Integrating AI and EdTech Solutions in Higher Education: Faculty Experiences at Nazarbayev University

Aiza Bissaliyeva

Submitted in partial fulfillment of the requirements for the degree of

Master of Sciences

in

Educational Leadership

Nazarbayev University Graduate School of Education

April, 2024

Word Count: 18913

Author Agreement

By signing and submitting this license, I, Aiza Bissaliyeva, (the author) grant to Nazarbayev University (NU) the non-exclusive right to reproduce, convert (as defined below), and/or distribute my submission (including the abstract) worldwide in print and electronic format and in any medium, including but not limited to audio or video.

I agree that NU may, without changing the content, convert the submission to any medium or format for the purpose of preservation. I also agree that NU may keep more than one copy of this submission for purposes of security, back-up and preservation.

I confirm that the submission is my original work, and that I have the right to grant the rights contained in this license. I also confirm that my submission does not, to the best of my knowledge, infringe upon anyone's copyright.

If the submission contains material for which I do not hold copyright, I confirm that I have obtained the unrestricted permission of the copyright owner to grant NU the rights required by this license, and that such third-party owned material is clearly identified and acknowledged within the text or content of the submission.

IF THE SUBMISSION IS BASED UPON WORK THAT HAS BEEN SPONSORED OR SUPPORTED BY AN AGENCY OR ORGANIZATION OTHER THAN NU, I CONFIRM THAT |I HAVE FULFILLED ANY RIGHT OF REVIEW OR OTHER OBLIGATIONS REQUIRED BY SUCH CONTRACT OR AGREEMENT.

NU will clearly identify my name(s) as the author(s) or owner(s) of the submission, and will not make any alteration, other than as allowed by this license, to your submission.
I hereby accept the terms of the above Author Agreement.

Author's signature:  Date: 22.04.2024

Declaration

I hereby declare that this submission is my own work and to the best of my knowledge it contains no materials previously published or written by another person, or substantial proportions of material which have been submitted for the award of any other course or degree at NU or any other educational institution, except where due acknowledgment is made in the thesis. This thesis is the result of my own independent work, except where otherwise stated, and the views expressed here are my own.

Author's signature:  Date: 22.04.2024

Ethical Approval

53 Kabanbay Batyr Ave.
Astana 010000
Republic of Kazakhstan
Date: XX of Xxxxxx, 2024

Dear:

Aiza Bissaliyeva

This letter now confirms that your research project titled…

Integrating AI and EdTech Solutions in Higher Education: Faculty Experiences at Nazarbayev University

(a) has been approved by the Graduate School of Education Ethics Committee of Nazarbayev University.

OR

(b) has been approved by the Graduate School of Education, pending the minor changes as specified by the reviewer with final official approval to be given by the advisor.

You may proceed with contacting your preferred research site and commencing your participant recruitment strategy.

Yours sincerely,

Aliya Kuzhabekova

On behalf of:
Dr Syed Abdul Manan, *PhD*
Chair, GSE Ethics Committee
Graduate School of Education
Nazarbayev University

Block C3, Room M027
Office: +7(7172)6016
Mobile: +77079240053
email: syed.manan@nu.edu.kz, gse.irec@nu.edu.kz

CITI Training Certificate

Completion Date 06-Oct-2023
Expiration Date 06-Oct-2026
Record ID 58920849

This is to certify that:

Aiza Bissaliyeva

Not valid for renewal of certification through CME.

Has completed the following CITI Program course:

Students conducting no more than minimal risk research
(Curriculum Group)
Students - Class projects
(Course Learner Group)
1 - Basic Course
(Stage)

Under requirements set by:

Nazarbayev University

Collaborative Institutional Training Initiative

101 NE 3rd Avenue, Suite 320
Fort Lauderdale, FL 33301 US
www.citiprogram.org

Generated on 22-Apr-2024. Verify at www.citiprogram.org/verify/?w8c18f9f2-e14a-4487-8e73-82b72fd793bc-58920849

Acknowledgment

I am immensely grateful for the warm reception and endorsement extended to me by Nazarbayev University as a young researcher. The university has consistently inspired me and provided invaluable opportunities for my academic development. This thesis signifies a major achievement in my academic journey, and I owe my deepest gratitude to Professor Aliya Kuzhabekova for her support and guidance during the thesis writing.

I am also thankful for Professor Elaine Sharplin, my line manager at work, who provided great support while I pursued my master's degree.

Additionally, I wish to express heartfelt thanks to the NU GSE administration, dedicated professors, and my encouraging groupmates for their unwavering dedication and shared knowledge.

Lastly, I am deeply appreciative of my family and loved ones for their constant encouragement and belief in me, which fueled my motivation.

Abstract

Integrating AI and Edtech Solutions in Higher Education: Faculty Experiences at Nazarbayev University

This research study investigates the landscape of educational technology (EdTech) and artificial intelligence (AI) tools usage among faculty at Nazarbayev University. The primary objectives are to assess the current utilization of EdTech tools, explore faculty experiences and familiarity with AI technologies in education, and understand the perceived benefits and challenges associated with integrating these technologies into their teaching practices. Furthermore, the study aims to identify key factors that influence faculty decisions to adopt or reject these technological innovations and to determine the types of support needed for their effective integration into educational contexts.

This study employs a predominantly quantitative approach, analyzing survey data to provide a comprehensive overview of how EdTech and AI tools are utilized in higher education. The analysis is supplemented by qualitative insights derived from an open-ended question, which serves to enrich the narrative and support the quantitative findings.

Ultimately, this thesis offers recommendations for administrators and policy makers to enhance the support structures in the universities, thereby fostering a more robust integration of EdTech and AI tools in higher education teaching. The insights gained from this study not only contribute to academic discourse but also serve as a practical guide for enhancing educational practices through technology.

Keywords: Educational technology (Edtech) utilization, Artificial intelligence (AI) tools, Higher education faculty experiences, Integration challenges, Support structures

Аңдатпа

Жоғары білім берудегі AI және Edtech шешімдерін біріктіру: Назарбаев Университетіндегі оқытушылар тәжірибесі

Бұл зерттеу жұмысы Назарбаев Университетінің оқытушылары арасында білім беру технологиясы (EdTech) және жасанды интеллект (AI) құралдарын пайдалану пейзажын зерттейді. Негізгі міндеттер – EdTech құралдарының ағымдағы пайдаланылуын бағалау, оқытушылардың тәжірибесін және білім берудегі AI технологияларымен танысуын зерттеу және осы технологияларды оқыту тәжірибесіне біріктірумен байланысты қабылданатын артықшылықтар мен қиындықтарды түсіну. Бұдан басқа, зерттеу осы технологиялық инновацияларды қабылдау немесе қабылдамау бойынша факультет шешімдеріне әсер ететін негізгі факторларды анықтауға және олардың білім беру контексттеріне тиімді интеграциясы үшін қажетті қолдау түрлерін анықтауға бағытталған.

Бұл зерттеу EdTech және AI құралдарының жоғары оқу орындарында қалай қолданылатыны туралы жан-жақты шолу жасау үшін сауалнама деректерін талдай отырып, негізінен сандық тәсілді қолданады. Талдау ашық сұрақтан алынған сапалы түсініктермен толықтырылады, ол баяндауды байытуға және сандық қорытындыларды қолдауға қызмет етеді.

Сайып келгенде, бұл дипломдық жұмыс әкімшілер мен саясаткерлерге университеттердегі қолдау құрылымдарын жақсарту бойынша ұсыныстарды ұсынады, осылайша EdTech және AI құралдарының жоғары білім беруде оқытуда сенімді интеграциясын ынталандырады. Бұл зерттеуден алынған түсініктер академиялық дискурсқа үлес қосып қана қоймай, сонымен қатар технология арқылы білім беру тәжірибесін жақсарту үшін практикалық нұсқаулық ретінде қызмет етеді.

Түйін сөздер: Білім беру технологиясын (Edtech) пайдалану, Жасанды интеллект (AI) құралдары, Жоғары білім беру факультетінің тәжірибесі, Интеграциялық қиындықтар, Қолдау құрылымдары

Аннотация

Интеграция решений искусственного интеллекта и образовательных технологий в высшем образовании: опыт преподавателей Назарбаев Университета

Данное исследование исследует ландшафт использования образовательных технологий (EdTech) и инструментов искусственного интеллекта (ИИ) преподавателями Назарбаев Университета. Основные цели — оценить текущее использование инструментов EdTech, изучить опыт преподавателей и их знакомство с технологиями искусственного интеллекта в образовании, а также понять предполагаемые преимущества и проблемы, связанные с интеграцией этих технологий в их педагогическую практику. Кроме того, исследование направлено на выявление ключевых факторов, которые влияют на решения преподавателей о принятии или отказе от этих технологических инноваций, а также на определение типов поддержки, необходимой для их эффективной интеграции в образовательный контекст.

В этом исследовании используется преимущественно количественный подход, анализируя данные опроса, чтобы предоставить всесторонний обзор того, как инструменты EdTech и искусственного интеллекта используются в высшем образовании. Анализ дополняется качественными выводами, полученными из открытого вопроса, который обогащает повествование и подтверждает количественные выводы.

В конечном итоге, эта диссертация предлагает рекомендации для администраторов и политиков по улучшению структур поддержки в университетах, тем самым способствуя более надежной интеграции EdTech и инструментов искусственного интеллекта в преподавании высшего образования. Выводы, полученные в результате этого исследования, не только способствуют академическому

дискурсу, но и служат практическим руководством для улучшения образовательной практики с помощью технологий.

Ключевые слова: использование образовательных технологий (Edtech), инструменты искусственного интеллекта (ИИ), опыт преподавателей высших учебных заведений, проблемы интеграции, структуры поддержки.

Table Of Contents

LIST OF TABLES

1. Introduction

Educational technology has long been a cornerstone of teaching and learning, showing significant potential to enhance educational outcomes. Over the decades, the rapid evolution of educational technology has continually tested the technical capacities of institutions to integrate new hardware and software solutions into their existing learning infrastructures (Chugh et al., 2023). When effectively integrated, these technologies can create more engaging and flexible learning environments (Januszewski & Molenda, 2008).

Within this technological evolution, Artificial Intelligence (AI) tools emerge as a revolutionary category of educational technology. Characterized by their ability to perform tasks that typically require human intelligence, these tools—through algorithms—can analyze learner data to personalize the learning experience (Luckin, 2016; Chassignol et al., 2018; Popenici and Kerr, 2017; Holmes, 2016; Baker and Smith, 2019). The potential of AI to transform education is immense, promising to automate administrative tasks, provide personalized learning paths, and facilitate scalable educational practices (Sruthi & Mukherjee, 2020; Wakelam et al., 2020). Furthermore, global educational strategies are increasingly incorporating AI literacy into their standards, reflecting a commitment to integrating these advanced technologies (Walter, 2024).

In Kazakhstan, the proactive adoption of AI across various sectors, especially education, is leading to significant advancements. The commitment to technological progress is evident as digital technologies transform higher education institutions, enhancing learning processes, improving management activities, increasing efficiency, and adapting to new teaching methods (Zhubanova, Beissenov & Goktas, 2024; Yeslyamov, 2024; Jakubakynov et al., 2024). These developments underscore the critical role of digital technology in innovating and enhancing Kazakhstan's education sector (Nurtayeva et al., 2024).

However, the path to integrating innovative technologies in Kazakhstani education is not without challenges. Issues such as limited access to technology, inadequate teacher training, unclear policies, resistance to change, and financial constraints are significant hurdles (Seitova, 2024). Overcoming these obstacles necessitates collaborative efforts to provide necessary training, establish clear guidelines, allocate resources effectively, and foster a culture of innovation within educational institutions.

Despite these efforts, the adoption of Edtech and AI tools in education remains complex, with many studies on EdTech and AI integration focusing primarily on Western contexts. In Kazakhstan, the full extent of AI utilization in education, along with faculty perceptions, adoption levels, and necessary support structures, is less understood. This gap highlights the need for more localized research to better understand the promises of AI and EdTech, the factors leading to their adoption or rejection, and the structures needed to support their integration effectively.

This chapter provides a foundational overview of the study, including background information that presents a broad view of the adoption of educational technology (EdTech) and Artificial Intelligence (AI) tools in the Kazakhstani educational context. It identifies the research problem, outlines the objectives of the study. It also specifies the research questions that will guide the inquiry. Additionally, the chapter highlights the significance of the research to the field, explaining how it contributes to existing knowledge. The chapter concludes with a detailed outline of the entire study's structure, previewing each section and its role in addressing the research objectives.

1.1 Background to the Study

The integration and adoption of technology in education, particularly as advanced by emerging fields like machine learning and artificial intelligence, continue to transform teaching and learning in higher education. As Popenici and Kerr (2017) point out, while these

advancements offer new possibilities, it is vital to remember that education should remain fundamentally human-centric and not become overly dependent on technology.

Supporting this integration, Skiba (2016) recommends that higher education institutions should promote technology awareness in the classroom through faculty support. This initiative requires educators to be open to taking risks, integrating new technologies into their teaching, and participating in ongoing professional development and collaboration within their learning networks, as highlighted by Trust (2017).

Further research into the adoption of classroom technology by Garner and Bonds-Raacke (2013) identifies time, attitude, belief, and comfort level as critical factors influencing faculty technology use. Echoing these sentiments, Crompton, Bernacki, and Greene (2020) suggest that educational technologists need to consider instructors' goals, standards, technology integration frameworks, and educational conditions to effectively facilitate technology use in higher education. This approach helps develop epistemic cognition, enabling educators to adopt, modify, and implement technologies purposefully.

Orakova et al. (2024) observe that primary school teachers display high pedagogical competence with varying levels of digital literacy and technological skills, noting that male teachers and those with less experience tend to have higher digital competencies. Similarly, Shumeiko et al. (2024) stress the importance of faculty technology adoption for enhancing educational experiences, which involves addressing motivational, content-based, and procedural components. Challenges such as the need for continuous skills development and resistance to distance education can be addressed through structured professional development and targeted interventions.

In the realm of language education, Brakhmetova (2024) underscores how the integration of technology in English as a Foreign Language (EFL) instruction can significantly enhance learning. By providing immersive experiences, increasing engagement

through gamification, and boosting proficiency with various digital tools, technology-driven methods foster personalized learning, develop digital literacy, and lead to significant improvements in language outcomes. However, Brakhmetova also identifies critical challenges, such as the need for more comprehensive teacher training and support for effective use of digital tools, and issues of equitable technology access, particularly in under-resourced areas.

Building on these insights, Yeleussiz (2024) explores similar challenges faced by EFL teachers in Kazakhstan, emphasizing limitations such as restricted resources, access to technology, and ethical concerns. The study also highlights divergent practices in the integration of media literacy, variations in perceptions of its importance, and a lack of professional development opportunities. Together, these studies illustrate the transformative potential of technology in language learning while also pointing out the essential supports needed to overcome the barriers to its effective implementation.

However, these studies represent just a few examples of research exploring the integration of technology within the Kazakhstani educational context. There is a clear need for broader investigations involving more diverse samples to deepen our understanding and expand the findings across different educational settings and disciplines.

1.2 Problem Statement

The rapid evolution of technology and its profound impact on economies worldwide underscores the need for nations like Kazakhstan to harness contemporary technologies to fuel socioeconomic growth. President Tokayev (2023) emphasized the pivotal role of artificial intelligence (AI) in enhancing the global economy and its potential to significantly shape Kazakhstan's developmental trajectory. This strategic focus aligns with the broader vision of modernizing the nation’s economy through advanced technologies and optimizing intellectual capital (Sadyrova et al., 2021).

Despite this national imperative, the integration of Educational Technology (EdTech) and Artificial Intelligence (AI) tools within Kazakhstani higher education reveals a concerning gap: there is a notable deficiency in comprehensive understanding among faculty members. While these technologies are gradually being adopted in educational settings, faculty members often lack a clear grasp of the benefits, the challenges they may face, and the critical factors that influence the successful adoption and utilization of such technologies. This gap not only hampers the effective implementation of EdTech and AI tools but also potentially stalls the educational sector's contribution to the nation's ambitious modernization goals.

Thus, the research problem centers on the need to explore and articulate the dynamics surrounding the adoption and use of EdTech and AI in Kazakhstani higher education. The study aims to identify the edtech usage levels among faculty of Nazarbayev University, specific benefits and challenges perceived, investigate the factors influencing technology adoption, and propose strategic interventions to enhance understanding and usage of these pivotal tools in the academic arena. This research will contribute to the broader goals of enhancing educational practices through technology and supporting Kazakhstan's socio-economic development through informed and strategic technology integration.

