

**Transforming Teacher Experience through AI: A Quantitative Study of
MugalimAI's Effects on Teachers' Workload, Self-Efficacy, and Job Satisfaction**

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Date: 4 of November, 2025

Dear Alena Oseledko,

This letter now confirms that your research project titled *Transforming Teacher Experience through AI: A Quantitative Study of Mugalim AI's Effects on Teachers' Workload, Self-Efficacy, and Job Satisfaction* has been approved by the Graduate School of Education Ethics Committee of Nazarbayev University.

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

Yours sincerely,

Daniel Hernández Torrano

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Abstract

Transforming Teacher Experience through AI: A Quantitative Study of MugalimAI's Effects on Teachers' Workload, Self-Efficacy, and Job Satisfaction

This study examined the association between the use of MugalimAI, a locally developed AI-powered lesson-planning platform, and three dimensions of teachers' professional experience, namely workload, self-efficacy, and job satisfaction, among in-service teachers in Kyrgyzstan. Guided by the Job Demands-Resources (JD-R) model, the study addressed two research questions: how the use of MugalimAI relates to teachers' professional experience within the user group, and in what ways MugalimAI users differ from non-users on these dimensions. A quantitative, non-experimental, cross-sectional design was employed, combining correlational and group comparison analyses. Data were collected through a structured online questionnaire administered to a purposively selected sample of in-service teachers in Kyrgyzstan; of the 215 initial responses, the final analytical sample following data screening consisted of 154 teachers, including MugalimAI users ($n = 59$) and non-users ($n = 95$), with a further refined subsample of 47 users retained for correlational analyses. Spearman's rank-order correlations were used to examine associations between the duration and frequency of platform use and teacher outcomes within the user subsample, while group differences between users and non-users were examined through inferential comparison analyses. Correlational analyses revealed no statistically significant associations between the intensity of MugalimAI use and workload, self-efficacy, or job satisfaction; however, a strong positive relationship between self-efficacy and job satisfaction was observed within the user group. Group comparison analyses indicated that MugalimAI users reported significantly lower workload across multiple indicators, including total working hours, time pressure, and work-life imbalance, as well as higher self-efficacy, particularly in classroom management and student engagement, and greater overall job satisfaction. These findings

suggest that MugalimAI may function as a professional resource enabling more favorable teacher outcomes, consistent with a threshold-based rather than dose-dependent interpretation of AI tool use. The study extends the JD-R framework to AI-supported teaching in a low- and middle-income, post-Soviet context and offers empirical evidence relevant to educational policy, platform design, and teacher well-being.

Keywords: artificial intelligence in education, teacher workload, teacher self-efficacy, job satisfaction, MugalimAI, Kyrgyzstan, job demands-resources model, AI lesson planning

Андатпа

Жасанды Интеллект Арқылы Мұғалімдердің Кәсіби Тәжірибесін Өзгерту: MugaliAI Платформасының Жұмыс Жүктемесіне, Өзін-Өзі Тиімділікке және Еңбекке Қанағаттануға Әсерін Зерттейтін Сандық Зерттеу

Бұл зерттеуде жергілікті деңгейде әзірленген жасанды интеллект негізіндегі сабақ жоспарлау платформасы MugaliAI-ды пайдалану мен Қырғызстанда жұмыс атқаратын мұғалімдердің кәсіби тәжірибесінің үш өлшемі: жұмыс жүктемесі, өзін-өзі тиімділік және еңбекке қанағаттану арасындағы байланыс зерделенді. Жұмыс талаптары мен ресурстар моделі (JD-R) шеңберінде зерттеу екі сауалды қарастырды: MugaliAI-ды пайдалану пайдаланушылар тобы ішінде мұғалімдердің кәсіби тәжірибесімен қалай байланысады және MugaliAI пайдаланушылары аталған өлшемдер бойынша пайдаланбайтындардан қай жағынан ерекшеленеді.

Корреляциялық талдау мен топаралық айырмашылықтар талдауын біріктіретін сандық, эксперименттік емес, көлденең қималы дизайн қолданылды. Деректер Қырғызстандағы мұғалімдердің мақсатты іріктелген үлгісі арасында таратылған құрылымдық онлайн-сауалнама арқылы жиналды; бастапқы 215 жауаптан деректерді скринингтен өткізгеннен кейінгі түпкілікті аналитикалық үлгі MugaliAI пайдаланушыларын ($n = 59$) және пайдаланбайтындарды ($n = 95$) қоса алғанда 154 мұғалімнен тұрды, ал корреляциялық талдау үшін 47 пайдаланушыдан тұратын нақтыланған іріктеме қалыптастырылды. Спирменнің рангтік корреляциялары пайдаланушылар іріктемесінде платформаны пайдалану ұзақтығы, жиілігі және мұғалімдердің кәсіби көрсеткіштері арасындағы байланысты зерделеу үшін қолданылды; пайдаланушылар мен пайдаланбайтындар арасындағы топаралық айырмашылықтар инференциалдық салыстыру әдістері арқылы талданды. Корреляциялық талдау MugaliAI-ды пайдалану қарқындылығы мен жұмыс жүктемесі, өзін-өзі тиімділік немесе еңбекке қанағаттану

арасында статистикалық тұрғыдан маңызды байланыстардың жоқтығын анықтады; алайда пайдаланушылар тобы ішінде өзін-өзі тиімділік пен еңбекке қанағаттану арасында тұрақты оң байланыс байқалды. Топаралық айырмашылықтар талдауы MugaliAI пайдаланушыларының жалпы жұмыс сағаттары, уақыт қысымы және жұмыс пен жеке өмір арасындағы тепе-теңсіздікті қоса алғанда, бірнеше көрсеткіш бойынша жұмыс жүктемесінің айтарлықтай төмен екенін, сондай-ақ сыныпты басқару мен оқушылардың белсенділігі саласында өзін-өзі тиімділіктің жоғары екенін және жалпы еңбекке қанағаттанудың жоғары деңгейін хабарлағанын көрсетті. Алынған нәтижелер MugaliAI-дың мұғалімдер үшін неғұрлым қолайлы кәсіби нәтижелерге ықпал ететін кәсіби ресурс қызметін атқаруы мүмкін екенін болжайды, бұл жасанды интеллект құралдарын пайдаланудың дозаға тәуелді емес, табалдырықтық түсіндірмесіне сәйкес келеді. Зерттеу JD-R моделінің қолданылу аясын төмен және орта табысты постсоветтік контексттегі жасанды интеллект қолдауымен оқытуға дейін кеңейтеді және білім беру саясаты, платформаларды әзірлеу және мұғалімдердің кәсіби әл-ауқаты үшін өзекті эмпирикалық деректер ұсынады.

Түйін сөздер: білім берудегі жасанды интеллект, мұғалімнің жұмыс жүктемесі, мұғалімнің өзін-өзі тиімділігі, еңбекке қанағаттану, MugaliAI, Қырғызстан, жұмыс талаптары мен ресурстар моделі, жасанды интеллект арқылы сабақ жоспарлау

Аннотация

Трансформация Профессионального Опыта Учителей с Помощью Искусственного Интеллекта: Количественное Исследование Влияния MugalimAI на Рабочую Нагрузку, Самоэффективность и Удовлетворённость Трудом

В настоящем исследовании изучалась связь между использованием MugalimAI, локально разработанной платформы для составления планов уроков на основе искусственного интеллекта, и тремя измерениями профессионального опыта учителей: рабочей нагрузкой, самоэффективностью и удовлетворённостью трудом, среди действующих учителей Кыргызстана. В рамках модели требований и ресурсов работы (JD-R) исследование было направлено на решение двух вопросов: как использование MugalimAI соотносится с профессиональным опытом учителей внутри группы пользователей и чем пользователи MugalimAI отличаются от непользователей по указанным измерениям. Применялся количественный, неэкспериментальный, поперечный дизайн, сочетающий корреляционный анализ и анализ межгрупповых различий. Данные собирались посредством структурированного онлайн-опросника, распространённого среди целенаправленно отобранной выборки действующих учителей Кыргызстана; из 215 первоначально полученных ответов итоговая аналитическая выборка после скрининга данных составила 154 учителя, включая пользователей MugalimAI ($n = 59$) и непользователей ($n = 95$), при этом для проведения корреляционного анализа была сформирована уточнённая подвыборка из 47 пользователей. Ранговые корреляции Спирмена применялись для изучения связей между продолжительностью и частотой использования платформы и профессиональными показателями учителей в подвыборке пользователей, тогда как межгрупповые различия между пользователями и непользователями анализировались с помощью методов инференциального сравнения. Корреляционный анализ не выявил

статистически значимых связей между интенсивностью использования MugalimAI и рабочей нагрузкой, самоэффективностью или удовлетворённостью трудом; вместе с тем внутри группы пользователей была обнаружена устойчивая положительная связь между самоэффективностью и удовлетворённостью трудом. Анализ межгрупповых различий показал, что пользователи MugalimAI сообщали о значимо меньшей рабочей нагрузке по ряду показателей, включая общее количество рабочих часов, временное давление и нарушение баланса между работой и личной жизнью, а также о более высокой самоэффективности, особенно в области управления классом и вовлечённости учащихся, и о большей общей удовлетворённости трудом. Полученные результаты свидетельствуют о том, что MugalimAI может выступать профессиональным ресурсом, способствующим более благоприятным профессиональным исходам для учителей, что согласуется с пороговой, а не дозозависимой интерпретацией использования инструментов искусственного интеллекта. Исследование расширяет применение модели JD-R на контекст преподавания с поддержкой ИИ в стране с низким и средним уровнем дохода и постсоветским образовательным контекстом, а также предоставляет эмпирические данные, релевантные для образовательной политики, разработки платформ и профессионального благополучия учителей.

Ключевые слова: искусственный интеллект в образовании, рабочая нагрузка учителя, самоэффективность учителя, удовлетворённость трудом, MugalimAI, Кыргызстан, модель требований и ресурсов работы, планирование уроков с помощью ИИ

Table of Contents

Author Agreement	ii
Declaration.....	iii
Ethical Approval	iv
CITI Training Certificate	v
Acknowledgments.....	vi
Abstract.....	viii
Аңдатпа	x
Аннотация.....	xii
Table of Contents	xiv
List of Tables	xvii
List of Figures	xviii
Chapter 1: Introduction	1
Context and Background.....	2
Global Integration of Digital Technologies in Education.....	3
MuglimAI: Kyrgyzstan’s Homegrown Educational AI Solution for Teachers	4
Statement of the Problem.....	7
Purpose and Research Questions	8
Research Questions	8
Definition of the Key Variables	8
Significance of the Study	9
Summary	10
Chapter 2: Literature Review	11
AI in Education	11
AI and Teacher Workload.....	11
AI and Teacher Self-Efficacy	14
AI and Teacher Job Satisfaction	15
Interrelations Among Teacher Workload, Self-Efficacy, and Job Satisfaction.....	17
Theoretical Framework.....	17
Conceptual Framework.....	19
Summary	20
Chapter 3: Methodology	22
Research Design.....	22
Participants.....	24
Data Collection Methods	27
Data Collection Procedures.....	29

Data Analysis Approach	30
Data Preparation and Screening	30
Data Coding, Scale Preparation, and Grouping of Variables	31
Workload.....	31
Self-Efficacy.	31
Job Satisfaction.	32
Grouping Variables.....	32
Scale Reliability	32
Descriptive Statistics.....	33
Inferential Analyses	33
Correlational Analyses.....	33
Group Comparison Analyses.	34
Ethical Considerations	35
Summary	36
Chapter 4: Findings.....	38
RQ1. Relationships Between MugalimAI Use and Teachers' Professional Experience	38
RQ2. Differences Between MugalimAI Users and Non-Users in Professional Experience.....	45
Workload.....	47
Self-Efficacy	52
Job Satisfaction	54
Summary	56
Chapter 5: Discussion	58
Overview of Key Findings.....	58
RQ1: The Absence of Intensity-Related Relationships Within the User Group	59
Interpreting the Null Correlation Findings	59
The Self-Efficacy–Job Satisfaction Link Among Users	61
RQ2: Systematic Differences Between MugalimAI Users and Non-Users.....	62
Workload.....	62
Self-Efficacy	65
Job Satisfaction	67
Self-Selection, Causality, and Alternative Explanations	68
Summary	70
Chapter 6: Conclusion.....	72
Answers to the Research Purpose and Research Questions.....	72
Theoretical Implications: Extending the JD-R Model to AI-Supported Teaching	74
Contextual Significance and Implications for Practice, Policy, and Platform Development	75

