court costs and attorney's fees that it incurs in protecting its intellectual property rights, and/or the confidentiality of any information.

JOINT RESPONSIBILITIES

8. The obligations of confidentiality shall not apply to information transmitted by one party to the other party.
9. The parties further agree that during the period of time that such information is to be treated as confidential under this Agreement, no party will make any commercial use, in whole or in part of the other party's Confidential Information, without that party's prior written consent.

Liberty University	Ajal Academy
Name: _____	Name: _____
Signature: _____	Signature: _____

Appendix M

Screening Criteria

1. Do you use AI to make education administrative decisions?

YES	NO

2. Use AI to mediate student cognition and the external cognitive environment toward establish student learning outcomes.

YES	NO

3. Provide direction and guidance to educators on the use of AI.

YES	NO

4. Trains educators on using AI in teaching and improving learning outcomes.

YES	NO

5. Support educators to effectively implement AI in teaching.

YES	NO

6. Ensure students' learning and development is guided by AI teaching and learning approaches.

YES	NO

7. Builds AI knowledge, skills, and professionalism of educators.

YES	NO

Appendix N

Audit Trail