1.3 Purpose of the Study

The primary purpose of this study is to comprehensively investigate the landscape of educational technology (EdTech) and artificial intelligence (AI) tools integration among faculty members of Nazarbayev University. The study aims to achieve multiple objectives, including assessing the current extent of EdTech utilization to understand the prevailing technological landscape, exploring faculty members' familiarity with AI tools in education, delving into their perspectives on the perceived benefits and challenges associated with the integration of EdTech and AI tools into their teaching practices, identifying and analyzing the

various factors influencing faculty members' decisions regarding the adoption or rejection of AI tools and other EdTech tools, and assessing the types of assistance and support that faculty members deem necessary for the effective integration of EdTech and specifically AI tools into their teaching practices.

By addressing objectives, this study endeavors to provide valuable insights into the current state of Edtech integration within higher education at Nazarbayev University. Furthermore, it seeks to inform the Center of Innovation in Learning and Teaching department within the Office of the Provost about the factors influencing faculty decisions and the support required for the successful implementation of these technologies. Ultimately, this research contributes to the advancement of teaching and learning practices at Nazarbayev University.

1.4 Research Questions

To achieve the research purpose the following questions were posed:

1) What is the current level of EdTech usage among faculty members in higher education?
2) How familiar are faculty members with AI tools and their potential applications in teaching and learning?
3) What are the perceived benefits and challenges of AI tools and other edtech integration among faculty in higher education?
4) What factors influence faculty members' decision to adopt or reject the use of AI tools and other edtech in their teaching practices?
5) What types of assistance and support do faculty members perceive as necessary or beneficial for effective integration of EdTech and AI tools into their teaching practices?

1.5 Significance of the Study

The significance of this study lies in its potential to enrich the global understanding of Educational Technology (EdTech) and Artificial Intelligence (AI) integration within a non-Western context, specifically in Kazakhstan. This research provides crucial cultural and contextual insights, contributing to the broader body of knowledge that has predominantly focused on Western experiences. By exploring the dynamics of technology adoption in Kazakhstani higher education, the study supports national efforts to modernize the economy and leverages contemporary technologies to enhance socio-economic growth (Sadyrova et al., 2021; Lee et al., 2013).

Additionally, the findings are expected to inform policy and decision-making, improve educational practices, and encourage innovation within the EdTech sector. This could facilitate more tailored educational strategies that not only advance Kazakhstan's educational system but also provide actionable insights for similar contexts globally, thereby fostering a more inclusive approach to educational technology integration.

1.6 Overview of the Study

This study is organized into six chapters, beginning with this introductory chapter, which offers background information, outlines the research problem, and presents the study's objectives and research questions. This chapter also defines essential terms and explains the significance of the research to the field. Chapter Two provides a comprehensive review of the literature related to the study's topic and concepts pertaining to the research questions that guides the research. Chapter Three describes the methodology used in this study, including the sampling procedures and instrumentation, and provides a rationale for the chosen research design. Chapter Four details the findings of the study and addresses the research questions posed. Chapter Five discusses the results, interpreting their significance and implications. The

final chapter, Chapter Six, summarizes the study, highlighting its limitations and the educational implications of the findings.

2. Literature Review

2.1 Introduction

The previous chapter introduced the study's objectives, detailed the research questions, and discussed its significance. Given that the purpose of this study is to assess the current utilization of EdTech tools, explore faculty experiences, understand the perceived benefits and challenges, and determine the types of support needed, this chapter reviews the literature relevant to the main concepts of the study.

In this chapter, I will first provide a definition and outline the scope of EdTech and AI within the context of higher education. Following this, I will review existing literature related to the adoption and usage of EdTech by faculty in higher education settings. The discussion will then extend to the perceived benefits and challenges associated with the integration of EdTech and AI technologies. Additionally, I will explore the factors that influence faculty decisions to adopt these technologies. Finally, the chapter will examine faculty members' perceptions of the assistance and support necessary for effective integration of EdTech and AI. This comprehensive review will establish a theoretical foundation for the research and identify gaps in existing studies, thereby setting the direction for this study.

2.2 Definition and scope of EdTech and AI in higher education

The adoption of educational technology within higher education institutions is on the rise as a means to enhance the quality of both teaching and learning. According to the Association for Educational Communications and Technology, educational technology is defined as "the examination and ethical application of enabling learning and enhancing performance through the creation, utilization, and supervision of suitable technological methods and assets." (Januszewski & Molenda, 2008). In straightforward terms, educational technology (EdTech) entails utilizing technology in diverse educational environments to elevate learning and enhance educational outcomes.

Internationally, higher education institutions (HEIs) are incorporating technology-driven educational resources, including learning management systems or virtual learning platforms (Weller, 2018), virtual and augmented reality (Jantjies et al., 2018), chatbot systems (Smutny & Schreiberova, 2020), video conferencing, social media integration, and mobile learning solutions (Weller, 2018). These educational technology (EdTech) tools assist educators in crafting engaging learning experiences for students, resulting in a variety of short- and long-term academic and social benefits. Furthermore, EdTech can facilitate communication between students and instructors and offer personalized feedback to students (Chugh et al., 2023). Nevertheless, it's essential to recognize that integrating EdTech into higher education institutions (HEIs) comes with its set of difficulties. As a result, HEIs must conduct thorough assessments of the efficiency and consequences of these technologies before embracing them.

The definition of educational technology has undergone significant transformations in conjunction with the changes in socio-economic structures (Richey, Silber, & Ely, 2008). Various developmental phases within the realm of educational technology have been discerned, encompassing: (1) the era of instructional design, which emphasized content; (2) the era of message design, emphasizing format; (3) the era of simulation, emphasizing interaction; and ultimately, (4) the contemporary era of educational technology research, with a distinct emphasis on learning environments (Winn, 2002).

The Higher Education section of the New Media Consortium Horizon Report (2014) provides a framework for illustrating and organizing emerging technologies to better understand the trends and technological developments driving educational change. The report has listed emerging digital technologies in seven categories (New Media Consortium [NMC] Horizon Report, 2014):

Table 1

Seven categories of emerging digital technologies

Categories	**Digital technologies**
Digital Strategies	Flipped classroom, gamification, location intelligence, makerspaces etc.
Learning Technologies	Learning analytics, MOOCs, Online Learning, Mobile learning etc.
Social media technologies	Social networks, collaborative environments, collective intelligence, crowdsourcing etc.
Visualization Technologies	3D printing, augmented reality, visual data analysis etc.
Internet Technologies	Cloud computing, real-time translation, the internet of things, syndication tools etc.
Consumer Technologies	3D video, electronic publishing, mobile apps, wearable technology etc.
Enabling Technologies	Machine learning, geolocation, cellular networks, Virtual assistants, wireless power etc.

(New Media Consortium [NMC] Horizon Report, 2014).

The evolution of educational technology influences pedagogical practices within HEIs, requiring educators to adapt their teaching methods to incorporate new technologies effectively (Chugh et al., 2023).

Defining Artificial Intelligence (AI)

Defining artificial intelligence (AI) can be challenging, even for specialists, as the scope of what constitutes AI is continuously evolving. Nick Bostrom, a prominent AI researcher at Oxford University, notes that advanced AI often becomes integrated into general applications and loses its AI label once it becomes widely used and effective, being instead regarded as just a computer program, algorithm, or app. The difficulty in defining AI also stems from its interdisciplinary approach, drawing insights from fields like anthropology, biology, computer science, linguistics, philosophy, psychology, and neuroscience, each adding its own perspective and vocabulary. In this context, AI is described as computer systems designed to interact with the world through capabilities (like visual perception and speech recognition) and intelligent behaviors (such as analyzing information and making decisions to achieve a goal) that mimic human traits (Luckin, 2016).

Chassignol et al. (2018) present a dual perspective on AI, defining it both as a field of study in computer science aimed at solving cognitive problems associated with human intelligence, and as a theoretical framework guiding the development of computer systems with human-like capabilities, such as visual perception, speech recognition, decision-making, and language translation.

Popenici and Kerr (2017) offer a fundamental definition, informed by a literature review of previous definitions in this field, defining artificial intelligence (AI) as computing systems capable of engaging in human-like processes such as learning, adapting, synthesizing, self-correction, and utilizing data for complex processing tasks. As Luckin and Holmes (2016) points out, AI encompasses computer software programmed to engage with the world in manners typically necessitating human intellect. This implies AI relies on both an understanding of the world and the algorithms capable of smartly manipulating this knowledge.

Baker and Smith (2019) define AI broadly as computers performing tasks typically associated with human cognition, such as learning and problem-solving. They choose this wide-ranging, capability-based approach because "artificial intelligence" encompasses diverse technologies, making it difficult to define by specific tech alone. Moreover, AI's future is unpredictable, with potential new developments that could support it differently. Their focus is on AI's outcomes for people, rather than the underlying technology, to keep their research applicable despite rapid technological advancements and the varied capabilities of current AI tools in the market.

AI tools in education

For over three decades, the integration of artificial intelligence in education (AIEd) has been a focus of scholarly inquiry, examining learning across various settings—from traditional classrooms to workplaces—to enhance both formal education and lifelong learning (Luckin & Holmes, 2016).

In their exploration of educational AI tools, Baker and Smith (2019) categorize these tools into three distinct perspectives: learner-facing, teacher-facing, and system-facing. Learner-facing tools are what most consider when thinking of AI in education; these include intelligent tutoring systems and adaptive learning platforms tailored to meet individual student needs through personalized content, knowledge gap diagnosis, automated feedback, and collaboration enhancement. On the other hand, teacher-facing AI is designed to alleviate teachers' workloads and encourage classroom innovation by automating tasks such as grading and plagiarism detection, providing insights on student or class performance, and facilitating novel teaching strategies. Lastly, the system-facing AI, the least widespread of the three, supports decision-making processes within educational administration and management, often necessitating data exchange between multiple institutions. This category encompasses a

broad array of applications, from scheduling to predictive analytics, highlighting its role in optimizing operational efficiency and foresight in education.

AIEd merges the interdisciplinary field of AI with learning sciences, including education, psychology, neuroscience, linguistics, sociology, and anthropology, aiming to create adaptive learning environments and tools that are flexible, inclusive, personalized, engaging, and effective. Such environments tailor teaching methods and materials to the unique needs and abilities of each learner (Luckin & Holmes, 2016).

Luckin and Holmes (2016) explain that the core of artificial intelligence in education (AIEd) lies around the use of 'models' to encapsulate knowledge of the world, specifically through pedagogical, domain, and learner models. An AIEd system designed to offer tailored feedback to students leverages these models to grasp effective teaching methods (pedagogical model), understand the subject matter (domain model), and recognize the student's distinct traits (learner model).

They further illustrate an educational technology powered by AIEd, which utilizes these three models to gain insights into the student, teaching methodologies, and the subject matter. AIEd algorithms analyze this integrated knowledge to tailor the educational content according to the student's individual needs and abilities. As the system delivers this content in various formats, such as text, videos, or interactive activities, it continuously assesses the student's interactions and progress. This ongoing evaluation updates the learner model with deeper insights into the student's understanding and motivation, ensuring a customized learning experience that effectively supports each student's educational journey (Luckin & Holmes, 2016).

2.3 Faculty Adoption and Usage of EdTech in Higher Education

In higher education, the adoption and usage of educational technology (EdTech) by faculty vary significantly across different segments. Moser (2007) provides an analysis of

faculty adoption levels, classifying them into stages ranging from innovators and early adopters to the late majority and laggards. This classification aids in understanding the diverse degrees of technology integration among faculty and highlights key factors that influence adoption, such as time commitment, skill development, and incentive structures. Additionally, Moser emphasizes the need for ongoing assessments, scalable support services, efficient consulting processes, and comprehensive evaluations to enhance technology integration.

Kyei-Blankson, Keengwe, and Blankson (2009) point out that while many faculty members use technology for basic tasks like presentations, such usage barely taps into the full educational potential of these tools. They advocate for course designs that actively involve students in using technology, thereby not only enriching their learning experience but also preparing them to integrate technology into their future teaching endeavors.

Soomro et al. (2020) find that faculty members' use of ICT in teaching is significantly influenced by their physical access to ICT resources, intrinsic motivation, and general ICT usage, with improved infrastructure at the university bolstering the integration of digital technologies. However, the impact of extrinsic motivation and skills training on ICT usage is minimal, suggesting that while some conditions may foster technology adoption, not all commonly cited factors are critical.

Elzarka (2012) investigates the levels of educational technology adoption among faculty, revealing a broad spectrum of usage for instructional purposes. The study highlights a strong correlation between personal and professional technology use, although this does not hold for part-time and older faculty. Elzarka also underscores the importance of efficacy factors in encouraging technology adoption, suggesting that insights from the study could

guide targeted training and support strategies to enhance faculty competence in integrating technology with content.

2.4 Faculty familiarity with AI Tools in education

The use of artificial intelligence (AI) in educational settings has significantly increased and garnered considerable attention in recent years.

AI in the U.S. education sector is predicted to surpass a market value of $85 million by 2022, growing at a compound annual rate of about 48%, a trend mirrored worldwide. This surge in adoption leads to collaborations between higher education institutions and industry to develop AI solutions aimed at decreasing college expenses and enabling students to tailor their learning to their needs (Educause, 2019).

Ng et al. (2023) and Casal-Otero et al. (2023) collectively highlight the evolution and recognition of AI in education. Ng et al. observe that advancements in educational tools and pedagogical strategies have transitioned the focus of AI teaching from purely technological to an interdisciplinary approach, complemented by global efforts to weave AI literacy into the latest educational standards and strategic initiatives. Casal-Otero further emphasizes this shift, noting an increased acknowledgment among teachers and policymakers of the importance of AI literacy, leading to its integration into educational curricula and strategic planning. Together, these studies underscore the growing emphasis on AI literacy as a crucial component of modern education.

Kiryakova and Angelova (2023) report that while a significant number of university professors are familiar with AI applications like ChatGPT, a considerable portion still uses it rarely or only as needed. The study suggests that curiosity drives many professors to use ChatGPT, primarily for idea generation and text writing in their teaching. Moreover, attitudes towards AI chatbots among university professors are generally positive: 21.8% view them favorably, while 12.6% see them as a threat. Notably, 37.9% perceive AI chatbots as both a

threat and an opportunity, reflecting a nuanced recognition of their potential benefits and risks. This indicates that while professors are open to using AI tools, they approach them with a degree of caution.

2.5 Perceived benefits and challenges of EdTech and AI Integration

Higher education is beginning to explore the new and uncharted potential that AI brings to teaching, learning, and the structure and management of higher education institutions. The effects and opportunities of these technological advancements are already becoming apparent (Popenici & Kerr, 2017).

Adopting this AI-driven approach comes with its own set of challenges, yet the advantages it offers to students, educators, and the broader educational landscape are significant.

Perceived benefits

The research emphasizes leveraging EdTech artifacts as valuable sources of data to assess and evaluate learners' achievement of specific learning outcomes. By utilizing EdTech tools, instructors can gather insights into students' performance and progress towards meeting the intended learning objectives within a course (Dexter, 2023).

The paper by Larsson and Teigland (2020) acknowledges the significant role of EdTech in the Swedish educational context. It highlights transformative outcomes achieved through EdTech, such as flipping the classroom and blended learning techniques. The use of open-source software to facilitate coding education is also emphasized.

Sruthi & Mukherjee (2020) and Wakelam et al. (2020) highlight that with the aid of AI, teachers have the potential to customize their teaching methods according to the unique personality, strengths, and additional skills of each student, thereby catering more effectively to their individual learning requirements. Consequently, this approach not only enhances students' academic performance and enjoyment in learning, but also fosters their ability to learn effectively, develop productive study habits, and articulate their ideas, thereby

broadening their knowledge base. Rus et al. observed that Intelligent Tutoring Systems (ITS) promote in-depth learning by continuously challenging students to effectively justify their stance and the reasoning behind it. This process significantly improves their understanding and memory retention of the information presented.

Kahraman points out that various studies on web-based platforms emphasize the advantages of AI in enhancing the quality of learning. AI elements like class monitoring, adaptive hypermedia, collaborative learning, and information filtering on these platforms foster collaboration and interaction among students, thereby facilitating their learning process.

Pokrivcakova asserts that AI has enhanced the quality and effectiveness of instruction. This improvement is due to the adaptive nature of modern, technology-based systems, which tailor the content or materials to meet learners' specific needs, ensuring an optimal learning experience.

The study by Ouyang, Zheng and Jiao (2022) notes the prevalence of traditional AI technologies, with more advanced techniques being less common. Key findings include AI's effectiveness in improving predictions, personalized recommendations, academic performance, and online participation. The review suggests integrating educational theories with AI, employing advanced AI for real-time data analysis, and further empirical research to understand AI's true impact in online higher education contexts.