Implications for Educational Practice	76
Implications for Education Policy	77
Implications for Platform Developers.....	77
Limitations of the Study.....	78
Directions for Future Research	80
Concluding Remarks.....	82
References.....	83
Appendices.....	92
Appendix A: Completed Generative AI Declaration Form	92
Appendix B: Recruitment Announcement Text Posted on MugalimAI Instagram Page	93
Appendix C: Recruitment Letter for MugalimAI Users (English Version)	94
Appendix D: Recruitment Letter for School Principals (English Version)	96
Appendix E: Recruitment Letter for Teachers (English Version)	99
Appendix F: Data Collection Instrument: Full Questionnaire (English Version)	101
Appendix G: Informed Consent Form (English Version).....	104

List of Tables

Table 1 <i>Demographic and Professional Characteristics of the Participants (N = 154)</i>	26
Table 2 <i>Internal Consistency Reliability of Study Measures (N = 197)</i>	33
Table 3 <i>Normality Tests (Shapiro-Wilk) for MugalimAI Use Indicators, Aggregate Professional Experience Variables and Their Subcomponents (Users Only)</i>	40
Table 4 <i>Spearman's Rank-Order Correlations Between MugalimAI Use Indicators and Aggregate Professional Experience Variables (Users Only)</i>	42
Table 5 <i>Spearman's Rank-Order Correlations Between MugalimAI Use Indicators and Workload, Self-Efficacy, and Job Satisfaction Subcomponents (Users Only)</i>	44
Table 6 <i>Tests of Homogeneity of Variance (Levene's) and Normality (Shapiro-Wilk) for Aggregate Professional Experience Indicators and Their Subcomponents</i>	46
Table 7 <i>Group Differences in Aggregate and Subcomponent Workload Measures Between MugalimAI Users and Non-Users</i>	50
Table 8 <i>Descriptive Statistics for Aggregate and Subcomponent Workload Indicators by MugalimAI Use Group</i>	51
Table 9 <i>Group Differences in Aggregate and Subcomponent Self-Efficacy Measures Between MugalimAI Users and Non-Users</i>	53
Table 10 <i>Descriptive Statistics for Aggregate and Subcomponent Self-Efficacy Indicators by MugalimAI Use Group</i>	53
Table 11 <i>Group Differences in Aggregate and Subcomponent Job Satisfaction Measures Between MugalimAI Users and Non-Users</i>	55
Table 12 <i>Descriptive Statistics for Aggregate and Subcomponent Job Satisfaction Indicators by MugalimAI Use Group</i>	55

List of Figures

Figure 1 <i>Conceptual Framework</i>	20
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Chapter 1: Introduction

The emergence of artificial intelligence (AI) is transforming professional life, and education is no exception (Bakti et al., 2023; Wang et al., 2024). In schools, AI is increasingly used to automate administrative work, generate teaching materials, personalize instruction, and support many other aspects of teaching (Nurmanova et al., 2025; Yerbabuena Torres et al., 2024; Wang et al., 2024). By reducing time-consuming tasks, generative AI can ease teachers' workload and free cognitive resources for pedagogical innovation and direct student interaction (Kshetri, 2023, as cited in Tan et al., 2025). This is particularly relevant to lesson planning, one of the most demanding aspects of teaching, which shapes instructional quality, classroom dynamics, and teachers' professional identity (Nurmanova et al., 2025; Sarkar et al., 2025). Integrating AI into lesson planning is therefore viewed as a means to enhance teaching effectiveness and support teacher job satisfaction and well-being (Prasad & Pasupathi, 2025).

Teachers play a key role in shaping the educational process (Dirsa et al., 2022), and their workload, sense of efficacy, and resulting professional satisfaction are critical to their individual practice and to the sustainability and long-term development of the education sector as a whole (Issah et al., 2025; Yuliani et al., 2022). In recent years, growing concerns about teacher burnout, attrition, and workload pressure have reinforced the urgency of investing in tools and policies that support, rather than burden, educators (Nguyen & Kremer, 2022). Developing and scaling technologies that meaningfully reduce routine tasks, strengthen teachers' confidence, and allow them to focus more fully on instruction is not merely a desirable goal. As education systems worldwide pursue digital transformation, it is increasingly important to ensure that innovation serves the needs of teachers as fully as it serves those of learners.

In Kyrgyzstan, policy increasingly emphasizes digital modernization, but implementation remains uneven. One grassroots innovation is MugalimAI, a locally developed AI lesson planning platform voluntarily adopted by teachers on a paid basis. It promises time savings, modern methodologies, and curriculum alignment. However, despite its popularity, no

empirical evidence shows how it affects teachers' workload, self-efficacy, or job satisfaction.

As AI technologies become more embedded in educational practice, there is a growing need to examine their real-world implications through evidence-based research, especially from the perspective of those most directly affected: the teachers themselves.

This study seeks to explore how the use of MugalimAI relates to teachers' perceptions of workload, self-efficacy, and job satisfaction. The purpose of this quantitative, non-experimental, cross-sectional study is to examine both differences between users and non-users of the platform and correlations within the user group based on frequency and duration of use. It is anticipated that the findings will clarify whether and how the AI platform functions as a professional resource that alleviates workload, strengthens instructional confidence, and enhances job satisfaction. Participants include a purposively selected, with the elements of convenience and self-selection, sample of in-service teachers in Kyrgyzstan, representing diverse demographic and professional backgrounds.

This chapter begins by establishing the broader educational and technological context in which the study is situated. It then introduces the central research problem and outlines the purpose of the study, along with its guiding research questions. The significance of the study is discussed in terms of its potential contributions to theory, policy, and practice, with particular attention to the professional well-being of teachers in digitally evolving education systems. Finally, the chapter provides an overview of the structure of this thesis, offering a roadmap for the chapters that follow.

Context and Background

This section provides a comprehensive overview of the global and national context in which this study is situated. It begins by exploring international trends in digital and AI integration in education, then narrows the focus to Kyrgyzstan's recent digital reforms and local innovations. Particular attention is given to the emergence of MugalimAI, a Kyrgyzstani-developed AI platform for teachers, which serves as the primary case for this research.

Global Integration of Digital Technologies in Education

The integration of digital technologies into education has become one of the most visible global trends in the 21st century. International organizations such as UNESCO (2023; 2024), the OECD (2023), and the World Bank (Rajasekaran et al., 2024) have consistently emphasized the transformative potential of educational technologies to expand access, personalize learning, and modernize pedagogical approaches. In response, countries around the world have adopted a range of digital strategies, from national ICT policies and one-to-one device programs to virtual learning environments and open educational resources.

Over the past two decades, governments such as those in the UK, USA, and China have made significant investments to integrate digital tools into classrooms, aiming to promote more effective learning (Banks & Williams, 2022, as cited in Alam et al., 2025; Luo et al., 2021, as cited in Alam et al., 2025). For instance, in the UK, annual spending on digital tools in schools and colleges has reached approximately £610 million, and a dedicated Flexible Learning Fund of £11 million was launched to promote blended and online learning in adult education (Alam et al., 2025). China's *Education Modernization 2035* strategy embeds technology across all levels of schooling, from rural internet expansion to digitized textbooks and online platforms (Zhu, 2019, as cited in Alam et al., 2025). European and North American systems have similarly expanded MOOCs, e-learning platforms, and blended teaching models, while also embedding digital competence frameworks in teacher education (UNESCO, 2024). Meanwhile, Global South countries pilot mobile learning, localized content, and community-driven connectivity initiatives (UNESCO, 2024). Collectively, these examples highlight a consensus that innovation must go beyond infrastructure to address equity, access, and pedagogical support for sustainable impact.

Educational technologies now encompass tools that enhance teaching and learning through collaboration, feedback, and personalization, increasingly supported by data-driven and adaptive solutions. Within this evolving landscape, AI has emerged as a distinct and rapidly expanding category of EdTech.

In educational contexts, AI can be used to support a range of functions such as personalized learning, automated assessment, predictive analytics, content generation, and intelligent tutoring. One of its key features is the ability to adapt to individual learners' needs by analyzing their performance data and providing tailored feedback or learning pathways (Holmes et al., 2019; Nuryadin & Marlina, 2023; Sahito et al., 2024). AI tools can also assist educators by streamlining lesson planning, analyzing classroom data, supporting formative assessment, or automating administrative routines (Karpouzis et al., 2024; Nuryadin & Marlina, 2023; van den Berg & Du Plessis, 2023). In countries with advanced digital infrastructure, AI has already been incorporated into classrooms through technologies such as facial recognition and automated grading systems in China, as well as adaptive mathematics learning platforms in parts of Latin America (UNESCO, 2019). As AI technologies continue to evolve, they are increasingly being integrated into mainstream education systems alongside more traditional digital tools, offering new modes of interaction, automation, and data-informed decision-making.

MugalimAI: Kyrgyzstan's Homegrown Educational AI Solution for Teachers

Various forms of educational technology are being steadily integrated into Kyrgyzstan's school system, with state-led initiatives playing an increasingly visible role. One notable example is the national platform *Kundoluk.kg*, which facilitates communication between schools, students, and parents by providing online access to academic records, schedules, and homework. The Ministry of Education has also introduced platforms such as *Bilim Bulagy* and *Sanarip Sabak*, offering multimedia resources aligned with the national curriculum to support subject-specific instruction. Together, these efforts aim to create more transparent, connected, and resource-rich learning environments while fostering teachers' access to standardized digital content and tools.

Building on this digital infrastructure, teachers themselves have started experimenting with AI in their practice. A recent study by Nurueva and Muktarbekova (2025) found that over two-thirds of surveyed Kyrgyzstani teachers had already interacted with AI-related tools in

some form. The majority expressed a willingness to further integrate such technologies into their work, reporting benefits such as time savings, assistance with lesson planning, and increased student engagement (Nurueva & Muktarbekova, 2025). These findings point to a growing readiness among teachers to explore AI as a means of enhancing classroom efficiency and pedagogical effectiveness.

At the policy level, Kyrgyzstan's broader efforts mirror global trends of experimenting with AI in different sectors, though shaped by local realities. The country has recently begun prioritizing AI integration across sectors, including education. This shift is reflected in the *Concept of Digital Transformation of the Kyrgyz Republic for 2024-2028*, which outlines a national commitment to digital innovation, including the development of AI-driven solutions in public services and education (Government of the Kyrgyz Republic, 2024). Furthermore, the government is currently preparing a *National Strategy on AI* and establishing a National Council for AI Development, signaling its intent to create a more structured and long-term vision for AI adoption in the country (Alasgarli, 2025; Osmonalieva, 2025). In addition, a Center for Applied Artificial Intelligence and Cybersecurity Research and Innovation is planned to be established in the country (Tynaeva, 2025). Together, these initiatives reflect an emerging policy-level recognition that technological advancement must be accompanied by investment in human capital, particularly in supporting educators.

However, the growth of educational technologies in Kyrgyzstan extends beyond government-led platforms to independent initiatives that increasingly experiment with AI. Among them, MugalimAI is the most notable locally developed tool, designed to support teachers in lesson planning and instructional design. It originated in 2020 as a volunteer project during the COVID-19 pandemic and later evolved into a formal EdTech startup (The Tech Kazakhstan, 2024). Officially launched in 2024, the platform helps teachers generate curriculum-aligned lesson plans, classroom activities, and assessments, emphasizing methodological quality, student-centered design, and alignment with national standards while reducing time spent on routine planning tasks.

Since its release, MugalimAI has gained wide adoption among educators in Kyrgyzstan and beyond. According to publicly available information shared by the platform developers, the number of registered teachers using MugalimAI exceeded 50,000 as of January 2026 (MugalimAI, 2026). The platform enables teachers to quickly generate complete, adaptable lesson plans with interactive materials tailored to diverse learning objectives and student needs. Also, teachers can use MugalimAI to create a complete lesson plan in under two minutes by selecting the class, subject, and topic (MugalimAI, n.d.). The platform further supports multiple planning frameworks and aligns all outputs with national standards. Beyond lesson planning, it generates assessments, interactive activities, and supplementary resources such as quizzes, reading tasks, and presentation templates. All plans, tests, and additional materials can be instantly translated into Russian, Kyrgyz, Kazakh, Uzbek, or English. The platform is web-based and requires no installation, which ensures ease of access across different devices and school environments.

The platform is designed to reduce teachers' workload across routine and time-intensive tasks. According to information publicly shared by the platform developers, the use of MugalimAI is reported to save teachers up to 10 hours per week. This includes approximately two hours on lesson planning, three hours on grading and feedback through automated scoring and commenting features, one to two hours on adapting tasks to students' performance levels, and up to two hours on administrative tasks such as generating progress reports and communicating with parents (MugalimAI, 2025).

Although not government-mandated, the platform is widely used on a paid, voluntary basis by teachers across urban and rural schools. In recognition of its innovative approach, MugalimAI was selected as a finalist in the 2024 Tools Competition, an international EdTech initiative supported by Schmidt Futures, the Gates Foundation, OpenAI, and others (Tools Competition, 2024). As of late 2024, the platform's developers had also announced plans to expand into neighboring countries such as Kazakhstan and Uzbekistan. MugalimAI thus represents a compelling case of bottom-up digital innovation in education, rooted in local

pedagogical expertise and aimed at empowering teachers through accessible, high-impact technology.

As this overview has shown, Kyrgyzstan's educational landscape is increasingly shaped by both global advancements and national efforts in digital innovation. MugalimAI, as a locally developed AI solution, illustrates how technology-driven tools are beginning to shape the professional experience of teachers and offer new forms of pedagogical support in Kyrgyzstan.

Statement of the Problem

In recent years, Kyrgyzstan has made visible efforts to modernize its education system through digital technologies. National initiatives have expanded access to resources, improved transparency, and fostered communication between schools, families, and students. At the policy level, the *Concept of Digital Transformation for 2024-2028* and the forthcoming *National AI Strategy* signal an ambition to embed AI more systematically into education. Alongside these government-driven reforms, local actors have also introduced innovative solutions such as MugalimAI. While this development demonstrates clear momentum, there is still no empirical evidence on how it shapes teachers' daily professional lives.

This gap is critical. While international literature on AI in education is expanding, most studies focus on student outcomes or large-scale implementations in high-income contexts. The experiences of teachers in low- and middle-income, post-Soviet countries remain largely absent. Without context-sensitive data, policies risk relying on assumptions or imported models that fail to match teachers' real needs.

Understanding how teachers engage with AI in practice is therefore essential. Dimensions such as workload, professional self-efficacy, and job satisfaction are central to instructional quality, teacher retention, and the sustainability of reforms (Issah et al., 2025). Through the examination of Kyrgyzstani teachers' interactions with MugalimAI, this study seeks to fill a critical knowledge gap and generate evidence that can inform the design of AI tools for teachers, guide professional development, and shape more responsive policy. The aim is to ensure that AI integration supports teachers' roles rather than adding to their burdens.

Purpose and Research Questions

The purpose of this quantitative, non-experimental, cross-sectional study, which incorporates correlational and group comparison analyses, is to examine the relationship between teachers' use of MugalimAI and three dimensions of their professional experience: workload, self-efficacy, and job satisfaction. The study focuses on in-service teachers in Kyrgyzstani schools who either use or do not use MugalimAI to identify whether and how engagement with the platform is associated with these key aspects of teachers' professional experience.

Research Questions

The study is guided by the following research questions:

RQ1: How is the use of MugalimAI related to teachers' overall professional experience, considering workload, self-efficacy, and job satisfaction?

RQ2: In what ways do teachers who use MugalimAI differ from those who do not in terms of these professional experience dimensions?

Definition of the Key Variables

Teacher workload is the “time spent in teaching, administrative or additional and extracurricular activities, and performing co-curricular responsibilities” (Hosain, 2016, as cited in Zydziunaite et al., 2020, p. 949).

Teacher self-efficacy refers to “teachers' beliefs about their ability to organize and execute actions required to successfully achieve specific teaching tasks in a particular context” (Holzberger & Prestele, 2021, as cited in Lingán-Huamán et al., 2023, p. 2).

Teacher job satisfaction is the “sense of fulfillment and enjoyment that instructors experience in their teaching profession” (Ainley & Carstens, 2018, p. 43, as cited in Mei & Mustapha, 2024, p. 47).

Significance of the Study

This study offers significant contributions to educational research, professional practice, and policymaking, particularly in the context of low- and middle-income, post-Soviet education systems like Kyrgyzstan.

First, it contributes to research on AI in education by providing empirical evidence from an underrepresented region. Existing literature largely focuses on high-income countries and system-level implementation, whereas this study highlights how teachers in Kyrgyzstan engage with AI in their daily practice. Examining classroom-level experiences helps connect global technological trends with local professional needs.

Theoretically, this study extends the Job Demands-Resources (JD-R) model to AI-supported teaching. While the model is widely used to examine teacher burnout, motivation, and job satisfaction (Admiraal & Røberg, 2023; Granziera et al., 2021), its application to everyday AI use remains limited. In this context, the study tests the model in a new technological and geographic setting by analyzing MugalimAI's influence on workload, self-efficacy, and job satisfaction. It aims to examine how AI may serve as a job resource for teachers in low- and middle-income contexts, offering a more nuanced view of how digital tools interact with teacher well-being and broadening the JD-R framework's relevance to educational innovation.

Practically, this study offers insights for teachers, school leaders, and EdTech developers. In Kyrgyzstan, educators often face heavy workloads, limited planning time, and scarce support. If tools like MugalimAI reduce routine tasks and strengthen instructional confidence, they can improve job satisfaction, teaching quality, and student outcomes. The findings may guide school-level investment in AI and help developers design features that genuinely address teachers' needs.

Finally, this research has direct implications for education policy in Kyrgyzstan. As the government advances its AI strategy and digital agenda, effective integration requires evidence grounded in local realities rather than aspirational goals or imported models. The study

highlights the outcomes of a grassroots, teacher-centered innovation by showing how teachers actually use AI and how it shapes their professional experience. Such evidence can support contextually appropriate policies and position educators as active agents in shaping the role of AI in schools.

Summary

This chapter established the rationale for the current study. It began by situating the research within broader global and national trends related to the integration of AI into education, highlighting the growing importance of teacher-focused innovations such as AI-supported lesson planning. Particular attention was given to the context of Kyrgyzstan, where both government-led digital reforms and grassroots initiatives, such as the locally developed MugalimAI platform, are shaping the evolving educational landscape. The chapter then introduced the central research problem, emphasizing the need to better understand how AI tools influence key dimensions of teachers' professional experience: perceived workload, self-efficacy, and job satisfaction. Overall, the chapter positioned the study as a context-sensitive contribution to ongoing debates on digital transformation in education and outlined its potential relevance for research, professional practice, and policymaking.

The remainder of this thesis is organized into five chapters. Chapter 2 presents a review of literature on the relationship between AI tools and teachers' workload, self-efficacy, and job satisfaction, explores the interconnections among these constructs, and introduces the Job Demands-Resources Model as the study's theoretical framework, on which the study's conceptual framework is built. Chapter 3 outlines the research design and methodology, including the sampling strategy, instrumentation, data collection, data analysis procedures, and ethical considerations. Chapter 4 presents the findings of the study, including statistics related to the research questions. Chapter 5 provides a discussion of the findings in relation to existing literature and theoretical perspectives. Finally, Chapter 6 concludes the thesis by summarizing the main contributions of the study, highlighting its limitations, and offering directions for future research, policy and practice.

Chapter 2: Literature Review

This study aims to examine how the use of MugalimAI, a locally developed AI-powered lesson planning platform, is associated with teachers' perceptions of workload, self-efficacy, and job satisfaction in Kyrgyzstan. Despite its growing popularity, little is known about its actual impact on teachers' daily professional experiences, making this investigation both timely and necessary.

This chapter synthesizes existing literature and outlines the theoretical and conceptual basis upon which the study is built. It reviews international literature on AI in education and its implications for teacher workload, self-efficacy, and job satisfaction, followed by a discussion of how these constructs are interrelated. The chapter then introduces the Job Demands-Resources (JD-R) model as the guiding theoretical lens and presents the conceptual framework that underpins the research.

AI in Education

Recent literature on AI in education increasingly focuses on its implications for teachers. Studies examine how AI tools can support lesson planning, assessment, and administrative routines, with growing attention to their impact on teacher workload, self-efficacy, and job satisfaction (Acevedo, 2025; Belloula, 2025; Eun & Kim, 2024; Hashem et al., 2024; Karpouzis et al., 2024; Lu et al., 2024; Prasad & Pasupathi, 2025; Shah et al., 2024; van den Berg & Du Plessis, 2023; Varuvel Dennison et al., 2025). The following subsections review existing empirical findings in each of these areas, providing the basis for examining how platforms such as MugalimAI may affect teachers in Kyrgyzstan.

AI and Teacher Workload

One of the most widely discussed promises of AI in education is its potential to alleviate teachers' workload. In particular, AI tools that assist with planning, documentation, and administrative tasks are seen as a way to reduce time pressure and redirect teachers' efforts toward more meaningful instructional work. This is especially relevant in low-resource settings

like Kyrgyzstan, where educators often juggle large workloads with limited institutional support.

Recent empirical studies provide growing evidence that AI-powered tools can significantly reduce teachers' workloads across diverse educational contexts. For example, Belloula (2025) conducted a mixed-methods study with ten teachers in public and private schools in Qatar, demonstrating that AI tools helped reduce lesson planning time by up to 40%. Teachers also reported improved time efficiency, as AI automation of repetitive tasks enabled them to focus more on creativity and instructional quality. These findings are particularly relevant for settings like Kyrgyzstan, where overburdened teachers may benefit from technologies that simplify routine processes.

Further supporting this view, van den Berg and Du Plessis (2023) showed that teachers in South Africa found AI-generated lesson plans to be useful starting points. By using ChatGPT, educators were able to quickly access structured content and adapt it to their own needs, saving time during the preparation phase. Similarly, Karpouzis et al. (2024), in a study across preschool, secondary, and university levels in Greece, highlighted that large language models (LLMs) offered fast response times and content personalization. These features closely resemble the design principles behind MugalimAI, which offers context-sensitive, fast, and multilingual support to educators in Kyrgyzstan's diverse classrooms.

Adding to this evidence base, a large-scale mixed-methods study by Varuvel Dennison et al. (2025) in low-resource public schools in Karnataka, India, evaluated the use of Shiksha Copilot, an AI-powered lesson planning platform. Involving over 1,000 teachers, the study found that the tool significantly reduced the time spent on both lesson preparation and administrative documentation. On average, participants saved 2.02 hours per week on lesson planning. Teachers also reported decreased stress and appreciated mobile access that allowed them to plan flexibly without extending working hours. These outcomes illustrate how well-designed AI platforms can contribute to both time savings and professional well-being, goals shared by similar initiatives in other developing education systems.