Popenici and Kerr (2017) argue that the real potential of technology in higher education is—when properly used—to extend human capabilities and possibilities of teaching, learning, and research. For example, Steele (2023) in her paper, highlights the potential of ChatGPT in transforming educational practices by leveraging its ability to efficiently summarize, interpret, and aggregate information across various fields and genres—tasks where human performance can be slow or inconsistent. However, Steele points

out that ChatGPT, while a powerful synthesizer and a mimic, lacks true comprehension and can misinterpret texts. To harness this, Steele proposes engaging students in critiquing ChatGPT summaries of texts they've studied, focusing on methods, findings, and limitations, and identifying inaccuracies or fabrications by ChatGPT. This exercise aims to enhance students' understanding by comparing their insights with ChatGPT's errors, encouraging them to become adept textual analysts. The ultimate goal is leveraging AI to enrich students' learning experiences, fostering their ability to articulate thoughts and engage deeply with content, to explore their intellectual passions and communicate it to others. Walter (2024) reiterates this perspective, highlighting the integration of ChatGPT into education as a key move towards a more personalized, inclusive, and effective learning experience, preparing students for both current academic challenges and future demands.

Aristanto (2023) notes that artificial intelligence (AI) technology can foster independence among students, reducing the teacher's traditionally dominant role to one focused on providing key insights and enlightenment. Teachers should still emphasize the core of teaching—shaping students' morals and behaviors. Meanwhile, for students, the availability of educational technology allows for self-regulation and oversight of their learning journey, preparing them for successful futures.

Moreover, AI's capacity to customize content and its delivery to individual student needs enables those who may struggle in traditional classroom environments to excel, thus creating a more inclusive and barrier-free learning atmosphere (Rakap, 2023).

Perceived challenges of AI in education

Walter (2024) highlights the potential for AI to significantly improve the education system, but also points out its drawbacks, notably teachers feeling overwhelmed by their limited understanding of the technology and its optimal uses. Furthermore, both educators

and students often lack awareness of the technology's limitations and risks, leading to students relying too heavily on the technology without critical thinking, thereby outsourcing essential cognitive tasks to machines. This can result in a reluctance among students to learn independently, preferring instead to reduce their effort.

Steele (2023) discusses the challenges that AI chatbots like ChatGPT introduce to traditional education systems, including the evaluation of student knowledge and skills, the reliability of the information students learn, and the market value of the skills being taught. These challenges can feel like direct threats to educators' careers and their identity. Similarly, the study by Chugh et al. (2023) explores the integration of technology into educational frameworks, highlighting obstacles such as faculty awareness of educational policies, institutional cultures that lack transparency, and aversions to the perceived risks associated with new technologies. Additionally, Larsson and Teigland (2020) address the regulatory challenges that new technologies face, focusing on the implications of policy, laws, and regulations. Together, these discussions underscore the complex interplay between technology, policy, and education, revealing widespread systemic challenges that extend across different aspects of educational reform.regulations.

Artificial Intelligence in education presents challenges such as liability issues concerning accountability for automated decisions, potential job impacts on teachers due to task automation, concerns about fairness and transparency in AI algorithms for student acceptance, risks of widening divides in access and equity, the need to prepare teachers for AI integration, and ethical considerations regarding data use and transparency (UNESCO, 2019).

2.6 Factors influencing the adoption of AI-based tools in higher education

In their study, Wang, Liu, and Tu (2021) explored the factors influencing higher education teachers' intentions to adopt AI technologies in their teaching. Utilizing structural equation modeling, the research focused on variables like anxiety, self-efficacy, attitude towards AI, and perceived ease and usefulness of AI tools. The study, involving 311 educators, revealed that these factors collectively account for a significant portion of the variance in teachers' intentions to continue using AI in their teaching, with attitude towards AI and perceived ease of use being particularly influential. The authors highlight the role of self-efficacy in positively affecting teachers' attitudes and perceptions towards AI adoption, while also noting that increased self-efficacy can reduce anxiety related to AI use. The study offers valuable insights for both researchers and educators in the field of AI in education.

AI is increasingly favored in education for its ability to customize experiences, reduce workloads, and analyze complex data. However, concerns regarding equity, inclusion, and privacy temper the enthusiasm for its adoption (Educause, 2019). Chugh et al. (2023) further explain that the successful implementation of these contemporary educational technologies in higher education institutions (HEIs) is contingent upon the existing administrative structures, which may need re-evaluation and adaptation to effectively integrate new technologies. Additionally, Pedro et al. (2019) recognizes the necessity for faculty members to adapt to and leverage EdTech and AI tools in their educational practices. This adaptation is crucial for developing new competencies, such as interpreting data from AI systems and managing both human and AI resources, ensuring a smoother integration and more effective use of these advanced technologies in educational settings.

Pokrivcakova (2019) observes that although many foreign language teachers support computer-assisted language learning (CALL) and are receptive to incorporating modern technologies, their adoption is hindered by a combination of external and internal factors.

External challenges such as inadequate equipment, limited technical support, inflexible curricula, and time constraints impede usage. Internally, obstacles like insufficient information, limited ICT skills, lack of motivation, and fear of losing control over students also significantly influence teachers' willingness to integrate AI-based tools in language education.

2.7 Faculty members perception on assistance and support

Walter's (2024) study suggests that fostering a new "culture of AI" within academia could empower students and faculty to adeptly utilize AI for educational purposes. This culture would encourage the academic community to embrace, understand, and critically assess AI. Implementing regular workshops and discussions on the latest AI advancements, ethical issues, and best practices could keep the academic community well-informed and skilled in handling AI tools and concepts. Such an approach emphasizes the importance of understanding AI's technical, practical, and societal challenges through real-world scenarios.

Walter advocates for integrating AI into academic curricula, offering consistent exposure across disciplines, and proposes mandatory classes on AI usage, covering everything from basic principles to ethical considerations. This ensures all students gain a fundamental understanding of AI, preparing them for a future where AI is prevalent in professional settings. Beyond formal education, fostering voluntary collaborations with AI professionals and encouraging student-led AI initiatives could bridge the theoretical-practical gap and promote a hands-on, innovative learning environment. In summary, he states that deepening engagement with AI through educational strategies and community involvement could significantly enrich this effort, cultivating a responsible AI culture within academia.

Luckin and Chukurova (2019) in their paper highlight the importance of collaboration among educators, developers, and researchers in the development and implementation of AI technologies in education. This cooperative approach aims to improve educators'

comprehension of AI and provide technology developers with better insight into teaching and learning processes. Through co-design processes and multi-stakeholder partnerships, such as those offered by programs like EDUCATE, educators are equipped with the support and knowledge needed to effectively incorporate AI tools into their teaching practices.

Similarly, Pokrivcakova (2019) underscores the necessity for faculty members to be well-prepared and confident in their ability to use AI technologies effectively in their classrooms. It highlights continuous professional training as essential for overcoming challenges in technology integration. Teachers need to believe in the efficacy of technology to enhance their educational goals and must have adequate ICT skills and unimpeded access to technology to effectively deploy AI-powered tools in their teaching practices.

2.8 Conclusion

In conclusion, the literature reviewed in this chapter illustrates a complex landscape surrounding the adoption and utilization of educational technology and AI tools in higher education. Studies consistently emphasize the importance of faculty familiarity and comfort with these technologies, highlighting the necessity for continuous professional development and collaborative frameworks that include educators, developers, and researchers. Moreover, the literature points to various barriers to effective integration, such as insufficient access to technology and lack of motivation, while also noting the potential of these technologies to significantly enhance pedagogical outcomes. This review not only sheds light on the current state of educational technology usage but also sets the stage for further investigation into effective strategies to overcome obstacles and leverage the full potential of AI and EdTech in enhancing educational experiences.

3. Methodology

3.1 Introduction

The purpose of this study was to explore the use of educational technology (EdTech) and artificial intelligence (AI) tools among faculty at Nazarbayev University. It investigated faculty experiences with and knowledge of AI technologies in education, examined the perceived advantages and obstacles of incorporating these technologies into teaching, and identified critical factors that influence faculty decisions to embrace or eschew these innovations. Additionally, the study assessed the necessary support for their successful integration into educational settings.

The previous chapter provided a review of the relevant literature pertaining to the main concepts of the study. This chapter outlines the methodology employed in the research. It details the research design, the research site and population, sampling techniques, data collection procedures and instruments, data analysis methods, and ethical considerations involved in the study.

3.2 Research Design

To explore the research problem and address the research questions, a descriptive quantitative research design was chosen for this study. According to Creswell (2012), a descriptive quantitative design involves a systematic approach used to gather numerical data and analyze it statistically to describe the characteristics of a specific group or phenomenon without establishing cause-and-effect relationships. This approach often employs surveys or standardized tests to collect data, providing precise numerical values essential for statistical analysis.

In a descriptive quantitative research, the focus is primarily on collecting numerical data to quantify attributes and describe patterns within the study population. This method is particularly useful for summarizing large amounts of data to provide a clear picture of the situation or condition being studied (Creswell, 2012). By utilizing a descriptive quantitative

approach, this study aims to yield detailed, factual insights into the integration of EdTech and AI tools, offering a foundational understanding of current trends and behaviors in educational settings. Moreover, numerous international studies on technology utilization have successfully employed descriptive quantitative research designs to identify trends and patterns (Moore-Hayes, 2011; Ghavifekr & Wan Rosdy, 2015; Yilmaz, 2021).

3.3 Research Site and Population

The choice of NU as the research site stems from the researcher's affiliation with the Center of Innovation in Teaching and Learning, which operates within the NU's Office of the Provost. The Office of the Provost holds a central role in offering institutional support for the development, review, and execution of academic policies and educational initiatives. These endeavors are geared towards promoting improvements in the overall learning and teaching experiences at the university (NU's website). As part of this initiative, the Center is dedicated to strengthening and enhancing learning and teaching practices by supporting the integration of educational technology and offering academic professional development opportunities across the entire university.

By conducting the study at NU, the researcher contributes to ongoing efforts within the institution to improve teaching and learning practices. This choice not only benefits the faculty and administrative staff of NU but also provides valuable insights to the Center of Innovation in Teaching and Learning. The research findings can serve as a foundation for the Center's future work on professional development opportunities and guidelines for faculty members, aligning with NU's commitment to educational innovation and excellence (NU’s Strategy 2018-2030).

The target population of the study encompassed the entire academic staff of NU. Notably, the NU faculty and teaching community comprise approximately 550-600 full-time

faculty members, including postdoctoral scholars and teaching assistants, as illustrated in Table 2, which presents the university's faculty composition.

Table 2

NU Faculty composition

Professors	Associate Professors	Assistant professors	Instructors	Teaching Fellow	Postdocs
6%	19%	34%	20%	12%	5%

In this study, the census ssampling was employed in order to target every member of the population. Creswell (2014) discusses census sampling as a method where every member of the population is included in the study. This approach is used when researchers aim to collect data from every single individual in a clearly defined population. Creswell (2014) notes that census sampling is particularly useful for small populations where it’s feasible to gather and analyze data from all members, thus ensuring complete coverage and eliminating sampling error. This can provide highly accurate and comprehensive data about the population being studied, making it ideal for cases where a detailed understanding of an entire population is required.

This method is appropriate for this study at Nazarbayev University, as it seeks to understand the specific perspectives of faculty members who are engaged enough with the topic of EdTech and AI to provide meaningful feedback.

To create a sampling frame for the survey, the researcher had contacted the university's HR department to obtain email lists of the faculty members who have officially employed at the university. The sampling frame was used to send emails to all faculty members at the university.

3.4 Data Collection Instruments

In this study, cross sectional survey was used as an instrument for data collection to help answer the research questions.

Connelly (2016) describes cross-sectional surveys as a research method commonly used in nursing, medical, and social science research to collect data on the prevalence of diseases, behaviors, intentions, knowledge, attitudes, and respondent opinions at a specific point in time. It emphasizes that cross-sectional surveys offer a snapshot of the variables being studied, allowing researchers to explore relationships between different factors. The surveys are flexible, quick to conduct, and can cover a wide range of human behaviors and conditions, making them suitable for diverse populations and research topics. However, the paper also notes potential limitations, such as the risk of bias and the static nature of data collection at a single time point, which may impact the interpretation of results.

The survey consisted of 20 questions in total, with three questions dedicated to addressing each research question. The first part of the questionnaire focused on gathering demographic information to establish a baseline understanding of the participant's profile. This included questions about their affiliated school or department, current academic position, total years of teaching experience, age group, and gender.

The next segment, questions 6 through 8, addressed the first research question regarding the current level of educational technology (EdTech) usage among faculty. Question 6 (Q6) was a slider question that asked participants to indicate their frequency of using EdTech tools in their teaching, with responses ranging from 1 (Not at all) to 5 (Extensively). Question 7 (Q7) enabled participants to identify specific EdTech tools they utilized, along with the frequency of use, while Question 8 (Q8) was a multiple-choice

question that sought to determine the years of experience participants had with using EdTech tools in their teaching.

Following this, questions 9 through 11 were designed to delve into the second research question concerning faculty familiarity with AI tools and their potential applications in teaching. Question 9 (Q9) assessed familiarity with AI tools using a slider scale from 1 (Not at all familiar) to 5 (Extremely familiar). Question 10 (Q10) was a multiple-choice query about whether respondents had ever used AI tools in their teaching. Question 11 (Q11) was an open-ended question inviting participants to describe different AI tools they used in their teaching practices.

The survey continued with questions 12 through 14, which were crafted to analyze the perceived benefits and challenges of integrating AI tools and EdTech, pertinent to the third research question. Question 12 (Q12) used a slider to gauge agreement with the statement, "Integrating AI tools and EdTech in teaching significantly enhances student learning," with responses ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). Question 13 (Q13) measured the perceived difficulty of integrating EdTech into teaching on a scale from 1 (Very Easy) to 5 (Very Challenging). Question 14 (Q14) was a multiple-choice question that asked participants to identify the biggest challenges they faced when integrating EdTech and AI tools into their teaching.

Lastly, questions 15 through 20 were aimed at exploring factors influencing faculty decisions to adopt or reject the use of AI tools and other EdTech solutions, and the types of support needed for effective integration. This included assessing how various factors influenced their decision to adopt these technologies, whether institutional policies and incentives played a role, and how often they sought professional development opportunities related to EdTech and AI tools. Additionally, questions asked participants to rate the

importance of various types of support and to identify support services they desired more access to.

3.5 Data Collection Procedures

The data collection process involved administering an online questionnaire to the faculty at Nazarbayev University (NU). Initially, after obtaining approval from the thesis supervisor and securing endorsement from the NU GSE's Institutional Review Board, the researcher coordinated with the Human Resources department at Nazarbayev University to access the contact information, specifically the email lists, of faculty members currently employed at NU.

Participants were contacted through their university email accounts, receiving a detailed package that included a cover letter outlining the study's objectives, its nature, potential benefits, risks, an attached informed consent form, and an invitation to participate in the research. Participants expressed their consent by completing the online questionnaire.

A link to the online Qualtrics questionnaire was included in the email to facilitate participation. A follow-up email was sent to the participants seven days after the initial contact, reminding them to complete the survey. The survey website was then deactivated five days following the reminder email, concluding the data collection phase.

3.6 Data Analysis

In the data analysis section, a variety of statistical methods were utilized to interpret the survey data effectively via using the jamovi software. Jamovi is particularly suitable for use in descriptive quantitative research studies because of its user-friendly interface, core functions for data entry and manipulation, and support for a wide range of statistical analyses.

As a result, it is accessible and efficient for researchers in educational measurement and evaluation (Sahin & Aybek, 2019).

Frequency analysis was first applied to summarize the demographic information collected from Questions 1-5. This provided a baseline context for understanding the subsequent data. Descriptive statistics were then used for Questions 6, 9, 12, 13, 15, and 18 to quantify levels of EdTech usage, familiarity with AI tools, and perceptions of benefits, challenges, and factors influencing technology adoption. Cross-tabulation and Chi-square tests examined the relationships between demographic factors and EdTech usage to identify significant patterns.

Additionally, content analysis was conducted on the open-ended responses in Question 11 to extract themes about AI tool knowledge among faculty. Content analysis for open-ended questions involves systematically analyzing textual responses to identify recurring themes, patterns, and meanings within the data. Researchers may use computer programs or manual coding to categorize and interpret the text, aiming to extract valuable insights and understand the perspectives and intentions of the respondents (Popping, 2015). While the primary focus of the study was on quantitative analysis of survey data, responses to one open-ended question was decided to be collected. These responses were not systematically analyzed but were used to provide additional insights into the quantitative findings during the discussion of results.

Binary coding was used for Questions 14 and 20 to analyze challenges in technology integration and the types of support desired by faculty, highlighting key areas for improvement. Frequency analysis for Questions 10, 16, 17, and 19 further detailed the actual usage of AI tools, the impact of institutional policies, the pursuit of professional development, and the use of support resources.

3.7 Ethical Considerations

The study adhered to ethical principles and standards throughout its execution (Creswell, 2014). This entails respecting the rights and intrinsic value of the participants in the study, protecting their confidentiality and privacy, obtaining their informed consent, and ensuring that the research is conducted fairly and without bias (Oliver, 2003). For this reason, at every stage of the research project, I took steps to protect the privacy of my research participants and to minimize any risks that might arise during the course of the study.

Before commencing fieldwork, I submitted a NU GSE Research Approval Application Form. This submission included a concise study description, the purpose, research questions, methodology, assessment of risks and benefits, and a thorough explanation of how participant anonymity and confidentiality was safeguarded. Additionally, I provided the Informed Consent Form and survey questions to the NU GSE Research Committee for ethics approval.

Anonymity and Confidentiality

Throughout the study, I prioritized maintaining the anonymity and confidentiality of all participants. This was achieved by using consent forms that clearly detailed the study's objectives, the time commitment required, potential risks and benefits, participants' rights, and contact information for further inquiries. The consent form also highlighted the advantages of participating, such as the opportunity for personal reflection on decision-making experiences.

Participants were fully informed about the voluntary nature of their participation, the confidential handling of their responses, and the academic purposes for which the data would be used. They were reassured that their choice to participate—or not—would bear no negative consequences.

To safeguard participant data, all sensitive information such as email addresses and contact details were securely stored in a password-protected electronic folder, accessible solely by the researcher. After the study was concluded, all consent forms and any documents containing participant contact information were securely destroyed. Consequently, reports generated from this research do not contain any identifiable information, ensuring that participants' identities remain protected.

Risks and Benefits

There are minimal risks associated with participation in this study. To ensure privacy, no personal information was gathered, maintaining participant anonymity. As Berg and Lune (2012) highlight, informed consent forms must inform participants of any "potential risks and benefits" (p. 90) associated with their involvement in research. In this context, there were no potential risks to the personal and professional lives of participants. It is important to note that participation required a time commitment. However, the decision to participate or not did not negatively impact the participants in any way.

This research aimed to illuminate the integration of EdTech and AI tools, offering valuable insights for educators and institutions, particularly within the Kazakhstani educational context. Participants not only contributed to a deeper understanding of these technologies but also had the chance to reflect on their decision-making experiences and gained knowledge about participating in empirical educational research. Additionally, this involvement provided an opportunity to learn new aspects about themselves and the effective use of AI tools in education, ultimately aiming to enhance teaching and learning experiences.

3.8 Chapter Summary

This chapter has detailed the methodology employed in the study, offering a thorough outline of the research design and methodology. It began by describing the research site and

population, followed by an explanation of the data collection procedures and the instruments used. The techniques used for data analysis and the ethical considerations involved were also addressed, discussing their implications to ensure the study's integrity and validity. Overall, this chapter has served as a foundational guide, clearly articulating the methods used to maintain the rigor of the research. The subsequent chapter will present the results derived from the various data collection instruments.

4. Presentations of the Findings

4.1 Introduction

The previous chapter is a thorough explanation of the research methods used in this study and describes the data analysis approach. In this chapter, I will present the findings of this study, which is focused on the exploration of the usage landscape of EdTech and AI tools among our faculty, including an assessment of current EdTech tool usage, an exploration of experiences and familiarity with AI tools in education, and an understanding of the benefits and challenges associated with incorporating these technologies into teaching. Additionally, the research seeks to identify factors influencing faculty decisions regarding the adoption or rejection of these innovations and to determine the support required for effective integration into educational practices.

4.2 Demographics

Frequency analysis to summarize demographics (Q1-Q5)

The questionnaire, completed by 55 participants, offers a foundational understanding of the demographics crucial for contextualizing the study's subsequent findings. The frequency analysis conducted on the survey data presents a comprehensive overview of the demographic characteristics of participants, shedding light on their diverse backgrounds and roles within the academic landscape. The School of Sciences and Humanities (SSH) accounts for the highest proportion of responses at approximately 29.1%, followed by the School of Engineering and Digital Sciences (SEDS) at about 18.2%. The Graduate School of Education (GSE) is represented by 16.4% of the participants, while the Center for Preparatory Studies (CPS) comprises 14.5%. The Nazarbayev University School of Medicine (NUSOM) makes up roughly 12.7% of the responses. Both the Graduate School of Public Policy (GSPP) and the Graduate School of Business (GSB) each contribute about 3.6% of the total responses, with a single participant representing the School of Mining and Geosciences (SMG),

accounting for 1.8%. with a single participant representing the School of Mining and Geosciences (SMG).

Table 3

Frequencies of Q1

Frequencies of Q1SchoolDept

Q1SchoolDept	Counts	% of Total	Cumulative %
SMG	1	1.8 %	1.8 %
SEDS	10	18.2 %	20.0 %
GSE	9	16.4 %	36.4 %
GSPP	2	3.6 %	40.0 %
CPS	8	14.5 %	54.5 %
GSB	2	3.6 %	58.2 %
SSH	16	29.1 %	87.3 %
NUSOM	7	12.7 %	100.0 %

Regarding academic positions, Assistant Professors and Associate Professors form the largest groups among academic positions, with 29.1% and 25.5% of responses, respectively, demonstrating a broad engagement with EdTech and AI tools across various stages of academic careers. Instructors (18.2%) and Teaching Fellows (14.5%) also show active involvement, followed by Postdoctoral Researchers/Fellows (9.1%). Professors, representing the smallest group, account for only 3.6% of responses, indicating a collective interest in academic innovation across different teaching and research roles.

Table 4

Frequencies of Q2

Frequencies of Q2AcademicPosition

Q2AcademicPosition	Counts	% of Total	Cumulative %
Prof	2	3.6 %	3.6 %
Assoc Prof	14	25.5 %	29.1 %
Asst Prof	16	29.1 %	58.2 %
Postdoc	5	9.1 %	67.3 %
TF	8	14.5 %	81.8 %
Instr	10	18.2 %	100.0 %

The distribution of teaching experience among respondents shows that 21.8% have 1-5 years of experience and the same percentage (21.8%) have more than 20 years of experience. Those with 11-15 years of experience account for 20% of the responses, followed by the 6-10 years category at 18.2%. Participants with 16-20 years of experience represent approximately 16.4% of the total, with a single respondent reporting less than 1 year of teaching experience.

Table 5

Frequencies of Q3

Frequencies of Q3TeachingExperienceYears

Q3TeachingExperienceYears	Counts	% of Total	Cumulative %
16-20	9	16.4 %	16.4 %
1-5	12	21.8 %	38.2 %
11-15	11	20.0 %	58.2 %
6-10	10	18.2 %	76.4 %
<1	1	1.8 %	78.2 %

Frequencies of Q3TeachingExperienceYears

Q3TeachingExperienceYears	Counts	% of Total	Cumulative %
>20	12	21.8 %	100.0 %

In terms of age groups, a significant engagement is observed among mid-career professionals aged 35-44 years, who represent 40% of respondents, and seasoned professionals aged 45-54 years, who account for 27.3%. The survey also includes younger academics aged 25-34 years (14.5%) and more experienced educators aged 55-64 years (16.4%). Additionally, a participant aged 65 or older underscores the cross-generational interest in educational technologies, representing 1.8% of the total responses.

Table 6

Frequencies of Q4

Frequencies of Q4AgeGroup

Q4AgeGroup	Counts	% of Total	Cumulative %
45–54	15	27.3 %	27.3 %
35–44	22	40.0 %	67.3 %
25–34	8	14.5 %	81.8 %
55–64	9	16.4 %	98.2 %
65 or older	1	1.8 %	100.0 %

The gender distribution of the survey participants shows a nearly even split, with male respondents comprising 49.1% and female respondents representing 47.3%. Additionally, individuals identifying as 'Other' account for 3.6% of the total, reflecting a diverse spectrum of perspectives regarding the integration of EdTech and AI tools in higher education.

Table 7

Frequencies of Q5

Frequencies of Q5Gender

Q5Gender	Counts	% of Total	Cumulative %
Female	26	47.3 %	47.3 %
Male	27	49.1 %	96.4 %
Other	2	3.6 %	100.0 %

4.3 Current level of Edtech usage

To address Research Question 1 ("What is the current level of EdTech usage among faculty members in higher education?"), the researcher analyzed the data with the three different types of questions.

Question 6 (Q6) in the survey serves as the initial question whose responses contribute to addressing the first research question. Q6, designed as a slider question, invited participants to indicate their frequency of using educational technology (EdTech) tools in their teaching by selecting a point along a scale from 1 (Not at all) to 5 (Extensively). This approach allowed for an assessment of participants' utilization levels of EdTech tools in their educational practices.

Question 7 (Q7) in the survey asks participants to select the EdTech tools they have used in their teaching from a provided list, with usage frequency options ranging from "0 times per week" to "daily".

Question 8 (Q8) is a multiple-choice question that asks participants to indicate their years of experience using EdTech tools in their teaching by selecting from the provided options.

Descriptive statistics and frequency distribution for Q6 (level of EdTech usage)

Descriptive Statistics was used in analyzing Q6. It gives a comprehensive overview of how frequently faculty members use EdTech tools in their teaching. Descriptive statistics summarizes the central tendency and variability of the usage levels across the scale from 1 (Not at all) to 5 (Extensively).

Table 8

Descriptives for Q6

Descriptives

	Q6EdTechUsageLevel
N	49
Missing	6
Mean	3.18
Median	3
Standard deviation	1.20
Minimum	1
Maximum	5

The analysis of faculty members' utilization of Educational Technology (EdTech) tools in their teaching activities draws from a dataset of 49 responses, after accounting for six missing entries. The findings illuminate a moderate level of EdTech tool engagement among participants, with the data revealing an average usage score of 3.18 on a scale ranging from 1 (Not at all) to 5 (Extensively). This moderate engagement is further underscored by both the median and the most frequently reported value (mode) being 3.

The distribution of responses, as indicated by a standard deviation of approximately 1.20, suggests a relative clustering of faculty usage around this moderate level, despite

encompassing the full range of the scale from minimal to extensive engagement. This range evidences the diverse approaches and experiences among faculty in integrating EdTech tools into their pedagogical practices.

Cross-tabulation and Chi-square tests to examine the relationship between demographic variables (Q1-Q5) and EdTech usage (Q6-Q8)

When doing Chi-square tests across various cross-tabulations between demographic variables (Q1-Q5) and EdTech usage levels (Q6-Q8), the result of p-values appeared to be greater than 0.05, indicating that there are no statistically significant associations between these demographic factors (such as teaching experience, academic position, etc.) and how faculty members use EdTech tools.

However, when computing cross-tabulation to examine the relationship between the length of time faculty have been using EdTech and their current levels of EdTech usage, the Chi-square test yielded a value of 71.3 with 30 degrees of freedom, resulting in a statistically significant p-value of less than .001 (as shown in table below). This indicates a strong statistical association between the years of using EdTech and the intensity of its use, suggesting that familiarity with and exposure to EdTech over time significantly enhance faculty engagement with these technologies.

Table 9

Contingency table for Q8 and Q6

Contingency Tables

	Q6EdTechUsageLevel						
Q8YearsUsingEdTech	**1**	**2**	**3**	**4**	**5**	**NaN**	**Total**
1	2	1	2	2	1	0	8
2	1	1	4	2	1	0	9

Contingency Tables

	Q6EdTechUsageLevel						
Q8YearsUsingEdTech	**1**	**2**	**3**	**4**	**5**	**NaN**	**Total**
3	1	0	5	0	3	0	9
4	1	5	3	2	1	0	12
5	0	0	3	5	2	0	10
7	0	0	0	0	0	2	2
NaN	0	1	0	0	0	4	5
Total	5	8	17	11	8	6	55

Table 10

Chi-square results

χ^2 Tests

	Value	**df**	**p**
χ^2	71.3	30	< .001
N	55		

Moreover, the cross tabulation revealed a significant association between faculty members' overall use of educational technology (EdTech) and their specific usage of Learning Management Systems (LMS). Chi-square statistic of 76.1 with 25 degrees of freedom and a p-value less than .001 indicates a statistically significant association between the levels of EdTech usage and the frequency of LMS usage (as shown in table below). This

implies that how frequently faculty members use educational technology correlates strongly with their LMS usage patterns.

Table 11

Contingency table for Q7 and Q6

Contingency Tables

	Q6EdTechUsageLevel						
Q7_1LMS_Usage	**1**	**2**	**3**	**4**	**5**	**NaN**	**Total**
1	0	0	0	0	0	1	1
2	1	4	2	0	0	0	7
3	3	3	3	0	1	0	10
4	0	0	3	2	2	0	7
5	1	1	8	9	5	0	24
NaN	0	0	1	0	0	5	6
Total	5	8	17	11	8	6	55

Table 12c

Chi-square results

χ^2 Tests

	Value	**df**	**p**
χ^2	76.1	25	< .001

χ^2 Tests

	Value	df	p
N	55		

The researcher also used descriptive statistics, specifically means and standard deviations to evaluate the variability in usage levels of various educational technology tools (Q7) among the faculty (as shown in table below).

Table 13

Descriptives for Q7

Descriptives

	N	Missing	Mean	Median	SD	Minimum	Maximum
Q7_1LMS_Usage	49	6	3.94	4	1.215	1	5
Q7_2OnlineDisscussionForums_Usage	46	11	1.72	1.00	0.981	1	5
Q7_3VideoConf_Usage	50	7	2.14	2.00	0.948	1	5
Q7_4InteractiveWhiteboardsUsage	49	8	1.53	1	1.157	1	5
Q7_5OnlineAssessmentToolsUsage	48	9	1.63	1.50	0.733	1	4
Q7_6CollabDocToolsUsage	49	8	2.67	2	1.345	1	5
Q7_7MobileLearningAppsUsage	48	9	1.38	1.00	0.937	1	5
Q7_8VRARToolsUsage	48	9	1.10	1.00	0.425	1	3
Q7_9AIToolsUsage	48	9	1.79	1.00	1.184	1	5
Q7_10SocialMediaLearningUsage	49	8	1.76	1	1.267	1	5

Learning Management Systems (LMS) are highly integrated with a mean usage rating of 3.94 and a standard deviation (SD) of 1.215, indicating frequent use. Conversely, Online

Discussion Forums and Interactive Whiteboards show limited adoption, with mean ratings of 1.72 and 1.53 respectively, pointing to infrequent use in daily teaching.

Video Conferencing and Collaborative Document Tools are moderately utilized, with means of 2.14 and 2.67 respectively. This suggests occasional usage for specific tasks, with Video Conferencing showing less variability in use (SD = 0.948) compared to Collaborative Tools (SD = 1.345).

Mobile Learning Apps and VR/AR Tools are the least used, with low mean ratings of 1.38 and 1.10, and minimal variability, especially for VR/AR Tools (SD = 0.425). AI Tools and Social Media for learning are also infrequently used with mean ratings just below 2 and higher variability, reflecting diverse usage patterns where they are employed.

4.4 Familiarity with AI Tools and Their Potential Applications

To address Research Question 2, which explores faculty familiarity with AI tools and their applications in teaching and learning, three survey questions were analyzed. Q9 is a slider question assessing faculty familiarity with AI tools on a scale from 1 (Not at all familiar) to 5 (Extremely familiar). Q10, a multiple-choice question, asks respondents whether they have ever used AI tools in their teaching. Q11, an open-ended question, invites participants to describe different AI tools they use in their teaching practices.

Descriptive statistics for Q9 (familiarity with AI tools)

The descriptive statistics for AI tool familiarity among faculty members were derived from responses of 50 participants, with 5 missing entries suggesting incomplete response rates. The mean familiarity rating was 2.54 on a scale from 1 (Not at all familiar) to 5 (Extremely familiar), indicating that the average familiarity level hovers slightly above the midpoint between "Not at all familiar" and "Neutral" (shown in table below). The median

value, however, stands at 3.00, which points to a distribution skew where a significant number of respondents feel neutral, raising the median above the mean. The standard deviation of 1.36 reflects a broad spread in responses, highlighting a diverse range of familiarity levels among the faculty, ranging from very unfamiliar to highly knowledgeable about AI tools. This spread suggests significant variability in how AI technologies are perceived and utilized across the faculty.