Further evidence comes from a qualitative case study by Acevedo (2025), who examined the experiences of secondary school educators in West Texas. Teachers who regularly incorporated different AI tools reported substantially lower time commitments for administrative communication, grading, and lesson planning. Teachers used these tools in “creating rubrics, developing assessments, generating instructional materials, and refining professional correspondence, all tasks that typically consume a substantial portion of a teacher’s week” (Acevedo, 2025, p. 72). On average, these educators estimated spending around 7-10 hours per week on such tasks, whereas colleagues who did not use AI indicated workloads closer to 15-17.5 hours, suggesting nearly a twofold difference in weekly time demands. These insights align with findings from other contexts, underscoring how generative AI can meaningfully reduce teachers’ non-instructional workload and associated stress.

Hashem et al. (2024) conducted an exploratory study to evaluate how effectively ChatGPT could assist teachers in reducing workload through automated lesson planning. Their literature review highlighted that lesson planning and content development are among the most time-consuming non-instructional duties contributing to teacher stress and burnout. The authors further noted that generative AI tools like ChatGPT hold promise in mitigating this burden by streamlining the creation of instructional materials. However, the results of their own testing revealed a critical limitation: the quality and relevance of AI-generated lesson plans were highly dependent on the specificity and clarity of the prompts provided. In practice, this means that teachers must invest time and effort into crafting precise inputs to achieve useful outputs—an additional cognitive step that may counteract potential time savings. By comparison, MugaliAI eliminates the need for prompt engineering altogether. It offers teachers pre-structured, curriculum-aligned templates and localized content suggestions, which lowers the technical threshold for effective use. This design increases the likelihood that teachers, particularly in low-resource settings like Kyrgyzstan, can benefit from time savings and workload reduction without needing to master AI prompting techniques.

Together, these studies provide a strong rationale for examining how MugalimAI may influence workload perceptions in Kyrgyzstan. Rather than assuming direct transferability, the present study aims to test whether similar time-saving benefits hold in the local context, where educational infrastructure, teacher autonomy, and policy dynamics present unique challenges and opportunities.

AI and Teacher Self-Efficacy

In addition to reducing workload, one of the less explored but increasingly important promises of AI in education is its potential to enhance teachers' self-efficacy. Self-efficacy is a critical component of teacher well-being and professional sustainability, especially in under-resourced contexts where stress and uncertainty can erode confidence. This section reviews recent empirical research examining the relationship between AI-related skills or tools and the development of self-efficacy among educators.

Eun and Kim (2024) examined how AI literacy relates to teacher self-efficacy and professional identity in English language education in Korea. While the quantitative correlation between AI literacy and self-efficacy was weak and not statistically significant ($r = .283$, $p = .170$), qualitative findings offered valuable insights. Teachers with stronger AI literacy expressed a greater sense of confidence in using emerging technologies to enhance instruction, which in turn reinforced their belief in their own teaching capabilities. Although this research focused on AI literacy rather than the direct use of AI platforms, it highlights a relevant mechanism: experiences of competence in working with AI can positively influence teachers' professional self-perception. Applying this insight to the present study, it is plausible that MugalimAI, while not requiring prior AI expertise, may offer a similar sense of empowerment. It is reasonable to think that the ability of the platform to simplify the planning process and allow teachers to feel more organized and in control may contribute indirectly to their professional self-efficacy.

Further evidence comes from a quasi-experimental study by Lu et al. (2024), which examined whether generative AI could enhance preservice teachers' teaching confidence. In

this study, 215 preservice teachers in China participated in a four-week instructional skills training program, with the experimental group using ChatGPT to support lesson planning and simulate classroom activities. The results demonstrated a statistically significant increase in teacher self-efficacy in the AI-assisted group compared to those trained through traditional methods ($F = 5.282, p = .023$). Participants reported that AI tools helped them refine lesson plans, anticipate instructional challenges, and prepare more effectively for classroom interaction. Although the study focused on preservice teachers and short-term interventions, it offers strong evidence that AI-assisted planning can strengthen teachers' perceived competence, one of the key dimensions of self-efficacy. This finding is particularly relevant to the Kyrgyzstani context, where in-service teachers often face high workloads and limited professional development resources. Thus, MugalimAI's offering of structured planning support in a localized and accessible way could similarly foster confidence in one's teaching practice, especially for educators who lack access to extensive pedagogical training.

Collectively, these studies suggest that AI can play a meaningful role not only in easing the logistical burdens of teaching but also in supporting teachers' psychological resources, such as confidence, control, and professional identity. As this study explores the relationship between MugalimAI usage and teacher self-efficacy in Kyrgyzstan, it builds on the notion that thoughtfully designed AI tools have the potential to reinforce teachers' belief in their own effectiveness, particularly in low-resource environments.

AI and Teacher Job Satisfaction

Teacher job satisfaction plays a critical role in retaining educators, promoting well-being, and maintaining high-quality instruction. As AI becomes more integrated into educational practice, it is important to assess whether and how these technologies influence satisfaction levels among educators. Specifically, AI platforms may affect job satisfaction both directly, by improving day-to-day experiences, and indirectly, by modifying key factors such as workload, autonomy, and professional growth opportunities.

Shah et al. (2024) conducted a large-scale quantitative study involving 300 university faculty members in Pakistan to examine how AI affects job satisfaction. The findings indicated that access to job resources, including supportive technologies like AI, was a strong positive predictor of job satisfaction ($r = .65, p < .01$). Additionally, a better work-life balance showed a significant positive association with satisfaction ($r = .74, p < .01$), whereas increased job demands, linked to excessive workload, were negatively correlated with satisfaction. These results suggest that AI may impact job satisfaction not only through users' direct interaction with technology but also by functioning as a job resource that helps reduce time pressure and administrative burden. In this light, MugalimAI's automated lesson planning and documentation tools could potentially enhance job satisfaction among teachers by easing workload and improving work-life balance—two critical factors highlighted in this study.

Expanding on this perspective, Prasad and Pasupathi (2025) explored the impact of AI-powered classroom assistants on job satisfaction among higher education teachers in Kerala, India. Based on data from 180 faculty members across three regions, the study used multiple regression analysis to examine six key predictors: workload management, personalized support, professional development, teaching efficiency, student engagement, and teacher autonomy. The findings demonstrated that all six factors were significantly associated with higher job satisfaction ($p < .05$). Notably, teachers reported greater satisfaction when AI tools helped manage workloads and enhanced their instructional autonomy. These results align with the assumption that AI-powered platforms can create more supportive working conditions by streamlining repetitive tasks and offering customized pedagogical support.

Together, these findings show the potential of AI to act as a facilitator of job satisfaction by addressing common sources of teacher stress and enabling more fulfilling professional experiences. In the context of Kyrgyzstan, where MugalimAI aims to support teachers in similar ways, such evidence highlights the importance of evaluating its impact not only on instructional efficiency but also on teachers' emotional and professional well-being.

Interrelations Among Teacher Workload, Self-Efficacy, and Job Satisfaction

Emerging evidence suggests that teacher workload, self-efficacy, and job satisfaction are closely connected in the professional experience of educators. While these constructs are distinct, they often contribute simultaneously to how teachers perceive their work and overall well-being. Exploring their combined influence provides valuable context for understanding how AI tools like MugalimAI might shape teacher experiences holistically.

A recent literature review by Mei and Mustapha (2024) identified both workload and self-efficacy as major correlates of job satisfaction. Specifically, teachers with higher self-efficacy tend to report greater satisfaction, as confidence in their instructional abilities contributes to a stronger sense of professional fulfillment. In contrast, heavier workloads are commonly associated with lower levels of job satisfaction, due to increased stress and reduced time for meaningful teaching tasks. While the review did not explore a direct causal link between workload and self-efficacy, it clearly demonstrates that both factors independently influence how satisfied teachers feel in their roles.

These insights support the rationale for examining all three variables together in the current study. By investigating how the use of MugalimAI relates to workload, teaching confidence, and job satisfaction, the research aims to capture a more integrated understanding of teacher experience in Kyrgyzstani schools.

Theoretical Framework

This study is grounded in the Job Demands-Resources (JD-R) model (Demerouti et al., 2001), a widely recognized framework for analyzing occupational well-being across different professional contexts, including education. The JD-R model posits that every occupation is shaped by job resources, such as tools, support, and autonomy, and job demands, such as workload and time pressure. The balance between demands and resources strongly influences outcomes such as motivation, burnout, job satisfaction, performance, and turnover (Demerouti & Bakker, 2011).

In education, Granziera et al. (2021) adapted the JD-R model to explore teacher well-being, demonstrating that excessive job demands, including administrative overload, often result in emotional exhaustion, whereas sufficient resources, such as instructional tools, autonomy, and professional support, enhance outcomes like job satisfaction. Within this framework, teacher workload represents a core job demand that typically undermines well-being, while AI-powered tools like MugalimAI can be conceptualized as job resources that help to reduce time pressure and cognitive overload, thereby creating more favorable working conditions.

Crucially, the JD-R model also incorporates personal resources, including constructs such as self-efficacy (Granziera et al., 2021). These personal resources play an important role in promoting positive outcomes, including job satisfaction. Although self-efficacy is often considered a stable internal trait, emerging research suggests that external tools and supportive technologies can enhance it indirectly. For example, studies have demonstrated that successful engagement with generative AI (Lu et al., 2024) or increased AI literacy (Eun & Kim, 2024) can boost teachers' confidence in their professional capabilities.

In this light, MugalimAI is theorized to function as a dual resource. First, as a job resource, it alleviates workload by automating routine lesson planning and documentation. Second, as a support for personal resources, it may directly strengthen teachers' self-efficacy by offering structured, curriculum-aligned designs and exposure to modern pedagogical methods. These two mechanisms, reducing job demands and enhancing personal resources, are both expected to contribute to higher levels of job satisfaction. By applying this theoretical lens, the study establishes a framework for examining how AI platforms interact with workload, self-efficacy, and job satisfaction in the context of Kyrgyzstan's digital transformation.

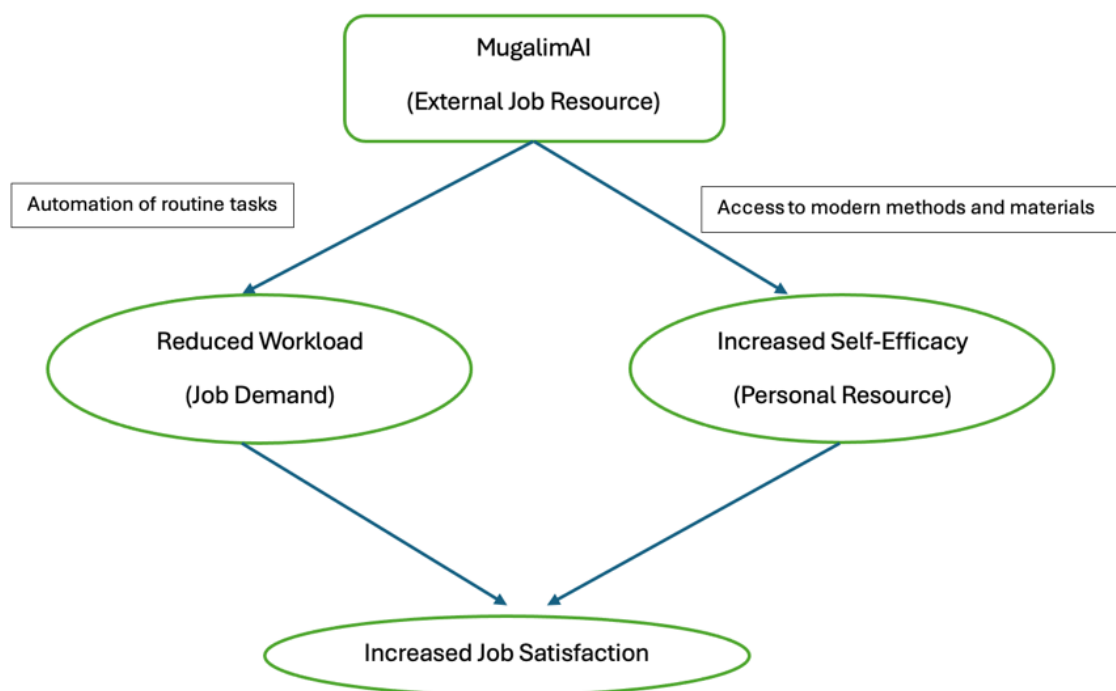
Conceptual Framework

Based on the JD-R model and the reviewed literature, this study proposes a conceptual framework that specifies the relationships between teacher workload, self-efficacy, and job satisfaction, with MugalimAI positioned as an external job resource.