Table 14

Descriptives for Q9

Descriptives

	Q9AIFamiliarity
N	50
Missing	5
Mean	2.54
Median	3.00
Standard deviation	1.36
Minimum	1
Maximum	5

Frequency analysis for Q10 (usage of AI tools)

The responses to the question "Have you ever used any AI tools in your teaching?" reveal a divided perspective among faculty members regarding the adoption of AI technologies (the table shown below). A total of 24% of respondents (12 individuals) stated they have "Definitely not" used AI tools, reflecting a significant portion who are either

unaware of or actively choose not to use such technologies. Close to this, 22% (11 respondents) feel they have "Probably not" used AI tools, which, when combined with the definite non-users, suggests that nearly half (46%) of the faculty have not engaged with AI tools.

Conversely, only a small group of 3 respondents (6%) selected "Might or might not," indicating a neutral or uncertain position on their use of AI tools. This minor segment shows some faculty are either indifferent or unsure about their use of these technologies.

In contrast, the categories of "Probably yes" and "Definitely yes" each include 12 respondents (24% for each category), summing up to 48% who acknowledge some level of usage of AI tools, ranging from probable to definite.

Table 15

Frequencies of Q10

Frequencies of Q10AIUseInTeaching

Q10AIUseInTeaching	Counts	% of Total	Cumulative %
1	12	24.0 %	24.0 %
2	11	22.0 %	46.0 %
3	3	6.0 %	52.0 %
4	12	24.0 %	76.0 %
5	12	24.0 %	100.0 %

Content analysis for Q11 (open-ended responses about types of AI tools known by faculty of NU)

The researcher has done a content analysis on the faculty responses reveals a notable awareness and application of AI tools in education, particularly with ChatGPT, which emerged as the most frequently mentioned tool due to its diverse educational uses. There was a strong emphasis on AI tools that enhance written communication, such as those assisting with writing, grammar, and plagiarism, reflecting a significant interest in using AI to improve these skills. Additionally, numerous responses highlighted educational platforms that integrate AI to gamify learning, provide interactive content, or facilitate assessments, demonstrating the valued multifunctional benefits of AI in educational settings. However, there was noticeable variability in tool familiarity; while some respondents are well-acquainted with a broad array of tools, others have limited or no experience, indicating varied levels of exposure and adoption among the faculty. This diversity underscores the differing engagement with AI technologies across the academic spectrum.

Detailed responses to the open-ended question about AI tool familiarity are provided in Appendix A. This appendix includes a list of all AI tools mentioned by respondents, offering additional context and exemplifying the range of tools currently recognized and utilized in the educational settings.

4.5 Perceived Benefits and Challenges of AI Tools and EdTech Integration

To address Research Question 3, which investigates faculty's perceived benefits and challenges of AI tools and EdTech integration, three survey questions were analyzed. Q12 is a slider question assessing agreement with the statement: "Integrating AI tools and EdTech in teaching significantly enhances student learning," with responses ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). Q13, a slider question, measures the perceived difficulty of integrating EdTech into teaching, on a scale from 1 (Very Easy) to 5 (Very Challenging). Q14, a multiple-choice question, asks participants to identify the biggest challenge they face when integrating EdTech and AI tools into their teaching.

Descriptive statistics for Q12 and Q13 (perceived benefits and challenges)

The descriptive statistics for faculty perceptions on the benefits of integrating AI tools and EdTech into teaching show a nuanced view among respondents (Q12). Out of 46 participants (with 11 missing responses), the average rating is 2.91 with a median of 3.00, indicating a slight agreement that these technologies enhance student learning, but leaning towards neutrality (shown in table below). The standard deviation of 1.30 reveals a broad dispersion of opinions, ranging from 1 to 5, suggesting that while some faculty see significant benefits, others are less convinced or vary widely in their experiences and attitudes.

Table 16

Descriptives of Q12

Descriptives

	Q12PerceivedBenefitAIEdTech
N	46
Missing	11
Mean	2.91

Descriptives

	Q12PerceivedBenefitAIEdTech
Median	3.00
Standard deviation	1.30
Minimum	1
Maximum	5

The analysis of question 13, which explores the difficulty faculty members experience when integrating EdTech into their teaching, reveals varied responses from the 44 participants, with 11 not providing a response (shown in table below). The average difficulty rating stands at 2.64, with a median of 3.00, indicating a moderate perception of challenge, slightly leaning towards more challenging. The responses vary widely (standard deviation of 1.20), ranging from 1 to 5, reflecting a spectrum from very easy to very challenging. This diversity suggests that while some faculty members find the integration process manageable, others face significant obstacles.

Table 17

Descriptives of Q13

Descriptives

	Q13IntegrationDifficultyEdTech
N	44
Missing	11
Mean	2.64
Median	3.00
Standard deviation	1.20

Descriptives

	Q13IntegrationDifficultyEdTech
Minimum	1
Maximum	5

Binary coding and descriptive statistics for Q14

To analyze the responses from the survey question regarding the biggest challenges in integrating EdTech and AI tools into teaching, the researcher converted the multiple-choice answers into binary form. This approach allowed for a clear aggregation of how often each type of challenge was selected, facilitating straightforward quantitative analysis.

The most common barrier, cited by 23 respondents, is a lack of training, indicating a significant need for enhanced educational support. Seventeen respondents reported a lack of resources, highlighting deficiencies in the availability of necessary tools and materials. Technical issues were also notable, with 10 respondents pointing out problems with technology functionality and reliability. Eight respondents expressed concerns over insufficient institutional support, underscoring the need for more robust administrative backing.

Additionally, 15 respondents identified several specific challenges under the "other" category that were not captured by predefined options. Key concerns included significant time constraints to learn and implement new technologies, a lack of understanding and motivation among faculty regarding the ethical use and potential benefits of these tools, and inadequate institutional incentives. Moreover, respondents expressed difficulties due to the sheer volume of available tools, leading to issues with practical application and concerns about student misuse. These findings suggest a need for clearer guidance, more robust

support, and better alignment of institutional priorities with the integration of technology in education.

4.6 Factors Influencing Faculty Members' Decision

To address Research Question 4, which examines the factors influencing faculty's decision to adopt or reject the use of AI tools and other EdTech solutions, three survey questions were analyzed. Q15 is a slider question that requires participants to rate how various provided factors influence their decision to adopt EdTech and AI tools, on a scale from 1 (Not at all influential) to 5 (Extremely influential). Q16 is a multiple-choice question that explores whether institutional policies and incentives have played a role in their decision to adopt technology. Q17 is another multiple-choice question that asks participants how frequently they seek professional development opportunities related to EdTech and AI tools.

Descriptive statistics for Q15 (factors influencing adoption)

The survey analysis regarding factors influencing faculty adoption of EdTech and AI tools shows that perceived usefulness is most critical, with an average rating of 3.86 and a median of 4, suggesting that tools viewed as beneficial are more likely to be adopted. Perceived ease of use also ranks high with a mean of 3.77, emphasizing the importance of user-friendly technology. Technical support follows closely with a mean of 3.52, indicating substantial reliance on available technical assistance for integrating these tools. Meanwhile, institutional support and peer influence are seen as moderately influential, with means of 2.90 and 2.50, respectively, pointing to a more varied perception among faculty regarding the impact of institutional support and peer influence on their technology adoption decisions.

Table 18

Descriptives of Q15

Descriptives

	N	Missing	Mean	Median	SD	Minimum	Maximum
Q15_1InstitutionalSupportInfluence	40	11	2.90	3.00	1.58	1	5
Q15_2PeerInfluence	40	11	2.50	2.00	1.41	1	5
Q15_3PerceivedEaseOfUse	40	11	3.77	4.00	1.23	1	5
Q15_4PerceivedUsefulness	43	11	3.86	4.00	1.15	1	5
Q15_5TechnicalSupportInfluence	40	11	3.52	4.00	1.40	1	5

Frequency analysis for Q16 and Q17

The frequency analysis of faculty responses regarding the role of institutional policies and incentives in their decision to use EdTech and AI tools indicates a varied impact (Q16). A total of 20% of respondents stated that institutional policies and incentives definitely did not influence their decisions ('Definitely not'), while 15.6% leaned towards a negative influence ('Probably not'). A neutral stance was taken by 24.4%, indicating uncertainty about the influence ('Might or might not'). However, a significant portion, 28.9%, felt that institutional policies probably did influence their decisions ('Probably yes'), and 11.1% affirmed a definitive positive influence ('Definitely yes'). This suggests that while a considerable number of faculty members acknowledge the importance of institutional support, there remains a broad spectrum of perceptions about its effectiveness and impact.

Table 19

Frequencies of Q16

Frequencies of Q16InfluenceOfInstitutionalPolicies

Q16InfluenceOfInstitutionalPolicies	Counts	% of Total	Cumulative %
1	9	20.0 %	20.0 %
2	7	15.6 %	35.6 %
3	11	24.4 %	60.0 %
4	13	28.9 %	88.9 %
5	5	11.1 %	100.0 %

The distribution of responses to the question (Q17) on how often faculty seek professional development (PD) opportunities related to EdTech and AI tools indicates that a small segment of respondents (17.8%) reported never seeking such opportunities, while 28.9% indicated they rarely engage in PD related to EdTech and AI. In contrast, the largest group, consisting of 33.3% of respondents, sometimes seeks PD opportunities, suggesting intermittent interest or availability of relevant training. Only 13.3% often participate in these development activities, and a further 6.7% always seek such opportunities, highlighting a committed but small group focused on continually enhancing their skills and knowledge in this area. This spread illustrates diverse attitudes towards PD in EdTech and AI among faculty, with a significant portion at least occasionally engaged in expanding their educational technology capabilities.

Table 20

Frequencies of Q17

Frequencies of Q17SeekingPDForEdTechAI

Q17SeekingPDForEdTechAI	Counts	% of Total	Cumulative %
1	8	17.8 %	17.8 %
2	13	28.9 %	46.7 %
3	15	33.3 %	80.0 %
4	6	13.3 %	93.3 %
5	3	6.7 %	100.0 %

4.7 Faculty Members' Perception of Assistance and Support Necessary for Effective Integration of EdTech and AI Tools

To address Research Question 5, which examines the necessary assistance and support for effective integration of EdTech and AI tools, three survey questions were analyzed. Q18 is a slider question that asks participants to rate the importance of various types of support provided on a scale from 1 (Not at all important) to 5 (Extremely important). Q19 is a multiple-choice question that inquires how frequently participants have utilized institutional resources and support services to integrate EdTech into their teaching. Q20 is also a multiple-choice question that asks participants to select from a provided list the support services they would like to have more of.

Descriptive statistics for Q18 (importance of different types of support)

The survey data on faculty perceptions of support for integrating EdTech and AI tools reveals diverse evaluations across different types of support: Training workshops have a mean of 3.37, indicating they are seen as somewhat important, but the high standard deviation suggests varied views on their effectiveness (table below). Technical support is

highly valued (mean: 3.57), emphasizing the need for reliable assistance. Peer mentoring shows moderate importance (mean: 2.82) with wide-ranging opinions on its efficacy. Instructional design support is also considered moderately important (mean: 3.27), highlighting the need for expertise in course integration. The most valued support is access to resources (mean: 4.10), indicating a consensus on its critical role for effective technology integration. These findings point to the necessity for tailored support that aligns with diverse faculty needs and preferences.

Table 21

Descriptives of Q18

Descriptives

	N	Missing	Mean	Median	SD	Minimum	Maximum
Q18_1ImportanceTrainingWorkshops	41	14	3.37	4	1.56	1	5
Q18_2ImportanceTechnicalSupport	42	13	3.57	4.00	1.43	1	5
Q18_3ImportancePeerMentoring	39	16	2.82	3	1.59	1	5
Q18_4ImportanceInstructionalDesign	40	15	3.27	4.00	1.40	1	5
Q18_5ImportanceAccessResources	42	13	4.10	5.00	1.21	1	5

Responses to the "Other" support category’s key insights include the necessity for allocated time to explore and implement AI tools effectively, the importance of recognizing such integration efforts in professional evaluations to motivate faculty, and a preference for efficient, self-directed learning resources over time-consuming workshops. These findings suggest that enhancing support structures should not only focus on providing resources but also on facilitating time management and offering acknowledgment in professional growth, which could significantly boost the adoption and effective use of educational technologies.

Frequency analysis for Q19 (use of institutional resources)

The frequency analysis of faculty use of institutional resources or support services for integrating EdTech shows a spectrum of engagement: 18.2% never used these services, 15.9% rarely used them, 38.6% used them sometimes, 15.9% often, and 6.8% always relied on such support. Additionally, 4.5% were either unaware of or did not find the EdTech tools applicable.

Table 22

Frequencies of Q19

Frequencies of Q19UsageOfInstitutionalSupportEdTech

Q19UsageOfInstitutionalSupportEdTech	Counts	% of Total	Cumulative %
1	8	18.2 %	18.2 %
2	7	15.9 %	34.1 %
3	17	38.6 %	72.7 %
4	7	15.9 %	88.6 %
5	3	6.8 %	95.5 %
6	2	4.5 %	100.0 %

Binary coding and descriptive statistics for Q20 (desired support types)

To analyze the survey data where respondents could select multiple types of support they desired for integrating EdTech and AI tools into their teaching, the responses were converted into binary format. This approach involves transforming multiple-choice answers into binary variables to simplify quantitative analysis and then applying descriptive statistics to summarize and interpret the preferences. This transformation involved coding each type of support as either `1` (selected) or `0` (not selected). Binary coding allows for a clear

quantification of preferences, helping to identify key areas where faculty members feel they need more support to effectively integrate technology into their teaching practices.

The findings reveal that 28 respondents emphasized the importance of training on specific tools, 10 highlighted the need for technical support, 18 saw value in pedagogical support, 9 expressed interest in collaboration opportunities, and 7 noted other forms of support. Among these, one faculty member pointed out the lack of institutional technical support, often taking on the role of tech support themselves. Others mentioned purchasing educational tools out-of-pocket, highlighting the need for institutional resource accessibility. There were also calls for practical application guidance and pedagogical support, especially beneficial for those lacking an educational background. Furthermore, concerns about the timing of professional development activities were raised, with a need for more flexible scheduling to fit busy academic calendars. These responses underscore the necessity for more tailored and accessible support to effectively leverage technology in teaching.

4.8 Summary of the Findings

The analysis of faculty utilization of Educational Technology (EdTech) tools, based on 49 responses, reveals that faculty members are moderately engaged in using these tools, with an average usage score of 3.18 out of 5. Statistical tests indicate a strong correlation between the duration of EdTech use and the intensity of usage. Additionally, there is a significant association between the use of EdTech and Learning Management Systems (LMS). LMS are frequently used, while Online Discussion Forums and Interactive Whiteboards have limited adoption.

The familiarity of faculty with AI tools averages at 2.54, indicating a slight preference over neutrality. However, around 46% of faculty members have not yet used AI tools in their teaching. AI tools that enhance written communication, such as grammar and plagiarism tools, are popular among faculty.

Faculty members perceive the integration of AI and EdTech into teaching as moderately beneficial, with an average perception rating of 2.91. The integration process is considered moderately challenging, with significant barriers including a lack of training and resources.

Factors influencing the adoption of these technologies highlight the importance of perceived usefulness and ease of use. There is a critical need for effective training and technical support. These findings suggest a cautious but growing acceptance and recognition of the potential benefits of EdTech and AI in enhancing educational outcomes.

5. Discussion

This research study examined the landscape of educational technology (EdTech) and artificial intelligence (AI) tool usage among faculty at Nazarbayev University. It delved into faculty experiences and familiarity with AI technologies in education, as well as explored the perceived benefits and challenges associated with integrating these technologies into their teaching practices. Moreover, the study identified key factors influencing faculty decisions to adopt or reject these technological innovations and determined the types of support required for their effective integration into educational contexts.

The preceding chapter detailed the study's findings obtained from the survey instrument. This chapter will discuss the results pertaining to the five research questions, which were:

1) What is the current level of EdTech usage among faculty members in higher education?

2) How familiar are faculty members with AI tools and their potential applications in teaching and learning?

3) What are the perceived benefits and challenges of AI tools and other edtech integration among faculty in higher education?

4) What factors influence faculty members' decision to adopt or reject the use of AI tools and other edtech in their teaching practices?

5) What types of assistance and support do faculty members perceive as necessary or beneficial for effective integration of EdTech and AI tools into their teaching practices?

5.1 What is the current level of Edtech usage among faculty members in higher education?

Research findings indicate that, on average, faculty members demonstrate a moderate degree of incorporating EdTech tools into their teaching. The mean, median, and mode calculations highlight a balanced use of technology in educational environments. However, it is important to consider the diversity in usage levels and the implications of missing responses for a comprehensive understanding of technology's role in higher education teaching.

The Goals 2000 Preservice Technology Infusion Project revealed that while higher education faculty initially showed moderate to high proficiencies in basic technologies like word processing and email, significant improvements were seen after treatment, especially in areas such as distance education, content-specific software, and instructional methods for technology integration. Over half of the faculty integrated various technologies for both student and instructor use, including computer presentations, content-specific software, email, the Internet, electronic references, and word processing (Vannatta & Beyerbach, 2014). These findings suggest an increase in EdTech usage among higher education faculty.

Cross-tabulation results examining the relationship between faculty's length of time using EdTech and their current levels of EdTech usage show that faculty who engage more with EdTech are also more intensive users of LMS. This highlights the central role of LMS in educational technology frameworks. The results emphasize the importance of LMS in faculty's daily technology use and suggest that enhancing LMS training and integration could further enhance EdTech adoption and effectiveness in educational settings.

A study by Georgina and Olson (2008) explored the impact of faculty technology literacy and targeted training on integrating technology into their teaching practices.

Conducted among faculty at US colleges of education, the research found strong links between faculty's technological skills and their ability to incorporate technology into pedagogy.

In a study by Fathema, Shannon, and Ross (2015), it is emphasized that faculty members often use Learning Management Systems (LMSs) as supplements to their lectures, with limited utilization of advanced features. The study highlights that universities invest significantly in LMSs to enhance teaching and learning processes but faculty members do not fully exploit these systems.The study conducted by Rhode et al. (2017) reveals that faculty engagement with the Learning Management System (LMS) is evolving. It indicates an increase in the usage of individual tools within the LMS, with differences observed between online and face-to-face courses. Although the overall adoption of LMS may have reached a plateau, there is continuous growth in the use of specific tools, emphasizing the importance of understanding how faculty interact with distinct features of the LMS.

The data also shows that traditional and foundational tools like LMS are commonly used, whereas newer and innovative technologies such as VR/AR and AI tools are not yet widely adopted. The varying usage levels of collaborative tools and AI suggest that while some faculty members are utilizing these technologies to enhance teaching and learning, there is still ample room for increasing their adoption. Additionally, the limited use of mobile apps and social media tools for learning highlights potential areas for improvement in faculty training and infrastructure enhancements to better integrate these technologies into everyday educational practices.

LMS platforms are well-established technologies that are favored for their familiarity and ease in organizing online courses and resources. They are generally more affordable and accessible compared to newer technologies like VR, AR, and AI tools, which often require

specific hardware, software, and training. The adoption of these advanced technologies requires a shift in pedagogy and underscores the need for further research on incorporating immersive technologies into education (Bermejo et al., 2023).

In another study by Al-Ansi et al. (2023), it is indicated that augmented reality (AR) and virtual reality (VR) technologies have shown significant growth and potential in education over the past twelve years. However, the widespread adoption of these technologies, along with artificial intelligence (AI) tools, has not yet been achieved. Challenges in implementation, the early stages of integration, and the need for further research and investment are identified as barriers to the broader adoption of AR, VR, and AI in educational settings.

5.2 How familiar are faculty members with AI tools and their potential applications in teaching and learning?

The survey results revealed significant variability in faculty familiarity with AI tools at the institution, with most respondents having a moderate level of familiarity. This wide range of responses emphasizes the diverse exposure and understanding of AI tools, which could impact their integration into teaching and learning processes.

The variability observed and the presence of faculty members who are not familiar with AI tools highlight areas where professional training and support systems could be developed. These interventions would enhance the integration of AI tools into educational practices. The findings suggest a need for targeted interventions to increase faculty familiarity and comfort with AI technologies, which would ultimately improve their integration into the curriculum and pedagogy.

According to research by Ghimire, Prather, and Edwards (2024), educators are increasingly recognizing the benefits of generative AI tools in the classroom. Specifically, computer science (CS) educators have a greater technical understanding and more positive attitudes towards these tools compared to educators in other disciplines.

Teachers see AI as highly beneficial for enhancing scaffolding in scientific writing within STEM education. Younger teachers, who are more accustomed to educational technology, are particularly eager to integrate AI into their teaching. However, the limited hands-on experience with AI tools among teachers indicates a need for increased training and exposure to AI technologies in educational settings (Kim & Kim, 2022).

The survey responses also revealed a polarized view of AI tool adoption among faculty members, with an equal split between non-users and users. Almost half of the faculty indicated some level of usage, while a similar percentage leaned towards non-usage. The small percentage of neutral responses suggests only a few members are undecided about their usage of AI tools.

This balanced yet polarized distribution highlights a critical divide in familiarity with and adoption of AI technologies in teaching practices. It signifies the presence of both opportunities and challenges regarding the integration of AI tools into educational methodologies within the institution. The existence of both non-users and users presents an opportunity for institutions to engage with faculty members at different levels of AI readiness. Providing training, support, and resources can bridge the gap and encourage more educators to explore and integrate AI tools, potentially enhancing educational outcomes and promoting innovation in teaching practices. Amani et al. (2023) found that 64% of faculty and staff use ChatGPT, showing familiarity with AI tools in education. Faculty use ChatGPT for various tasks, including technical questions and accessing general knowledge, indicating

active use. Additionally, 47% of faculty are comfortable with students using ChatGPT in their courses, indicating moderate acceptance of AI technologies in academia. Dai, Liu, and Lim (2023) suggest that faculty members recognize the need to adapt their assessment methods and design tasks aligned with AI tools' capabilities.

Grajeda et al. (2023) integrated AI tools like ChatGPT to enhance student engagement at the university. Teacher experiments in various disciplines since November 2022 led to institutional initiatives like workshops and courses to improve faculty proficiency in using AI tools for teaching.

Finally, the survey also showed that faculty are familiar with various AI tools, particularly those supporting writing, content management, and interactive learning. Faculty recognize the potential of AI to support and enhance teaching and learning processes. This insight can guide further investigations into tool integration into curricula and their impact on educational outcomes.

Barrett and Pack's (2023) study suggests faculty members have strong familiarity with a diverse range of AI tools, especially those supporting writing tasks in education. This familiarity indicates educators actively use AI technologies to enhance writing instruction and support student learning. Both students and teachers generally agree on the acceptability of using GenAI in the early stages of the writing process, such as brainstorming and outlining.

5.3 What are the perceived benefits and challenges of AI tools and other edtech integration among faculty in higher education?

The survey results indicated that faculty members generally agreed that these technologies have the potential to enhance student learning, although the overall sentiment

was somewhat neutral. However, there was a wide range of opinions on the effectiveness of these technologies, suggesting that while some faculty members recognize significant benefits, others remain skeptical or have had different experiences and attitudes towards their adoption in educational settings.

Furthermore, the survey revealed a diverse set of obstacles that faculty members encounter when integrating technology into their teaching, with training and resource limitations being the most prominent. The "other" responses emphasized the need for improved training, clearer benefits, better time management solutions, and stronger institutional support to effectively overcome these barriers.

In a study by Bucea-Manea-Tonis et al. (2022), it was demonstrated that AI can significantly enhance higher education by personalizing learning, optimizing resource management, predicting student outcomes, improving teaching methods, enabling innovative pedagogical practices, and supporting research and development. This fosters a dynamic learning environment that promotes student success and innovation. Similarly, Bocevska and Nedelkovsk (2021) highlighted the benefits of integrating new technologies in higher education, such as increased accessibility, enhanced engagement, secure data storage, scalability, innovation in teaching methods, and minimal hardware requirements. Ultimately, these improvements contribute to the overall quality of education and better prepare students for success in a technology-driven world.

The research by Trinidad & Ngo (2019) also underscored the use of technology by faculty members in higher education to enhance student-to-student interaction, provide prompt feedback on student learning, and facilitate efficient communication with students.

While some stakeholders believe that AI tools can support student learning, transform higher education, and provide personalized learning experiences, others have raised concerns about the ethical implications of using AI tools in education. These concerns include issues related to academic integrity and plagiarism detection, as well as reservations about the impact of AI on traditional teaching methods (Dai, Liu, & Lim, 2023).

The study by Grajeda et al. (2023) emphasized the importance of AI proficiency for both educators and students, framing AI integration as a pedagogical evolution rather than just a technological shift. The study found that AI tools positively impact students' academic experiences by enhancing understanding, creativity, and productivity.

However, implementing educational technology in higher education is not without its challenges. West (1999) discussed the barriers faced by higher education institutions in adopting educational technology, including faculty resistance, the costs associated with new technologies, and the reluctance of educators to change their traditional roles as the sole providers of knowledge. These factors collectively hinder the enthusiastic and rapid integration of EdTech in higher education settings.

Fathema and Sutton (2013) also identified challenges such as system problems, design flaws, and lack of motivation as key factors contributing to the underuse of Learning Management Systems (LMS).

5.4 What factors influence faculty members' decision to adopt or reject the use of AI tools and other edtech in their teaching practices?

The survey analysis regarding factors influencing faculty adoption of EdTech and AI tools showed that perceived usefulness is the most critical, suggesting that tools viewed as beneficial are more likely to be adopted. Perceived ease of use also ranks high, emphasizing the importance of user-friendly technology. Technical support also plays a critical role, with a

significant dependence on available assistance for integrating these tools effectively. Institutional support and peer influence are considered moderately influential factors.

Regarding the role of institutional policies and incentives in the decision to use EdTech and AI tools, the responses indicated a diverse range of impacts. While a considerable number of faculty members acknowledge the importance of institutional support, there remains a broad spectrum of perceptions about its effectiveness and impact.

The article by West (1999) comprehensively explores the various barriers to integrating technology into teacher education, which include limited equipment availability, insufficient faculty training, unclear expectations for technology use in academic activities, funding shortages, and a lack of time for faculty to learn new technologies. Additional challenges such as skepticism about the pedagogical value of new technologies, inadequate technical support, a shortage of suitable materials, and the absence of clear goals for the teacher education program further compound these issues, collectively hindering the effective infusion of technology into educational settings.

In addition to these practical barriers, factors like awareness, perceived risk, and performance expectancy also significantly influence faculty members' attitudes towards adopting AI in their teaching and learning processes (Rahiman & Kodikan, 2023). These factors are crucial as even when universities encourage faculty to adopt new technologies for teaching, the acceptance or resistance to these technologies is influenced by a variety of factors including age, highest education earned, teaching experience, computer competency, prior computer experience, availability of technology, and institutional support (John, 2015).

A conceptual model, based on Roger's Diffusion Theory, was created to pinpoint crucial factors affecting the adoption of Information Technology by faculty in tertiary educational institutions. This model, tested among full-time lecturers in top Asian universities, revealed that computer self-efficacy, relative advantage, compatibility, and prior

computer experience significantly shape the perceived ease of use and attitude towards utilizing educational technologies (John, 2015).

Further studies, such as by Sinclair and Aho (2018), examine resistance to adopting Learning Management Systems (LMS), identifying prevalent inertia linked to fears about technology and concerns over its potential negative impacts on teaching. Similarly, Wichadee (2015) highlighted the importance of perceived ease of use and usefulness of LMS in influencing instructors' attitudes towards technology adoption, using the Technology Acceptance Model (TAM) which focuses on factors like Perceived Usefulness (PU), Perceived Ease of Use (PEOU), and Attitudes toward Usage (ATU) in predicting the early adoption of new computer technologies.

Lastly, concerns raised by teachers about potential issues caused by using AI, such as changes in the role played by teachers in the classroom and the transparency of decisions made by the AI system, further illustrate the complexity of technology adoption in educational contexts (Kim & Kim, 2022). These studies collectively underscore the multifaceted challenges and considerations involved in the adoption and integration of new technologies in education.

5.5 What factors influence faculty members' decision to adopt or reject the use of AI tools and other edtech in their teaching practices?

The responses suggested that while there is consensus on the high importance of certain supports like access to resources and technical support, there is variability in how faculty value training and peer mentoring. Responses to the "Other" category for needed support to integrate EdTech and AI tools highlight specific faculty needs and these insights indicate that alongside technical support, institutions should consider strategies that provide time management solutions, professional recognition, and efficient self-learning resources to enhance EdTech and AI tool adoption. This data could be crucial for informing strategic

decisions on resource allocation, professional development offerings, and policy adjustments in your institution.

Additionally, the frequency analysis of faculty use of institutional resources or support services for integrating EdTech revealed varied engagement levels. This indicates a varied familiarity and reliance on institutional support among faculty, with a substantial number engaging only occasionally, highlighting potential gaps in communication about or effectiveness of the available resources.

Further insights from the responses indicate a strong faculty interest in integrating technology into their teaching, coupled with a clear need for more comprehensive and considerate support structures. These responses highlight diverse but specific needs, ranging from technical assistance to flexible training modalities that accommodate faculty schedules. Identifying these needs suggests potential areas for improvement in how institutions support EdTech integration, emphasizing the necessity for tailored support that aligns with faculty requirements and teaching contexts.

Relevant literature further emphasizes the need for a proper understanding of technology's roles in education and ongoing support to optimize faculty engagement with technological tools. Trinidad & Ngo (2019) stress the importance of coaching to help faculty explore and utilize different technological tools for student engagement. Similarly, Akram et al. (2021) identify that technological competencies may evolve, underlining the importance of continuous professional development for teachers. Dexter’s (2015) study suggests that faculty can enhance their EdTech decision-making through collaboration, reflection, and staying current with technologies.

Sinclair and Aho (2018) in their study suggested that in order to encourage staff to explore the creative functionality of learning management systems (LMSs), universities

should recognize and support innovation by addressing pedagogic inertia, providing comprehensive training and support beyond basic usage, promoting openness to experimentation, and acknowledging and reducing perceived risks associated with innovation. By creating a supportive environment that values and rewards innovative teaching practices, institutions can empower staff to challenge conceptual limitations, experiment with new pedagogical approaches, and utilize the full potential of LMSs for enhanced teaching and learning experiences.

The study by Ahmed et al. (2022) outlines strategies for schools to enhance teacher support in integrating AI-based solutions in the classroom. These strategies include providing adequate resources and technological equipment, offering professional development through workshops and training programs, recognizing and rewarding innovative teachers who successfully implement AI technologies, creating dedicated time for experimentation and exploration of AI solutions, encouraging collaboration among teachers to share best practices, and linking technology use to formal recognition and professional growth opportunities.

The Barrett and Pack's (2023) study underscores the need for explicit guidelines and professional development for teachers on the use of GenAI in educational contexts. This suggests that while faculty members are familiar with AI tools, there is a call for further support and training to maximize the benefits of these technologies in teaching and learning.

5.6 Chapter Summary

This chapter explored the complexities of integrating technology within higher education, focusing on faculty adoption of Educational Technology (EdTech) and Artificial Intelligence (AI) tools. Survey results indicated that while there was broad consensus on the importance of resources and technical support, opinions varied significantly on the value of training and peer mentoring. Some faculty emphasized the need for time management solutions, professional recognition, and efficient self-learning resources to enhance adoption.

The chapter also highlighted the varied engagement levels of faculty with institutional support services, pointing to gaps in communication or effectiveness of these resources. Specific faculty needs identified included comprehensive support structures that accommodated diverse faculty schedules and preferences.

Literature reviewed in the chapter underscored the necessity of continuous professional development and tailored support strategies to encourage effective technology adoption. Studies by Trinidad & Ngo (2019) and Dexter (2015) emphasized ongoing coaching and professional development as crucial for improving faculty's EdTech decision-making skills.

Moreover, resistance to technology adoption was examined, with factors such as pedagogic inertia and fear of new technologies noted as significant barriers. Strategies to overcome these challenges, suggested by Sinclair and Aho (2018) and Ahmed et al. (2022), included comprehensive training and fostering a culture of innovation.

The chapter concluded by noting the evolving nature of faculty competencies and the ongoing need for institutions to provide environments that support and advance the integration of cutting-edge educational technologies.

6. Conclusion

The previous chapter presented and discussed the results of the study, which aimed to explore faculty usage of EdTech and AI tools in their teaching practices. It also assessed their experiences and familiarity with these technologies, the perceived benefits and challenges, and the types of support needed for effective integration. This chapter provides a summary of major findings from the survey, concluding with an exploration of the research implications and limitations. Additionally, it offers recommendations for future research and includes a personal reflection on the study's outcomes and the process of conducting the research. To achieve the study's purpose the following research questions were posed:

1) What is the current level of EdTech usage among faculty members in higher education?

2) How familiar are faculty members with AI tools and their potential applications in teaching and learning?

3) What are the perceived benefits and challenges of AI tools and other edtech integration among faculty in higher education?

4) What factors influence faculty members' decision to adopt or reject the use of AI tools and other edtech in their teaching practices?

5) What types of assistance and support do faculty members perceive as necessary or beneficial for effective integration of EdTech and AI tools into their teaching practices?