In traditional teaching contexts, workload functions as a major job demand: excessive lesson planning, grading, and administrative duties increase stress and reduce professional well-being. At the same time, self-efficacy acts as a personal resource: teachers who feel confident in their instructional abilities tend to be more resilient, motivated, and satisfied with their work (Granziera et al., 2021; Mei & Mustapha, 2024). Job satisfaction represents the primary outcome variable.

Within this framework, MugalimAI is conceptualized as a dual resource. On one hand, it reduces job demands by automating routine planning and documentation tasks, thereby lowering perceived workload. On the other hand, it strengthens personal resources by giving teachers structured, curriculum-aligned lesson designs and access to modern pedagogical methods, which may reinforce their professional confidence and sense of competence (Eun & Kim, 2024; Lu et al., 2024).

These dual effects (lower workload and higher self-efficacy) are hypothesized to jointly contribute to greater job satisfaction (Mei & Mustapha, 2024). The framework, therefore, reflects an integrated model in which workload and self-efficacy are treated as mediating variables linking MugalimAI use to job satisfaction. In this way, the study examines how external resources (AI platforms) interact with both job demands and personal resources to shape teacher well-being in the context of Kyrgyzstan's digital transformation.

Figure 1*Conceptual Framework***Summary**

This chapter reviewed international literature on the integration of AI in education, with particular attention to its relevance for teacher workload, self-efficacy, and job satisfaction. The synthesis of recent empirical studies suggests that AI-supported tools may function as important professional resources by reducing routine job demands, supporting instructional processes, and strengthening teachers' confidence in their practice. Through these mechanisms, the literature indicates that AI may also contribute to improved job satisfaction by fostering more manageable workloads and more positive professional experiences. Drawing on the JD-R model, the chapter established a theoretical foundation for understanding AI as a job resource and introduced the conceptual framework guiding this study. This framework explains how the use of platforms such as MugaliAI may shape teacher well-being through interconnected pathways linking workload reduction and enhanced self-efficacy to higher levels of job satisfaction.

The next chapter outlines the research methodology used to investigate these relationships in the context of Kyrgyzstan. It presents the study's design, data collection instruments, sampling, data analysis approach, and ethical considerations. Together, these

elements establish a systematic and transparent strategy for examining how MugalinAI usage is associated with teachers' perceptions of workload, self-efficacy, and job satisfaction.

Chapter 3: Methodology

This study examines the association between the use of the MugalimAI platform and teachers' professional experience, with a particular focus on three key dimensions: workload, self-efficacy, and job satisfaction. The study explores how engagement with the platform relates to these outcomes and whether differences exist between teachers who use MugalimAI and those who do not.

The research adopts a quantitative approach to investigate patterns in teachers' experiences across diverse educational contexts in Kyrgyzstan. The study focuses on measurable indicators of platform use and teacher outcomes and aims to generate empirical evidence relevant to both academic research and practice-oriented discussions on the integration of AI in education.

This chapter outlines the methodological approach used in the study. It begins with a description and justification of the research design, followed by details on participants, instruments, and data collection procedures. The chapter then describes the data screening and analysis processes and concludes with ethical considerations, providing a transparent foundation for addressing the research questions.

Research Design

This study adopted a quantitative, non-experimental, cross-sectional research design to examine how teachers' use of the MugalimAI platform was associated with their perceived workload, self-efficacy, and job satisfaction. The study incorporated both correlational and group comparison analyses: correlational analyses were used to examine associations between platform use indicators and teacher outcomes (RQ1), while group comparisons were used to examine differences between MugalimAI users and non-users (RQ2).

The study was grounded on the post-positivist research paradigm, which acknowledges that absolute objectivity is unattainable, yet emphasizes that systematic and rigorous inquiry can produce reliable and valid knowledge (Creswell, 2014). Post-positivism supports the use of empirical evidence and statistical analysis to investigate social phenomena, aligning with the

study's aim of examining associations between the use of an AI-based educational platform and selected aspects of teachers' professional experience through measurable data. Accordingly, a quantitative research approach was employed, involving the collection and analysis of numerical data to address the research questions (Rana et al., 2023).

One of the key strengths of quantitative research lies in its potential for generalizability. The use of structured instruments and larger samples allows findings to be examined across diverse contexts, increasing their applicability beyond individual cases (Lim, 2024). Given that this study explored patterns in teachers' workload, self-efficacy, and job satisfaction across varied educational settings in Kyrgyzstan, a quantitative design provided the consistency and scalability required to generate both contextually relevant and transferable insights. While qualitative approaches can offer rich, in-depth accounts of individual experiences, they are less suited to identifying broader patterns that may inform system-level decision-making and large-scale digital reforms in education (Creswell, 2014). As noted by Lim (2024), quantitative research plays a central role in evidence-based decision-making by enabling researchers, practitioners, and policymakers to derive actionable insights from empirical data. This is particularly relevant for the present study, which seeks to contribute not only to academic understanding but also to practical and policy-oriented discussions on the integration of AI in education.

In addition, the study employed a non-experimental design, which is appropriate for examining naturally occurring phenomena without manipulating variables or introducing interventions (O'Dwyer & Bernauer, 2014). Within the context of educational research, such a design supports ethical standards by avoiding direct interference in instructional processes, thereby minimizing potential risks to teaching quality and student learning (O'Dwyer & Bernauer, 2014). A cross-sectional approach complemented this design by enabling the collection of data at a single point in time, allowing for a timely and resource-efficient examination of teachers' experiences with MugalimAI (Creswell, 2014). Overall, this methodological approach allowed for the ethical and efficient investigation of naturally

occurring relationships between AI platform use and teacher-related outcomes. It provided a robust foundation for generating contextually relevant and transferable insights to inform educational research, practice, and policy.

Participants

The study used a non-probability sampling approach. Purposive sampling was applied to ensure the inclusion of school teachers and to reach both users and non-users of the MugalimAI platform (Creswell, 2014; Etikan et al., 2016). In addition, convenience sampling and elements of self-selection were involved through recruitment via professional networks, educational organizations, and an open invitation distributed by the platform through social media posts and email communication.

Participants were accessed through multiple recruitment channels. First, the MugalimAI development team distributed an open invitation to participate in the study via the platform's official social media page (see Appendix B) and email communication with registered users (see Appendix C). Second, the researcher shared the survey link through professional networks, including teacher communities, educational organizations, and personal contacts in schools across Kyrgyzstan (see Appendix D and E). As a result, in total, 215 teachers responded to the online questionnaire before the initial data screening process.

Following initial data screening to remove incomplete responses and identify implausible values, the final analytical sample consisted of 154 in-service teachers from schools across Kyrgyzstan, including both MugalimAI users ($n = 59$; 38%) and non-users ($n = 95$; 62%), which enabled comparative analyses aligned with the study objectives.

Table 1 presents an overview of the demographic and professional characteristics of the participants. The sample was predominantly female ($n = 139$; 90%), while 12 participants (8%) identified as male and 3 (2%) preferred not to disclose their gender. Participants represented a range of age groups, with the largest proportions in the 45-54 category ($n = 50$; 32%) and 35-44 category ($n = 38$; 25%), followed by 55 years or older ($n = 32$; 21%) and 25-34 ($n = 24$; 16%); 10 teachers (6%) were under 25.

Teaching experience was skewed toward more experienced educators:

77 teachers (50%) reported more than 15 years of experience, and 42 (27%) reported 8-15 years. Smaller proportions reported 1-3 years ($n = 17$; 11%), 4-7 years ($n = 10$; 7%), or less than one year ($n = 7$; 5%) of experience. Subject specialization also varied: non-STEM teachers comprised the largest group ($n = 73$; 47%), followed by STEM teachers ($n = 46$; 30%) and primary school teachers ($n = 27$; 18%); a small number taught both STEM and non-STEM ($n = 5$; 3%) or did not indicate a subject area ($n = 3$; 2%).

The sample included teachers from both rural ($n = 80$; 52%) and urban schools ($n = 74$; 48%). Regionally, the largest proportion of participants was from Chuy Oblast ($n = 70$; 46%), with additional representation from Jalal-Abad ($n = 27$; 18%), Osh ($n = 21$; 14%), Issyk-Kul ($n = 16$; 10%), Naryn ($n = 8$; 5%), Batken ($n = 6$; 4%), and Talas ($n = 5$; 3%). The number of valid responses varied slightly across characteristics due to occasional missing values.

Overall, the sample was characterized by a predominance of experienced, mid- to late-career teachers, balanced representation across urban and rural schools, and sufficient variation in subject areas and platform use to support subsequent analyses.

Table 1*Demographic and Professional Characteristics of the Participants (N = 154)*

Sample Characteristics	<i>n</i>	<i>%</i>
MugalimAI use		
<i>User</i>	59	38 %
<i>Non-user</i>	95	62 %
Gender		
<i>Female</i>	139	90 %
<i>Male</i>	12	8 %
<i>Prefer not to say</i>	3	2 %
Age		
<i>Under 25</i>	10	6 %
<i>25-34</i>	24	16 %
<i>35-44</i>	38	25 %
<i>45-54</i>	50	32 %
<i>55 or older</i>	32	21 %
Years of teaching experience		
<i>1-3 years</i>	17	11 %
<i>4-7 years</i>	10	7 %
<i>8-15 years</i>	42	27 %
<i>Less than 1 year</i>	7	5 %
<i>More than 15 years</i>	77	50 %
Subject		
<i>non-STEM</i>	73	47 %
<i>STEM</i>	46	30 %
<i>Primary school</i>	27	18 %
<i>Both (STEM and non-STEM)</i>	5	3 %
<i>Other (not indicated)</i>	3	2 %
Type of school		
<i>Rural</i>	80	52 %
<i>Urban</i>	74	48 %
Region		
<i>Batken Oblast</i>	6	4 %
<i>Chuy Oblast</i>	70	46 %
<i>Issyk-Kul Oblast</i>	16	10 %
<i>Jalal-Abad Oblast</i>	27	18 %
<i>Naryn Oblast</i>	8	5 %
<i>Osh Oblast</i>	21	14 %
<i>Talas Oblast</i>	5	3 %

Note. Percentages are rounded. Some participants skipped a few background questions, so totals may differ slightly across characteristics. “MugalimAI use” indicates whether participants reported using the platform.

Data Collection Methods

An online questionnaire was used as the primary method of data collection. This approach was considered appropriate for the study context, as online surveys enable cost-efficient access to large and geographically distributed populations, which is particularly relevant when recruiting participants across multiple regions (Regmi et al., 2016).

The structured questionnaire consisted of five sections, each aligned with the study variables and contextual factors. The full questionnaire is included in Appendix F.

1. Demographic and Professional Background

This section included six items capturing participants' age, gender, years of teaching experience, subject area, school location (urban or rural), and region.

2. MugalimAI Use (Group 1 only)

Teachers who indicated that they used MugalimAI responded to items measuring their engagement with the platform. This section was developed by the researcher to capture exposure to MugalimAI and included three items: (a) duration of use; (b) frequency of use per week; and (c) average time spent on the platform (hours per week).