6.1 Summary of the Major Findings

Edtech usage levels

Faculty members generally demonstrate a moderate degree of incorporating educational technology (EdTech) tools into their teaching practices, as evidenced by mean, median, and mode calculations that highlight a balanced use of technology in educational environments. However, variations in usage levels and the implications of missing responses suggest a need for a deeper understanding of technology's role in higher education.

The Goals 2000 Preservice Technology Infusion Project further revealed that while faculty initially displayed moderate to high proficiencies in basic technologies such as word processing and email, significant improvements were observed post-treatment in areas like distance education, content-specific software, and instructional methods for technology integration, with over half of the faculty integrating various technologies for both student and instructor use.

Additionally, cross-tabulation results examining the relationship between faculty's length of time using EdTech and their current levels of usage highlighted the central role of Learning Management Systems (LMS), suggesting that enhancing LMS training and integration could further boost EdTech adoption and effectiveness in educational settings or at least be a good starting point.

Familiarity with AI tools in education

Although most respondents reported a moderate level of familiarity, the wide range of responses underscores the diverse exposure and understanding of AI tools among faculty members. This diversity could potentially impact how AI tools are integrated into teaching and learning processes at NU. The presence of faculty members who are not familiar with AI tools particularly emphasizes the need for developing professional training and support systems. Such interventions are suggested to increase faculty familiarity and comfort with AI technologies, which could, in turn, improve their integration into the curriculum and pedagogy, enhancing educational practices overall.

Perceived benefits anf challenges of edtech and AI tools

The study found both advantages and challenges of using MALL in Kazakhstani primary schools for both EFL and KL2 teachers. The benefits were the facilitating of the assessment and keeping the students' interest and motivation to learn languages. However, challenges related to mobile technological, pedagogical, and content knowledge indicated the need for teacher training and professional development to improve MALL pedagogy to address a potential gap in teachers' pedagogical content knowledge (PCK).

Factors influencing the adoption

The survey analysis highlighted that perceived usefulness is the most critical factor influencing faculty adoption of EdTech and AI tools, indicating that tools seen as beneficial are more likely to be adopted. The ease of use also ranks highly, stressing the importance of user-friendly technology. Technical support is crucial, with a significant reliance on available assistance for effective integration of these tools. Institutional support and peer influence are considered moderately influential. Additionally, the responses regarding the role of institutional policies and incentives in adopting EdTech and AI tools revealed a diverse range of impacts. While many faculty members recognize the importance of institutional support, there is a wide spectrum of opinions regarding its effectiveness and impact.

Assistance and support

The survey highlighted consensus on the importance of resource access and technical support for faculty. Specific needs for time management solutions, professional recognition, and self-learning resources were also identified, suggesting areas to enhance EdTech and AI tool adoption. This could inform decisions on resource allocation, professional development, and policy adjustments.

Additionally, the analysis revealed varied engagement levels with institutional resources for integrating EdTech, indicating gaps in communication or resource

effectiveness. Responses also emphasized a strong interest in integrating technology into teaching, pointing to a need for more tailored and flexible support structures to better accommodate faculty schedules and preferences.

6.2 Implications of the Study

For Faculty

There is a clear need for continuous professional development programs focused on enhancing both the technical proficiency and pedagogical effectiveness of using EdTech and AI tools. Such programs would not only improve familiarity with these technologies but also ensure their effective integration into teaching practices. Additionally, establishing peer mentoring programs could be beneficial. These programs would allow more experienced users to guide their less experienced colleagues, fostering a collaborative environment that enhances skills acquisition and builds confidence in using advanced technologies.

For Administrators

Administrators should consider allocating more resources toward the development of robust support systems for EdTech, including technical support and access to up-to-date tools. This would help alleviate some of the challenges associated with technology integration. Periodically conducting needs analyses would afford a more comprehensive understanding of faculty requirements and feedback, enabling administrators to better tailor their support and development initiatives. Additionally, administrators should facilitate professional development opportunities that are responsive to the evolving landscape of educational technologies.

For Policymakers

Policymakers play a crucial role in shaping the environment in which these technologies are used. Their focus should be on developing policies that not only support the integration of

EdTech and AI into educational settings but also maximize their educational impact. This involves addressing ethical concerns and ensuring equitable access to these technologies. Moreover, policymakers should design incentive strategies that encourage innovation and experimentation with new teaching tools. Such incentives could provide a significant impetus for further adoption and integration at all educational levels, potentially leading to enhanced learning outcomes and educational innovation.

6.3 Limitations of the Study

In conducting the statistical analysis for this study, it was observed that certain questions had missing responses, with each question missing between 2 to 3 entries. While these gaps represented only a small fraction of the overall dataset, and it was determined that they would not significantly affect the robustness of the study's findings, the presence of missing data is nonetheless a recognized limitation. Future research could implement more rigorous data collection strategies or delve into the reasons behind these non-responses to enhance the completeness and accuracy of the data.

Additionally, the non-representativeness of the study population presents another limitation. The findings are specific to the sampled group and may not be generalizable to broader populations in different contexts or regions. Further studies should aim to include a more diverse and representative sample to enable broader generalizations.

Regarding the survey method, the reliance on an Internet-based survey presents challenges concerning the accuracy of the data, as it depends on respondents providing truthful responses. Moreover, the relatively low response rate could potentially skew the results and may not accurately reflect the wider community's perspectives or experiences. Future efforts should focus on increasing the engagement and completion rates of surveys through enhanced outreach, more engaging survey designs, and possibly incentives for

participation. These approaches could help mitigate the limitations associated with Internet-based data collection and improve the reliability of the findings.

6.4 Recommendations for Further Research

Based on the findings and limitations of this study, several recommendations for further research can be proposed.

This study employed a descriptive quantitative research design to explore faculty use of EdTech and AI tools. For further research, using other statistical tools on findings correlations between the demographics and other variables could allow researchers to collect more extensive information. Also, by adding to it a qualitative research design, specifically conducting interviews on the faculty would provide broader perspectives to support the quantitative narrative of the study. It would be valuable to expand this study to include faculty members from other Kazakhstani universities to see if the results are consistent across different types of institutions. Such a study would allow for generalizations and comparisons between institutions.

Future research can focus on enhancing survey design for improved participant engagement. This includes for example, optimizing question clarity, length, and wording, as well as improving the overall user experience. Employing multiple distribution channels, such as email, social media, and targeted advertisements, could broaden the survey's reach and boost response rates. Personalized outreach strategies, like customized email invitations and follow-up reminders, can further encourage participation. Collaboration with certain stakeholders can also extend the survey's reach and attract a wider audience to provide insights into diverse factors that influence technology adoption and usage patterns.

6.5 Conclusion and Reflection

Undertaking this study on faculty integration of EdTech and AI tools has been an enlightening journey filled with both challenges and insights. Initially, my focus was primarily on understanding the technological aspects and their impact on teaching practices. However, as I delved deeper into the research process, I realized the intricate interplay between technological proficiency, pedagogical strategies, and content knowledge. This realization led me to approach the study with a more holistic perspective, considering five research questions around the technology utilization among faculty.

Personally, this study has ignited a curiosity to explore further the potential of technology in education beyond the scope of this research. The diverse experiences and perspectives shared by faculty members have inspired me to continue investigating innovative approaches to enhance teaching and learning at NU. This study has been a valuable learning experience, both professionally and personally. It has equipped me with new insights, skills, and perspectives that will undoubtedly inform my future research endeavors and teaching practices. Moving forward, I am excited to continue exploring the dynamic relationship between technology and education, with a deeper appreciation for the complexities and nuances involved in its integration.

References

Ahmed, S., Khalil, Md. I., Chowdhury, B., Haque, R., Senathirajah, A. R. bin S., & Omar Din, F. M. bin. (2022). Motivators and Barriers of Artificial Intelligent (AI) Based Teaching. Eurasian Journal of Educational Research, 100, 74–89.

Akram, H., Yingxiu, Y., Al-Adwan, A. S., & Alkhalifah, A. (2021). Technology Integration in Higher Education During COVID-19: An Assessment of Online Teaching Competencies Through Technological Pedagogical Content Knowledge Model. *Frontiers in Psychology*, *12*, 736522. https://doi.org/10.3389/fpsyg.2021.736522

Alexander, B., Ashford-Rowe, K., Barajas-Murphy, N., Dobbin, G., Knott, J., McCormack, M., Pomerantz, J., Seilhamer, R., & Weber, N. (2019). *EDUCAUSE Horizon Report: 2019 Higher Education Edition*. EDUCAUSE. https://library.educause.edu/resources/2019/4/2019-horizon-report

Al-Ansi, A. M., Jaboob, M., Garad, A., & Al-Ansi, A. (2023). Analyzing augmented reality (AR) and virtual reality (VR) recent development in education. *Social Sciences & Humanities Open*, *8*(1), 100532. https://doi.org/10.1016/j.ssaho.2023.100532

Amani, S., White, L., Balart, T., Arora, L., Shryock, Dr. K. J., Brumbelow, Dr. K., & Watson, Dr. K. L. (2023). Generative AI Perceptions: A Survey to Measure the Perceptions of Faculty, Staff, and Students on Generative AI Tools in Academia. *ArXiv*. https://doi.org/10.48550/arxiv.2304.14415

Baker, T., & Smith, L. (2019). Educ-AI-tion rebooted? Exploring the future of artificial intelligence in schools and colleges. Retrieved from Nesta Foundation website: https://media.nesta.org.uk/documents/Future_of_AI_and_education_v5_WEB.pdf

Barrett, A., & Pack, A. (2023). Not quite eye to A.I.: student and teacher perspectives on the use of generative artificial intelligence in the writing process. *International Journal of Educational Technology in Higher Education*, *20*(1), 59. https://doi.org/10.1186/s41239-023-00427-0

Bermejo, B., Juiz, C., Cortes, D., Oskam, J., Moilanen, T., Loijas, J., Govender, P., Hussey, J., Schmidt, A. L., Burbach, R., King, D., O'Connor, C., & Dunlea, D. (2023). AR/VR Teaching-Learning Experiences in Higher Education Institutions (HEI): A Systematic Literature Review. *Informatics*, *10*(2), 45. https://doi.org/10.3390/informatics10020045

Bocevska, A., Nedelkovski, I., & professor, F. (2021). OVERVIEW OF THE NEW TECHNOLOGIES IMPACTING HIGHER EDUCATION. *HORIZONS INTERNATIONAL SCIENTIFIC JOURNAL*, *9*, 7–17.

Brakhmetova, A. (2024). ADVANCING ENGLISH AS A FOREIGN LANGUAGE INSTRUCTION THROUGH INNOVATIVE TECHNOLOGIES: PERSPECTIVES AND PRAC- TICES IN KAZAKHSTAN. *Eurasian Science Review*, *2*(4).

Bucea-Manea-Ţoniş, R., Kuleto, V., Gudei, S. C. D., Lianu, C., Lianu, C., Ilić, M. P., & Păun, D. (2022). Artificial intelligence potential in higher education institutions enhanced learning environment in romania and serbia. *Sustainability*, *14*(10), 5842. https://doi.org/10.3390/su14105842

Casal-Otero, L., Catala, A., Fernández-Morante, C., Taboada, M., Cebreiro, B., & Barro, S. (2023). AI literacy in K-12: A systematic literature review. *International Journal of STEM Education, 10*(1), 29. https://doi.org/10.1186/s40594-023-00418-7

Chassignol et al. (2018). Artificial Intelligence trends in education: a narrative overview. *Procedia Computer Science,* 136. Pp. 16-24.

DOI:10.1016/j.procs.2018.08.233

Challenges, & for, O. (n.d.). *Artificial Intelligence in Education:*

Chugh, R., Turnbull, D., Cowling, M. A., Vanderburg, R., & Vanderburg, M. A. (2023). Implementing educational technology in Higher Education Institutions: A review of technologies, stakeholder perceptions, frameworks and metrics. *Education and Information Technologies*, *28*(12), 16403–16429. https://doi.org/10.1007/s10639-023-11846-x

Connelly, L. M. (2016). Cross-Sectional Survey Research. *MEDSurgNursing*, *25*(5), 369–370.

Creswell, J. W. (2014). *Educational research: Planning, conducting and evaluating quantitative and qualitative research* (4th ed.). Pearson.

Crompton, H., Bernacki, M., & Greene, J. A. (2020). Psychological foundations of emerging technologies for teaching and learning in higher education. *Current Opinion in Psychology, 36,* 101–105. https://doi.org/10.1016/j.copsyc.2020.04.011

Dai, Y., Liu, A., & Lim, C. P. (2023). Reconceptualizing ChatGPT and generative AI as a student-driven innovation in higher education. *Procedia CIRP*, *119*, 84–90. https://doi.org/10.1016/j.procir.2023.05.002

Dexter, S. (2023). Developing faculty EdTech instructional decision-making competence with principles for the integration of EdTech. *Educational Technology Research and Development : ETR & D*, *71*(1), 163–179. https://doi.org/10.1007/s11423-023-10198-0

Elzarka, S. (2012). Technology Use in Higher Education Instruction. *UMI Dissertation Publishing*.

Fathema, N. (2015). Expanding The Technology Acceptance Model (TAM) to Examine Faculty Use of Learning Management Systems (LMSs) In Higher Education Institutions. *MERLOT Journal of Online Learning and Teaching*.

Fathema, N., & Sutton, K. L. (2013). Factors Influencing Faculty Members' LearningManagement Systems Adoption Behavior: AnAnalysis Using The Technology Acceptance Model . *IJTEMT*, *2*(6), 20–28.

Georgina, D. A., & Olson, M. R. (2008). Integration of technology in higher education: A review of faculty self-perceptions. *The Internet and Higher Education*, *11*(1), 1–8. https://doi.org/10.1016/j.iheduc.2007.11.002

Ghavifekr, S., & Rosdy, W. A. W. (2015). Teaching and Learning with Technology: Effectiveness of ICT Integration in Schools. *International Journal of Research in Education and Science*, *1*(2), 175. https://doi.org/10.21890/ijres.23596

Ghimire, A., Prather, J., & Edwards, J. (2024). Generative AI in Education: A Study of Educators' Awareness, Sentiments, and Influencing Factors. *ArXiv*. https://doi.org/10.48550/arxiv.2403.15586

Grájeda, A., Burgos, J., Córdova, P., & Sanjinés, A. (2024). Assessing student-perceived impact of using artificial intelligence tools: Construction of a synthetic index of application in higher education. *Cogent Education*, *11*(1). https://doi.org/10.1080/2331186X.2023.2287917

Januszewski, A. & Molenda, M. (2008). Definition. In A. Januszewski & M. Molenda (Eds.), Educational technology: A definition with commentary (1st. ed.). pp. 195-211. New York, US. Lawrence Earlbaum Associates.

Jakubakynov, B., Tolegenuly, N., Naribai, R., Nurzhanova, Z., Shcherban, T., & Nebelenchuk, I. (2024). Innovative technologies in higher education: developing

international cooperation in professional training. *Globalisation, Societies and Education*, 1–14. https://doi.org/10.1080/14767724.2024.2339309

John, S. P. (2015). The integration of information technology in higher education: A study of faculty's attitude towards IT adoption in the teaching process. *Contaduría y Administración*, *60*, 230–252. https://doi.org/10.1016/j.cya.2015.08.004

Ng, D. T. K., Lee, M., Tan, R. J. Y., Hu, X., Downie, J. S., & Chu, S. K. W. (2023a). A review of AI teaching and learning from 2000 to 2020. Education and Information Technologies, 28(7), 8445–8501. https://doi.org/10.1007/s10639-022-11491-w

Kim, N. J., & Kim, M. K. (2022). Teacher's Perceptions of Using an Artificial Intelligence-Based Educational Tool for Scientific Writing. *Frontiers in Education*, *7*. https://doi.org/10.3389/feduc.2022.755914

Kiryakova, G., & Angelova, N. (2023). Chatgpt—a challenging tool for the university professors in their teaching practice. *Education Sciences*, *13*(10), 1056. https://doi.org/10.3390/educsci13101056

Kyei-Blankson, L., Keengwe, J., & Blankson, J. (2009). Faculty Use and Integration of Technology in Higher Education. *AACEJ*, *17*(3), 199–213.

Larsson, A. (2020). *Digital Transformation and Public Services: Societal Impacts in Sweden and Beyond* (R. Teigland, Trans.). Routledge.

Luckin, R., & Cukurova, M. (2019). Designing educational technologies in the age of AI: A learning sciences-driven approach. *British Journal of Educational Technology : Journal of the Council for Educational Technology*, *50*(6), 2824–2838. https://doi.org/10.1111/bjet.12861

Luckin, R & Holmes, W. (2016) Intelligence Unleashed: An argument for AI in Education. UCL Knowledge Lab: London, UK.