3. Workload

The third section assessed teachers' workload and included six items adapted from the Teacher Workload Survey developed by the UK Department for Education (UK Department for Education, 2019). This section captured both the distribution of working time and teachers' subjective perceptions of workload pressure. The first part consisted of three numeric-response items asking participants to report: (a) the total number of hours spent on professional activities during their most recent full working week, (b) the number of hours spent specifically on teaching, and (c) the number of hours worked outside school hours. The second part focused on perceived workload appropriateness and balance. It included three Likert-type items rated on a 5-point scale, ranging from *strongly disagree* to *strongly agree*. The items assessed whether teachers felt able to complete their work within contracted hours (e.g., "I can complete my assigned workload during my contracted working hours"), whether they perceived their

workload as acceptable (e.g., “I have an acceptable workload”), and whether they experienced a satisfactory work-life balance (e.g., “Overall, I achieve a good balance between my work life and my private life”).

The workload section combined time-use indicators with perceptual items adapted from the Teacher Workload Survey (UK Department for Education, 2019), providing a multidimensional assessment of both working hours and perceived workload strain. The instrument has been used in national large-scale studies of teachers’ working conditions. Given the structure of the adapted items and the absence of consistently reported internal consistency estimates in the original source, reliability was assessed empirically using the study dataset.

4. Teacher Self-Efficacy

The fourth section measured teacher self-efficacy using the short form of the Ohio State Teacher Efficacy Scale (OSTES) developed by Tschannen-Moran and Hoy (2001). The OSTES assesses teachers’ beliefs in their capability to influence three domains of practice: instructional strategies (e.g., “To what extent can you use a variety of assessment strategies?”), classroom management (e.g., “How much can you do to control disruptive behavior in the classroom?”), and student engagement (e.g., “How much can you do to motivate students who show low interest in schoolwork?”). In this study, the 12-item short form was used, with four items representing each subscale. Participants rated their perceived capability on a 9-point Likert-type scale ranging from *nothing* to *a great deal*.

The OSTES has demonstrated strong internal consistency in prior research, with reported Cronbach’s alpha coefficients of .86 for instructional strategies, .86 for classroom management, .81 for student engagement, and .90 for the total scale (Tschannen-Moran & Hoy, 2001). The scale was selected due to its conceptual alignment with key domains of teaching practice that may be supported by AI-based tools such as MugalimAI.

5. Job Satisfaction

The fifth section measured job satisfaction using five Likert-type items from the PIRLS 2016 Teacher Job Satisfaction Scale (IEA, 2016). Participants indicated how frequently

they experienced positive sentiments about their work on a 4-point scale, from *never or almost never* to *very often* (e.g., “I find my work full of meaning and purpose”).

PIRLS 2016 Teacher Job Satisfaction Scale (IEA, 2016) has been widely applied in international large-scale assessments of teachers’ work conditions. The selected items provided a concise measure of positive work-related sentiments. As the original source did not provide consistent evidence on the internal consistency of this set of items, reliability was examined empirically using the current study dataset.

The questionnaire also included one additional Net Promoter Score (NPS)-type item for platform users, intended to capture their general willingness to recommend MugalimAI to colleagues. As this item was not directly aligned with the study’s research questions or theoretical framework, it was not included in the main statistical analyses and is not discussed further in the findings.

Data Collection Procedures

Data collection was conducted from 17 November 2025 to 24 January 2026 using an online questionnaire. The questionnaire was administered using Qualtrics and distributed in Russian, Kyrgyz, and English to ensure accessibility. All instruments originally developed in English were translated into Russian and Kyrgyz by native speakers with proficiency in educational and research terminology. To ensure linguistic and conceptual equivalence across language versions, the translations were reviewed using a back-translation procedure (Brislin, 1970).

Before data collection, all participants received comprehensive information about the study’s procedures, objectives, potential benefits, and risks. Informed consent was obtained online prior to questionnaire completion; teachers were required to read the consent form and indicate their agreement before proceeding.

Data Analysis Approach

Data analysis was conducted using Jamovi software (Version 2.3; The jamovi project, 2022). An initial dataset of 215 responses was imported into Jamovi and underwent a multi-step screening process before statistical analysis.

Data Preparation and Screening

First, duplicate submissions were removed. Subsequently, responses with more than 40% missing data were also excluded to ensure sufficient completeness for scale scoring and subsequent analyses. After these initial cleaning procedures, 197 responses remained.

Next, the dataset was screened for implausible or extreme values that likely reflected data entry errors, misunderstanding of questions, or inattentive responding. Distributional checks and boxplots were examined for key numeric variables (e.g., reported working hours). Based on these diagnostics, a set of conservative plausibility thresholds was applied to reduce the influence of extreme values on correlations and group comparisons. Thresholds were informed by realistic limits of weekly working time and teaching load, the structure of a typical week. They were selected to exclude clearly extreme values while retaining meaningful variation among respondents. The following criteria were used:

- Workload 1.1 total hours spent on work ≤ 80 , reflecting an upper bound for weekly working time beyond which values are likely implausible.
- Workload 1.2 hours spent on teaching ≤ 50 , reflecting a high-end boundary for instructional hours within a standard school schedule.
- Workload 1.3 hours spent on work outside school hours ≤ 40 , allowing substantial out-of-school work while excluding extreme weekly totals.
- Zero values were retained, as they may reflect the absence of specific activities during the reported week rather than measurement error.

Following additional screening, the final analytical sample used for the main analyses consisted of 154 participants (59 users and 95 non-users).

Data Coding, Scale Preparation, and Grouping of Variables

Prior to statistical analysis, all questionnaire responses were systematically coded and prepared in Jamovi in accordance with the original scale specifications and the analytical aims of the study. Particular attention was paid to maintaining conceptual consistency across scales and preserving the structure proposed by the original scale developers.

Workload. Workload was assessed using two types of indicators. The first three items captured objective time-use measures and required numeric responses, including total hours spent on professional activities, hours spent on teaching, and hours worked outside contracted school time. These variables were retained in their original metric form and treated as objective workload indicators in subsequent analyses.

The remaining three items measured perceived workload appropriateness and work-life balance and were reverse-coded before analysis so that higher scores reflected a higher perceived workload burden. Response options were coded as follows: *Strongly agree* (1), *Tend to agree* (2), *Neither agree nor disagree* (3), *Tend to disagree* (4), *Strongly disagree* (5). For the purposes of the present study, these three perceptual workload items were labeled according to their conceptual focus as follows: (1) *Time pressure / overtime necessity*, reflecting whether teachers felt able to complete their work within contracted hours; (2) *Perceived workload intensity*, capturing overall judgments about the acceptability of workload demands; (3) *Work-life imbalance*, indicating the extent to which work was perceived to interfere with personal life. All three items were treated as continuous variables and were used both as individual indicators and as a composite perceived workload score, calculated by summing the three items.

Self-Efficacy. Teacher self-efficacy was coded using a 9-point response scale, consistent with the original instrument developed by the scale authors (Tschannen-Moran & Hoy, 2001). Response options were coded as follows: *Nothing* (1), *Very little* (3), *Some influence* (5), *Quite a bit* (7), and *A great deal* (9), with higher scores indicating higher perceived self-efficacy. Following the original subscale structure proposed by the instrument

authors, items were grouped into three subcomponents: (1) *Instructional strategies* (Items 1-4), (2) *Classroom management* (Items 5-8), and (3) *Student engagement* (Items 9-12). Subscale scores were computed by summing the relevant items within each domain. In addition, an overall self-efficacy score was calculated as the sum of all twelve items. Both the total score and the subcomponent scores were treated as continuous variables and retained for subsequent analyses.

Job Satisfaction. Job satisfaction items were coded in line with the original source using a 4-point frequency-based scale, with *Never* coded as 0, *Sometimes* as 1, *Often* as 2, and *Very often* as 3 (IEA, 2016). Higher scores reflected higher levels of job satisfaction. In addition to computing a total job satisfaction score based on the sum of all five items, for the purposes of the present study, the items were conceptually categorized into three analytically meaningful dimensions reflecting different aspects of teachers' professional experience: (1) *Global satisfaction* (Item 1), capturing overall positive evaluation of the profession; (2) *Professional purpose and pride* (Items 2 and 5), reflecting a sense of meaning and value attached to teaching; and (3) *Emotional engagement with work* (Items 3 and 4), indicating enjoyment and enthusiasm in daily professional activities. Subscale scores were calculated by summing the items within each group. Both overall and subcomponent scores were treated as continuous variables and used in the analyses.

Grouping Variables. For group comparison analyses, participants were categorized based on their reported use of the MugalimAI platform into platform *Users* and *Non-users*. Among platform users, indicators of frequency of use and duration of use were retained as continuous variables and used in correlational analyses examining associations between platform engagement and professional experience outcomes.

Scale Reliability

Internal consistency reliability was assessed using Cronbach's alpha after the initial data cleaning stage, following the removal of duplicate responses and cases with more than 40% missing data ($N = 197$). This approach ensured that reliability estimates were based on

sufficiently complete responses and were not artificially inflated or reduced by subsequent plausibility-based exclusions of extreme values. As shown in Table 2, internal consistency across the study measures was acceptable to good, with Cronbach's alpha coefficients ranging from $\alpha = .73$ to $.88$.

Table 2

Internal Consistency Reliability of Study Measures (N = 197)

	Cronbach's α
Workload 1 (time-use indicators) ^a	.77
Workload 2 (perceived workload) ^b	.78
Self-Efficacy ^c	.88
<i>Instructional strategy</i> ^d	.75
<i>Classroom management</i> ^e	.80
<i>Student engagement</i> ^f	.76
Job Satisfaction ^g	.86
<i>Global satisfaction & Professional purpose and pride</i> ^h	.78
<i>Emotional engagement with work</i> ⁱ	.73

Note. ^a Items 1.1, 1.2, 1.3, ^b Items 2.1, 2.2, 2.3, ^c All Self-Efficacy Items 1-12, ^d Items 1-4, ^e Items 5-8, ^f Items 9-12, ^g All Job Satisfaction Items 1-5, ^h Items 1,2,5, ⁱ Items 3,4

Descriptive Statistics

Participants' demographic and professional characteristics were summarized using descriptive statistics, including frequencies and percentages.

Inferential Analyses

Correlational Analyses. To address RQ1, correlational analyses were conducted to examine the relationships between MugalimAI use and teachers' professional experience, including workload, self-efficacy, and job satisfaction. These analyses were restricted to respondents who reported using the MugalimAI platform and provided valid responses on platform use indicators ($n = 47$). This reduction was due to implausible values on platform use indicators after the application of plausibility thresholds. Before correlation analyses, additional

plausibility filters were applied to MugalimAI use variables to ensure realistic ranges of reported platform engagement. These filters were informed by the platform's launch date and by reasonable limits on weekly usage intensity. The following criteria were applied:

(1) MugalimAI use duration ≤ 25 months, consistent with the platform's launch in 2024 and the maximum possible period of use at the time of data collection; (2) MugalimAI use frequency (times per week) ≤ 35 times, allowing for intensive engagement while excluding extreme values likely reflecting item misinterpretation; (3) MugalimAI use frequency (hours per week) ≤ 35 hours, allowing very high weekly engagement while removing values inconsistent with typical use patterns and teachers' time constraints.

Distributional properties of MugalimAI use indicators and professional experience variables were assessed using the Shapiro-Wilk test. Given the non-normal distribution of several variables, Spearman's rank-order correlation coefficients were computed.

Correlation analyses were conducted in several stages. First, correlations between MugalimAI use indicators (use duration and frequency) and overall professional experience outcomes (overall perceived workload, self-efficacy, and job satisfaction) were examined. Second, additional correlation analyses were conducted at the subcomponent level, examining associations between MugalimAI use indicators and distinct components of workload (time pressure and overtime necessity, perceived workload intensity, and work-life imbalance), self-efficacy (instructional strategies, classroom management, and student engagement), and job satisfaction (global satisfaction, professional purpose and pride, and emotional engagement with work).

Group Comparison Analyses. To address RQ2, group comparison analyses were conducted to examine differences between teachers who used MugalimAI and those who did not with respect to workload, self-efficacy, and job satisfaction. These analyses were conducted using the full analytical sample after the application of workload-related plausibility filters ($N = 154$).

Assumptions of normality and homogeneity of variances were assessed for all outcome variables before group comparisons using the Shapiro-Wilk test and Levene's test, respectively. Depending on whether these assumptions were met, either Student's independent-samples T-tests or Mann-Whitney U tests were applied. Effect sizes were reported using Cohen's d for parametric tests and Rank-biserial correlations for non-parametric tests to provide information about the magnitude of observed differences.

Group comparisons were conducted at two levels. First, differences between MugalimAI users and non-users were examined for overall workload, self-efficacy, and job satisfaction. Second, additional group comparisons were conducted at the subcomponent level to obtain a more nuanced understanding of differences in specific aspects of workload (time pressure, workload intensity, work-life imbalance), self-efficacy (instructional strategies, classroom management, student engagement), and job satisfaction (global satisfaction, professional purpose and pride, emotional engagement with work).

Ethical Considerations

This study adhered to key ethical principles, including informed consent, privacy, confidentiality, data security, voluntary participation, and harm minimization (Oates et al., 2021). The study did not involve more than minimal risks to participants. Ethical approval for the study was obtained from the Graduate School of Education Institutional Research Ethics Committee (GSE IREC) before data collection.

Participants received clear information about the study purpose, procedures, potential risks and benefits, and their rights as research participants before taking part in the survey. Informed consent was obtained online prior to questionnaire completion, and participants were informed that their participation was entirely voluntary and they could skip any question they did not wish to answer and could discontinue participation at any point without penalty. The informed consent form is included in Appendix G.

To protect anonymity, the survey was designed to avoid collecting personally identifiable information, such as names, IDs, or email addresses. In addition, the survey

platform did not record IP addresses, and the researcher did not access any teacher databases or contact lists. Recruitment was conducted through intermediaries (e.g., school representatives or partner organizations) who shared information about the study with teachers, ensuring that participation remained anonymous even to the researcher. The dataset was handled in de-identified form and stored securely using password-protected files, with access restricted to the researcher. Contact details of the researcher, supervisor, and GSE IREC were provided in the participant information sheet to allow teachers to ask questions or raise concerns about the study. Overall, these measures ensured that participation carried no more than minimal risk to participants.

Summary

This chapter outlined the methodological framework used to examine how engagement with the MugalimAI platform is associated with teachers' professional experience in terms of workload, self-efficacy, and job satisfaction. A quantitative, non-experimental, cross-sectional design enabled the investigation of naturally occurring relationships across a geographically diverse sample of teachers while ensuring ethical feasibility and analytical rigor. The use of structured, validated, and conceptually aligned instruments, systematic data screening and preparation procedures, and appropriate inferential techniques supported the generation of reliable empirical evidence addressing the study's research questions. Combining analyses of platform engagement among users with systematic comparisons between users and non-users provided a rigorous basis for examining how the use of an AI-based platform is associated with teachers' professional experience. In addition, careful attention to ethical principles, including informed consent, anonymity, voluntary participation, and secure data handling, strengthened the integrity and trustworthiness of the research process.

The next chapter presents the results of the statistical analyses conducted to address the study's research questions. It reports findings from both correlational analyses examining how indicators of MugalimAI use are associated with teachers' workload, self-efficacy, and job satisfaction among platform users, and group comparison analyses exploring differences

between users and non-users across these professional experience dimensions. Results are presented at both the overall scale level and the subcomponent level to provide a more nuanced understanding of the observed patterns.

Chapter 4: Findings

This chapter presents the empirical findings of the study examining the relationship between the use of the MugalimAI platform and teachers' professional experience in Kyrgyzstan. Professional experience is conceptualized through three core dimensions: workload, self-efficacy, and job satisfaction.

The findings are presented in relation to the study's two research questions. The first research question examines how teachers' use of the MugalimAI platform is related to their overall professional experience, specifically in terms of perceived workload, self-efficacy, and job satisfaction. To address this question, correlational analyses were performed among platform users to examine how variation in the duration and frequency of MugalimAI use was associated with differences in teachers' workload, self-efficacy, and job satisfaction. The second research question explores in what ways teachers who use MugalimAI differ from those who do not with respect to these dimensions of professional experience. To address this question, group comparison analyses were conducted using the full analytical sample. For both research questions, analyses were performed at two levels, overall composite scale scores and specific subcomponents, to capture both general patterns and more nuanced variations across the study variables.

Overall, this chapter integrates correlational and group comparison analyses to provide a comprehensive, multi-level examination of how MugalimAI use relates to teachers' professional experience. Together, these analyses offer an empirically grounded understanding of patterns of association and group differences across workload, self-efficacy, and job satisfaction.

RQ1. Relationships Between MugalimAI Use and Teachers' Professional Experience

To address RQ1, correlational analyses were conducted to examine whether variation in MugalimAI use duration and frequency was associated with differences in perceived workload, self-efficacy, and job satisfaction. Analyses were performed sequentially at the aggregate scale level and at the level of individual subcomponents in order to capture both general patterns and

more fine-grained relationships that may not be observable when using composite indicators alone.

Before the correlation analyses, the dataset was filtered to include only teachers who reported using the MugalimAI platform and provided valid responses on platform use indicators. Consequently, analyses addressing RQ1 were conducted on a reduced subsample of platform users ($n = 47$). Due to missing responses on certain scale items, the effective sample size varied slightly across specific analyses.

The distributional normality of both aggregate indicators and subcomponents of MugalimAI use, and teachers' professional experience variables was assessed using the Shapiro-Wilk test to inform the selection of an appropriate correlation method (see Table 3). Given evidence of non-normality in several variables, Spearman's rank-order correlation coefficients were computed to examine associations between platform use duration and frequency and teachers' workload, self-efficacy, and job satisfaction at both the aggregate and subcomponent levels.

Table 3
Normality Tests (Shapiro-Wilk) for MugalimAI Use Indicators, Aggregate Professional Experience Variables and Their Subcomponents (Users Only)

	N	Shapiro-Wilk W	Shapiro-Wilk p
MugalimAI use duration	47	.86	< .001
MugalimAI use frequency (times per week)	47	.78	< .001
MugalimAI use frequency (hours per week)	47	.75	< .001
Workload 1.1 Total hours spent on work	47	.95	.054
Workload 1.2 Hours spent on teaching	47	.97	.241
Workload 1.3 Hours spent on work during out of school hours	47	.93	.010
Perceived workload	41	.95	.096
<i>WL1 Time pressure / overtime necessity</i>	46	.89	<.001
<i>WL2 Perceived workload intensity</i>	42	.90	.002
<i>WL3 Work-life imbalance</i>	42	.89	<.001
Self-Efficacy	40	.92	.006
<i>SE1 Instructional strategies SUM</i>	47	.93	.007
<i>SE2 Classroom management SUM</i>	43	.93	.011
<i>SE3 Student engagement SUM</i>	42	.95	.064
Job Satisfaction	43	.95	.049
<i>JS1 Global satisfaction</i>	45	.79	<.001
<i>JS2 Professional purpose and pride SUM</i>	44	.86	<.001
<i>JS3 Emotional engagement with work SUM</i>	43	.89	<.001

Note. A low p-value suggests a violation of the assumption of normality

The analysis began with an examination of correlations between MugalimAI use indicators and aggregate measures of teachers' professional experience. The full correlation matrix is presented in Table 4. As expected, a statistically significant strong positive correlation was observed between MugalimAI use frequency measured in times per week and frequency measured in hours per week ($r_s = .77, p < .001$), indicating that teachers who reported more frequent platform use also tended to spend more time using it. This pattern suggests internal consistency among the MugalimAI use indicators and supports their suitability for correlational analysis. In contrast, use duration demonstrated small and statistically nonsignificant associations with both frequency measures.

No statistically significant relationships were found between MugalimAI use indicators and workload-related variables, including individual workload components (total working hours, teaching hours, and hours spent working outside school hours) as well as overall perceived workload, with all correlations nonsignificant ($p > .05$).

Similarly, no statistically significant associations were identified between MugalimAI use indicators and teachers' overall self-efficacy. Neither platform use duration nor frequency of use, measured in times per week or hours per week, was significantly related to self-efficacy scores ($p > .05$). The same pattern was observed for overall job satisfaction, with no significant correlations detected between platform use indicators and teachers' reported levels of job satisfaction ($p > .05$).

Among the professional experience variables themselves, a statistically significant relationship was observed only between overall self-efficacy and overall job satisfaction. Specifically, a strong positive correlation was found between these two variables ($r_s = .55, p < .001$), suggesting that teachers reporting higher levels of professional self-efficacy also tended to report greater job satisfaction. No statistically significant correlations were identified between overall perceived workload and either self-efficacy or job satisfaction ($p > .05$).

Table 4

Spearman's Rank-Order Correlations Between MugalimAI Use Indicators and Aggregate Professional Experience Variables (Users Only)

	MugalimAI use duration	MugalimAI use times per week	MugalimAI use hours per week	Workload 1.1 Total hours spent on work	Workload 1.2 Hours spent on teaching	Workload 1.3 Hours spent on work during out of school hours	Perceived Workload	Self- Efficacy	Job Satisfaction
MugalimAI use times per week	.34 *	—							
MugalimAI use hours per week	.29	.77 ***	—						
Workload 1.1 Total hours spent on work	-.01	.15	.04	—					
Workload 1.2 Hours spent on teaching	.15	.21	.16	.58 ***	—				
Workload 1.3 Hours spent on work during out of school hours	.05	.15	.03	.58 ***	.41 **	—			
Perceived workload	.06	-.13	-.16	.22	.24	.10	—		
Self-Efficacy	.03	.11	.20	-.04	.03	.13	-.31	—	
Job Satisfaction	-.10	.21	.02	.08	.19	.16	-.23	.55 ***	—

Note. * $p < .05$, ** $p < .01$, *** $p < .001$

Following the analysis of aggregate indicators, correlations were further examined at the level of subcomponents to explore whether more specific patterns of association could be identified (see Table 5). No statistically significant associations were observed between MugalimAI use indicators for duration and frequency of use and any of the workload, self-efficacy, and job satisfaction subcomponents ($p > .05$). Overall, these findings indicate that the extent of MugalimAI use was not associated with specific aspects of perceived workload, self-efficacy, and job satisfaction among platform users.

Taken together, the correlational analyses conducted at both the aggregate and subcomponent levels provided consistent evidence that variation in the extent of MugalimAI use was not systematically associated with differences in teachers' professional experience. Neither the duration nor the frequency of platform use demonstrated meaningful relationships with workload, self-efficacy, or job satisfaction among platform users. These results suggest that greater intensity of platform engagement was not linked to either overall or specific aspects of teachers' professional experience within the user subsample.

Table 5

Spearman's Rank-Order Correlations Between MugalimAI Use Indicators and Workload, Self-Efficacy, and Job Satisfaction Subcomponents (Users Only)

	MugalimAI Use		
	Use duration	Frequency (times/week)	Frequency (hours/week)
Workload			
<i>WL1 Time pressure / overtime necessity</i>	-.09	-.01	-.04
<i>WL2 Perceived workload intensity</i>	.12	-.19	-.23
<i>WL3 Work-life imbalance</i>	.10	-.16	-.10
Self-Efficacy			
<i>SE1 Instructional strategies SUM</i>	-.03	.18	.16
<i>SE2 Classroom management SUM</i>	-.09	-.11	-.04
<i>SE3 Student engagement SUM</i>	.13	.10	.12
Job Satisfaction			
<i>JS1 Global satisfaction</i>	.07	.17	-.04
<i>JS2 Professional purpose and pride SUM</i>	-.06	.17	.00
<i>JS3 Emotional engagement with work SUM</i>	-.15	.21	.05

Note. All $p > .05$

RQ2. Differences Between MugalimAI Users and Non-Users in Professional Experience

This subsection addresses RQ2 by examining how teachers who use MugalimAI differ from those who do not in terms of their professional experience. Group comparison analyses were conducted to compare MugalimAI users and non-users across key professional experience dimensions, including workload, self-efficacy, and job satisfaction. To provide a comprehensive assessment, differences were examined at two levels: using aggregate indicators representing overall levels of each construct, and the level of individual subcomponents to capture more fine-grained group differences. Together, these analyses allow for an integrated evaluation of whether and how platform use is associated with variations in teachers' professional experience. Group comparison analyses were conducted using the full analytical sample after applying workload-related data filters ($n = 154$).