Moore-Hayes, C. (2011). Technology Integration Preparedness and its Influence on Teacher-Efficacy. *Canadian Journal of Learning and Technology*, *37*(3).

Moser, F. Z. (2007). Faculty Adoption of Educational Technology. *Educause Quarterly*, *1*, 66–69.

Nurtayeva, D., Kredina, A., Kireyeva, A., Satybaldin, A., & Ainakul, N. (2024). The role of digital technologies in higher education institutions: The case of Kazakhstan. *Problems and Perspectives in Management*, *22*(1), 562–577. https://doi.org/10.21511/ppm.22(1).2024.45

Official website of the President of the Republic of Kazakhstan. The head of the state participated in the international forum Digital Bridge 2023. https://www.akorda.kz/ru/glava-gosudarstva-prinyal-uchastie-v-mezhdunarodnom-forume-digital-bridge-2023-1294242

Orakova, A., Nametkulova, F., Issayeva, G., Mukhambetzhanova, S., Galimzhanova, M., & Rezuanova, G. (2024). The Relationships between Pedagogical and Technological Competence and Digital Literacy Level of Teachers. *Journal for the Cognitive Science of Religion*, *6*(1), 1–21. https://doi.org/10.46303/jcsr.2024.2

Ouyang, F., Zheng, L. and Jiao, P. (2022). Artificial intelligence in online higher education: A systematic review of empirical research from 2011 to 2020. *Educ Inf Technol, 27*, pp. 7893–7925, https://doi.org/10.1007/s10639-022-10925-9

Popenici, S., & Kerr, S. (2017). Exploring the impact of artificial intelligence on teaching and learning in higher education. *Research and Practice in Technology Enhanced Learning*. https://doi.org/10.1186/s41039-017-0062-8

Pokrivcakova, S. (2019). Preparing teachers for the application of AI-powered technologies in foreign language education. *Journal of Language and Cultural Education*, *7*(3), 135–153. https://doi.org/10.2478/jolace-2019-0025

Popping, R. (2015). Analyzing Open-ended Questions by Means of Text Analysis Procedures. *Bulletin of Sociological Methodology/Bulletin de Méthodologie Sociologique*, *128*(1), 23–39. https://doi.org/10.1177/0759106315597389

Rahiman, H. U., & Kodikal, R. (2024). Revolutionizing education: Artificial intelligence empowered learning in higher education. *Cogent Education*, *11*(1). https://doi.org/10.1080/2331186X.2023.2293431

Rhode, J., Richter, S., Gowen, P., Miller, T., & Wills, C. (2017). Understanding faculty use of the learning management system. *Online Learning*, *21*(3). https://doi.org/10.24059/olj.v21i3.1217

Sadyrova et al. (2021). Innovation processes in Kazakhstan: development factors. *J Innov Entrep, 10*(36). https://doi.org/10.1186/s13731-021-00183-3

Şahin, M., & Aybek, E. (2019). Jamovi: an easy to use statistical software for the social scientists. *International Journal of Assessment Tools in Education*, 670–692. https://doi.org/10.21449/ijate.661803

Seitova, V. (2024). INNOVATIVE TECHNOLOGIES IN EDUCATION: A CASE STUDY OF IMPLE- MENTATION IN KAZAKHSTAN. *Eurasian Science Review*.

Shumeiko, T., Bezhina, V., Zhiyenbayeva, A., Bozhevolnaya, N., & Zubko, N. (2024). Improving the readiness of teachers for using distance technologies in supplementary technical education: A case study in Kazakhstan. *International Journal of Innovative Research and Scientific Studies*, *7*(1), 92–106. https://doi.org/10.53894/ijirss.v7i1.2506

Sinclair, J., & Aho, A.-M. (2017). Experts on super innovators: understanding staff adoption of learning management systems. *Higher Education Research & Development*, *37*(1), 1–15. https://doi.org/10.1080/07294360.2017.1342609

Soomro, K. A., Kale, U., Curtis, R., Akcaoglu, M., & Bernstein, M. (2020). Digital divide among higher education faculty. *International Journal of Educational Technology in Higher Education*, *17*(1), 21. https://doi.org/10.1186/s41239-020-00191-5

Steele, J. L. (2023). To GPT or not GPT? Empowering our students to learn with AI. *Computers and Education: Artificial Intelligence*, 5. https://doi.org/10.1016/j.caeai.2023.100160

Trinidad, J. E., & Ngo, G. R. (2019). Technology's roles in student-centred learning in higher education. *International Journal of Academic Research*, *15*(1/2019), 81–94. https://doi.org/10.3224/ijar.v15i1.06

Vannatta, R. A., & Beyerbach, B. (2000). Facilitating a Constructivist Vision of Technology Integration among Education Faculty and Preservice Teachers. *Journal of Research on Computing in Education*, *33*(2), 132–148. https://doi.org/10.1080/08886504.2000.10782305

Wang, Y., Liu, C. and Tu, Y. F. (2021). Factors Affecting the Adoption of AI-Based Applications in Higher Education. *Educational Technology & Society, 24(*3), pp. 116-129.

Walter, Y. (2024). Embracing the future of Artificial Intelligence in the classroom: the relevance of AI literacy, prompt engineering, and critical thinking in modern education. *International Journal of Educational Technology in Higher Education*, *21*(1), 15. https://doi.org/10.1186/s41239-024-00448-3

West, G. B. (1999). Teaching and technology in higher education: changes and challenges. *Adult Learning*, *10*(4), 16–18. https://doi.org/10.1177/104515959901000406

Wichadee, S. (2015). Factors Related to Faculty Members' Attitude and Adoption of a Learning ManagementSystem. *TOJET: The Turkish Online Journal of Educational Technology*, *14*(4), 53–61.

Yeleussiz, A. (2024). Exploring EFL Teachers' Perceptions of Media Literacy in Kazakhstan. *Journal of Social Studies Education Research*, *15*(1), 282–316.

Yeslyamov, S. (2024). Application of Software Robots Using Artificial Intelligence Technologies in the Educational Process of the University. *Journal of Robotics and Control (JRC)*, *5*(2), 359–369.

Yilmaz, A. (2021). The effect of technology integration in education on prospective teachers' critical and creative thinking, multidimensional 21st century skills and academic achievements. *Participatory Educational Research*, *8*(2), 163–199. https://doi.org/10.17275/per.21.35.8.2

Zhubanova, S., Beissenov, R., & Goktas, Y. (2024). Learning Professional Terminology With AI-Based Tutors in Technical University. *Research Square*. https://doi.org/10.21203/rs.3.rs-3927218/v1

Appendices

Appendix A: AI Declaration

Thesis Title: Integrating AI and EdTech Solutions in Higher Education: Faculty Experiences at Nazarbayev University

Appendix A – Declaration of the Use of Generative AI

I hereby declare that I have read and understood NUGSE's policy concerning appropriate use of AI and composed this work independently (please check one):

☒ with the use of artificial intelligence tools, or
☐ without the use of artificial intelligence tools.

(If you have used AI tools as defined in the GSE policy document, please complete the rest of this form.)

During the preparation of this thesis/examination, I used __chatGPT_____ [NAME of TOOL] to

_____proofread my writing_____ [REASON][1].

I also declare that I

☒ am aware of the capabilities and limitations of AI tool(s),

☒ have verified that the content generated by AI systems and adopted by me is factually correct,

---

[1] Examples of REASON: brainstorm ideas / find or select sources on a topic / paraphrase / structure and organize the written text / edit the text for clarity and grammar / ask for tips to improve coherence / cite and reference sources

☒ am aware that as the author of this thesis I bear full responsibility for the statements and assertions made in it,

☒ have submitted complete and accurate information about my use of AI tools in this work, and

☒ acknowledge that there may be disciplinary consequences if I have not followed NUGSE's guidelines regarding AI appropriate use.

Name: Aiza Bissaliyeva Signature: 

Date: 22.04.24

Appendix B: Survey questions

Demographics

Q1. Please select your school/department:

- School of Engineering and Digital Sciences
- School of Sciences and Humanities
- School of Medicine
- School of Mining and Geosciences
- Graduate School of Business
- Graduate School of Education
- Graduate School of Public Policy
- Center for Preparatory Studies
- Other

Q2. Please select your current academic position:

Professor

- Associate Professor
- Assistant Professor
- Postdoctoral Researcher/Fellow
- Research Assistant
- Instructor
- Teaching Fellow
- Other

Q3. Please select the range that best represents your total years of experience in higher education teaching:

- Less than 1 year
- 1-5 years
- 6-10 years
- 11-15 years
- 16-20 years
- More than 20 years

Q4. Please select the age group that includes your current age:

- Under 25
- 25–34
- 35–44
- 45–54
- 55–64
- 65 or older

Q5. Please select your gender:

- Male
- Female
- Other

Research Question 1. Current Level of EdTech Usage Among Faculty

Q6. On a scale from 1 (Not at all) to 5 (Extensively), how frequently do you use Educational technology (Edtech) tools in your teaching?

Q7. Please select the EdTech tools you have used in your teaching.

	0 times per week	1-2 times a week	3-4 times a week	5-6 times a week	Daily
Learning Management Systems (e.g., Blackboard, Canvas, Moodle)					
Online Discussion Forums					
Video Conferencing Platforms (e.g., Zoom, Microsoft Teams)					
Interactive Whiteboards (e.g., SMART Board)					
Online Assessment and Quizzing Tools (e.g., Kahoot, Quizlet)					
Collaborative Document Editing Tools (e.g., Google Docs)					
Mobile Learning Apps (e.g., Duolingo, Khan Academy)					
Virtual Reality (VR) or Augmented Reality (AR) Tools					
AI Tools (Adaptive Learning Platforms, Intelligent Tutoring Systems, Chatbots and Virtual Assistants etc.)					
Social Media Integration for Learning (e.g., Whatsapp, Twitter, Facebook Groups)					
Other					

Q8. How many years have you been using EdTech tools in your teaching?

- 1-3 years
- 3-5 years
- 5-7 years
- 7-10 years
- more than 10 years
- I am not familiar with EdTech tools / Not applicable

Research Question 2. Familiarity with AI Tools and Their Potential Applications

Q9. On a scale from 1 (Not at all familiar) to 5 (Extremely familiar), how would you rate your familiarity with artificial intelligence (AI) tools in the context of teaching and learning?

Q10. Have you ever used any AI tools in your teaching?

- Definitely not
- Probably not
- Might or might not
- Probably yes
- Definitely yes

Q11. What different types of AI tools are you aware of that can be used in teaching and learning? (Open-ended question)

Research Question 3. Perceived benefits and challenges of AI tools and other edtech integration

Q12. On a scale from 1 (Strongly Disagree) to 5 (Strongly Agree), indicate your agreement with the following statement: "Integrating AI tools and EdTech in teaching significantly enhances student learning."

Q13. On a scale from 1 (Very Easy) to 5 (Very Challenging), how would you rate the process of integrating EdTech into your teaching?

Q14. What do you perceive as the biggest challenge in integrating EdTech and AI tools into your teaching?

- Lack of training
- Lack of resources
- Technical issues
- Lack of institutional support
- Others

Research Question 4. Factors influence faculty members' decision to adopt or reject the use of AI tools and other edtech

Q15. On a scale from 1 (Not at all influential) to 5 (Extremely influential), rate how the following factors influence your decision to adopt EdTech and AI tools:

- Institutional support
- Peer influence
- Perceived ease of use
- Perceived usefulness
- Technical support
- Other

Q16. Have institutional policies and incentives played a role in your decision to use or not use EdTech and AI tools?

- Definitely not
- Probably not
- Might or might not
- Probably yes
- Definitely yes

Q17. How often do you seek professional development opportunities related to EdTech and AI tools?

- Never
- Rarely
- Sometimes
- Often
- Always

Research Question 5. Faculty members perception on assistance and support necessary for effective integration of EdTech and AI tools

Q18. On a scale from 1 (Not at all important) to 5 (Extremely important), rate how important the following types of support are for effectively integrating EdTech and AI tools:

- Training workshops
- Technical support
- Peer mentoring
- Instructional design support
- Access to resources
- Other

Q19. In the past year, how often have you used institutional resources or support services for integrating EdTech in your teaching?

- Never
- Rarely
- Sometimes
- Often
- Always

- I am not familiar with EdTech tools / Not applicable

Q20. What type of support would you like to have more of to effectively integrate EdTech and AI tools into your teaching?

- Training on specific tools
- Technical support
- Pedagogical support
- Collaboration opportunities
- Other

Appendix C: Letter of Invitation

Dear Faculty Members,

I hope this message finds you well.

I am a graduate student at the Graduate School of Education, Nazarbayev University, currently engaged in research for my master's degree program. I am reaching out to kindly invite your participation in a research project focused on the integration of educational technology (EdTech) and artificial intelligence (AI) within teaching practices at Nazarbayev University. This study has received approval from the NUGSE Research Committee, ensuring its adherence to the standards of academic research and ethics.

This research study aims to explore the usage landscape of EdTech and AI tools among our faculty, including an assessment of current EdTech tool usage, an exploration of experiences and familiarity with AI tools in education, and an understanding of the benefits and challenges associated with incorporating these technologies into teaching. Additionally, the research seeks to identify factors influencing faculty decisions regarding the adoption or rejection of these innovations and to determine the support required for effective integration into educational practices.

To participate in the survey, please click the following link: https://nukz.qualtrics.com/jfe/form/SV_b256CDpntYkHRqe

The survey will take approximately 4-5 minutes to complete.

Importantly, **this study is conducted anonymously**, ensuring that all responses remain confidential and are used solely for research purposes. Your decision to participate or not will have no negative impact on you.

By starting the survey, you confirm that you have read the attached informed consent form and agree to participate in this study, fully aware that you may withdraw your participation at any time without any penalty.

I sincerely appreciate your time and willingness to contribute to this research.

Sincerely,

Aiza Bissaliyeva

Graduate School of Education, Nazarbayev University

53 Kabanbay Batyr Ave., Astana, 010000, Republic of Kazakhstan

Mobile: +7 701 466 50 57

Email: aiza.bissaliyeva@nu.edu.kz

Appendix D: Informed Consent

SURVEY

DESCRIPTION: This research study extends an invitation to participate in a research study focused on the integration of educational technology (EdTech) and artificial intelligence (AI) tools within the teaching practices of faculty at Nazarbayev University (NU). The study is designed to delve into the landscape of EdTech and AI tool usage among our faculty, aiming to assess the current utilization of EdTech tools, explore faculty experiences and familiarity with AI tools in education, and gain insights into the benefits and challenges of embedding these technologies into teaching methodologies. Moreover, it endeavors to determine the factors that influence faculty decisions to adopt or reject these technological innovations, with the objective of identifying the necessary support for their effective integration into educational practices. This research aspires to offer valuable insights that will not only benefit educators and the institution but also contribute significantly to the enhancement of teaching and learning experiences at Nazarbayev University by fostering a deeper understanding and strategic application of EdTech and AI innovations.

TIME INVOLVEMENT: Your participation in the survey will take approximately 4-5 minutes.

RISKS AND BENEFITS: Participation in this study carries no associated risks. The anticipated benefits include the opportunity for participants to reflect upon their decision-making processes and gain insights from engaging in empirical educational research. Importantly, this study is conducted anonymously, ensuring that all responses remain confidential and are used solely for research purposes. Your decision to participate or not will have no negative impact on you.

PARTICIPANT'S RIGHTS: If you have read this form and have decided to participate in this project, please understand your participation is voluntary and you have the right to withdraw your consent or discontinue participation at any time without penalty or loss of benefits to which you are otherwise entitled. The alternative is not to participate. You have the right to refuse to answer particular questions. The results of this research study may be presented at scientific or professional meetings or published in scientific journals.

CONTACT INFORMATION:

Questions: If you have any questions, concerns or complaints about this research, its procedures, risks and benefits, contact the Master's Thesis Supervisor for this student work, Aliya Kuzhabekova at aliya.kuzhabekova@nu.edu.kz

Independent Contact: If you are not satisfied with how this study is being conducted, or if you have any concerns, complaints, or general questions about the research or your

rights as a participant, please contact the NUGSE Research Committee to speak to someone independent of the research team at gse_researchcommittee@nu.edu.kz

Please sign this consent form if you agree to participate in this study.

- I have carefully read the information provided;
- I have been given full information regarding the purpose and procedures of the study;
- I understand how the data collected will be used, and that any confidential information will be seen only by the researchers and will not be revealed to anyone else;
- I understand that I am free to withdraw from the study at any time without giving a reason;

- With full knowledge of all foregoing, I agree, of my own free will, to participate in this Study.

Signature: _____ Date: _____