Assumptions of normality of distributions and homogeneity of variances were assessed before conducting group comparisons at both the aggregate and subcomponent levels (see Table 6). Homogeneity of variances was examined using Levene's test, while normality was assessed using the Shapiro-Wilk test.

Table 6

Tests of Homogeneity of Variance (Levene's) and Normality (Shapiro-Wilk) for Aggregate Professional Experience Indicators and Their Subcomponents

	<i>Homogeneity Tests (Levene's)</i>				<i>Normality Tests (Shapiro-Wilk)</i>	
	F	df	df2	p	W	p
Workload 1.1 Total hours spent on work	0.11	1	152	.740	.98	.016
Workload 1.2 Hours spent on teaching	0.61	1	152	.438	.99	.272
Workload 1.3 Hours spent on work during out of school hours	6.99	1	152	.009	.95	<.001
Perceived Workload	0.19	1	133	.666	.98	.043
<i>WL1 Time pressure / overtime necessity</i>	0.02	1	149	.888	.95	<.001
<i>WL2 Perceived workload intensity</i>	1.85	1	141	.176	.95	<.001
<i>WL3 Work-life imbalance</i>	0.50	1	135	.483	.96	<.001
Self-Efficacy	1.14	1	139	.287	.97	.002
<i>SE1 Instructional strategies SUM</i>	2.64	1	149	.106	.98	.025
<i>SE2 Classroom management SUM</i>	0.59	1	146	.442	.97	.001
<i>SE3 Student engagement SUM</i>	0.24	1	143	.628	.98	.051
Job Satisfaction	1.09	1	140	.298	.97	.008
<i>JS1 Global satisfaction</i>	0.81	1	145	.370	.95	<.001
<i>JS2 Professional purpose and pride SUM</i>	1.42	1	142	.235	.96	<.001
<i>JS3 Emotional engagement with work SUM</i>	1.53	1	142	.219	.96	<.001

Note. A low p-value suggests a violation of the assumption of equal variances

At the aggregate level, the results indicated that the assumptions of both normality and homogeneity of variances were satisfied only for hours spent on teaching (Workload 1.2) (Shapiro-Wilk = .99, $p = .272$; Levene's test = .61, $p = .438$). Therefore, an independent-samples Student's t-test was applied for this comparison. For total hours spent on work, hours spent on work outside school hours, overall perceived workload, self-efficacy, and job satisfaction, the assumptions of normality and/or homogeneity were violated (Shapiro-Wilk $p < .05$; Levene's test $p < .05$ where applicable). Consequently, nonparametric Mann-Whitney U tests were used for these comparisons.

At the subcomponent level, the results of Levene's test indicated that the assumption of equal variances was met for all workload, self-efficacy, and job satisfaction subcomponents, as all p-values exceeded .05. However, the Shapiro-Wilk test showed that the assumption of normality was violated for most subcomponents ($p < .05$), with the exception of the student engagement self-efficacy subcomponent (SE3), which approached normality ($p = .051$). Accordingly, nonparametric Mann-Whitney U tests were used for most subcomponent comparisons, whereas an independent-samples Student's t-test was applied for the student engagement self-efficacy subcomponent, where assumptions were approximately met.

Workload

Results of group comparisons for workload indicators at both the aggregate and subcomponent levels are presented in Table 7. Corresponding descriptive statistics for users and non-users are provided in Table 8.

Regarding total hours spent on work per week (Workload 1.1), a statistically significant difference between users ($M = 24.56$, $SD = 16.24$) and non-users ($M = 37.60$, $SD = 16.11$), $U = 1524.50$, $p < .001$, rank-biserial $r = 0.46$. Overall, teachers who did not

use MugalimAI reported spending more total hours on work per week than those who used the platform. The effect size indicated a modest effect.

A statistically significant difference was also found for hours spent on teaching activities (Workload 1.2), with users reporting lower values ($M = 16.37$, $SD = 9.92$) compared to non-users ($M = 22.19$, $SD = 9.33$), $t(152) = -3.67$, $p < .001$, Cohen's $d = -0.61$. Non-users reported spending more time on teaching activities than MugalimAI users. The effect size indicated a moderate effect.

Similarly, for hours spent on work outside school hours (Workload 1.3), the analysis revealed a statistically significant difference between users ($M = 8.98$, $SD = 6.19$) and non-users ($M = 12.76$, $SD = 8.49$), $U = 2062.50$, $p = .006$, rank-biserial $r = 0.26$. Overall, teachers who did not use MugalimAI reported spending more time on work outside school hours than those who used the platform. The effect size reflected a modest effect.

At the aggregate level, results for overall perceived workload showed a statistically significant difference between users ($M = 7.71$, $SD = 3.12$) and non-users ($M = 9.54$, $SD = 3.11$), $U = 1470.00$, $p = .002$, rank-biserial $r = 0.32$. Overall, MugalimAI users reported lower overall perceived workload scores than non-users. The effect size suggested a modest effect.

At the subcomponent level, statistically significant differences were observed for time pressure and the necessity to work overtime (WL1). Users reported lower levels ($M = 2.58$, $SD = 1.25$) compared to non-users ($M = 3.19$, $SD = 1.27$), $U = 1957.50$, $p = .005$, rank-biserial $r = 0.27$, reflecting a modest effect. These results suggest that teachers who used MugalimAI reported lower levels of time pressure and need for overtime work compared to non-users.

For perceived workload intensity (WL2), no statistically significant difference was found between users ($M = 2.57$, $SD = 1.18$) and non-users ($M = 3.03$, $SD = 1.35$), $U = 1946.50$, $p = .052$, rank-biserial $r = 0.19$. This result suggests that the groups did not differ significantly in their perceptions of workload intensity.

Finally, a statistically significant difference emerged for work-life imbalance (WL3), with users reporting lower levels ($M = 2.52$, $SD = 1.16$) than non-users ($M = 3.25$, $SD = 1.12$), $U = 1468.00$, $p < .001$, rank-biserial $r = 0.34$. The effect size was modest, indicating that MugalimAI users experienced less imbalance between work and personal life.

The findings suggest that teachers who used MugalimAI tended to report lower workload across multiple dimensions at both the aggregate and subcomponent levels. Specifically, users reported fewer total hours spent on work (Workload 1.1), fewer hours devoted to teaching activities (Workload 1.2), and less time spent working outside school hours (Workload 1.3). At the aggregate level of perceived workload, a statistically significant difference was also observed for overall perceived workload, with users reporting lower scores compared to non-users. At the level of perceived workload subcomponents, significant differences were found for time pressure and the necessity to work overtime (WL1) as well as for work-life imbalance (WL3), with MugalimAI users reporting lower levels on both indicators. In contrast, no statistically significant difference between users and non-users was found for perceived workload intensity (WL2).

Table 7

Group Differences in Aggregate and Subcomponent Workload Measures Between MugalimAI Users and Non-Users

		Statistic	df	p	Mean difference	SE difference	Effect Size
Workload 1.1 Total hours spent on work	Mann-Whitney U	1524.50		< .001	-15.00		Rank biserial correlation 0.46
Workload 1.2 Hours spent on teaching	Student's t	-3.67	152.00	< .001	-5.82	1.59	Cohen's d -0.61
Workload 1.3 Hours spent on work during out of school hours	Mann-Whitney U	2062.50		.006	-3.00		Rank biserial correlation 0.26
Perceived Workload	Mann-Whitney U	1470.00		.002	-2.00		Rank biserial correlation 0.32
<i>WL1 Time pressure / overtime necessity</i>	Mann-Whitney U	1957.50		.005	-1.00		Rank biserial correlation 0.27
<i>WL2 Perceived workload intensity</i>	Mann-Whitney U	1946.50		.052	-0.00		Rank biserial correlation 0.19
<i>WL3 Work-life imbalance</i>	Mann-Whitney U	1468.00		< .001	-1.00		Rank biserial correlation 0.34

Note. $H_a: \mu_{\text{User}} \neq \mu_{\text{Non-user}}$

Table 8

Descriptive Statistics for Aggregate and Subcomponent Workload Indicators by MugalimAI Use Group

	Group	N	Mean	Median	SD	SE
Workload 1.1 Total hours spent on work	User	59	24.56	20.00	16.24	2.11
	Non-user	95	37.60	37.00	16.11	1.65
Workload 1.2 Hours spent on teaching	User	59	16.37	16.00	9.92	1.29
	Non-user	95	22.19	22.00	9.33	0.96
Workload 1.3 Hours spent on work during out of school hours	User	59	8.98	7.00	6.19	0.81
	Non-user	95	12.76	10.00	8.49	0.87
Perceived Workload	User	52	7.71	7.50	3.12	0.43
	Non-user	83	9.54	9.00	3.11	0.34
<i>WL1 Time pressure / overtime necessity</i>	User	57	2.58	3.00	1.25	0.17
	Non-user	94	3.19	3.00	1.27	0.13
<i>WL2 Perceived workload intensity</i>	User	54	2.57	2.50	1.18	0.16
	Non-user	89	3.03	3.00	1.35	0.14
<i>WL3 Work-life imbalance</i>	User	54	2.52	2.50	1.16	0.16
	Non-user	83	3.25	3.00	1.12	0.12

Self-Efficacy

Group comparison results and descriptive statistics for self-efficacy are presented in Tables 9 and 10.

At the aggregate level, the analysis indicated a statistically significant difference in overall self-efficacy between MugalimAI users ($M = 80.59$, $SD = 12.17$) and non-users ($M = 75.62$, $SD = 13.18$), $U = 1761.00$, $p = .022$, rank-biserial $r = 0.23$. Overall, teachers who used MugalimAI reported higher levels of self-efficacy than those who did not. The observed difference was associated with a modest effect size.

At the level of self-efficacy subcomponents, no statistically significant difference was found for instructional strategies self-efficacy (SE1) between users ($M = 26.75$, $SD = 4.50$) and non-users ($M = 25.35$, $SD = 5.37$), $U = 2230.00$, $p = .063$, rank-biserial $r = 0.18$.

In contrast, a statistically significant difference emerged for classroom management self-efficacy (SE2), with users reporting higher scores ($M = 27.96$, $SD = 4.88$) than non-users ($M = 25.85$, $SD = 5.35$), $U = 1857.50$, $p = .006$, rank-biserial $r = 0.27$. These findings suggest that teachers who used MugalimAI reported higher classroom management self-efficacy than those who did not. The effect size was modest.

Similarly, for student engagement self-efficacy (SE3), the results revealed a statistically significant difference between users ($M = 26.26$, $SD = 4.96$) and non-users ($M = 24.33$, $SD = 4.93$), $t(143) = 2.27$, $p = .024$, Cohen's $d = 0.39$, indicating higher levels among MugalimAI users. The effect size was modest.

In general, the findings indicate higher overall self-efficacy among MugalimAI users, with group differences evident in classroom management (SE2) and student engagement (SE3), while instructional strategies self-efficacy (SE1) did not differ significantly between groups.

Table 9

Group Differences in Aggregate and Subcomponent Self-Efficacy Measures Between MugalimAI Users and Non-Users

		Statistic	df	p	Mean difference	SE difference	Effect Size
Self-Efficacy	Mann-Whitney U	1761.00		.022	4.00		Rank biserial correlation 0.23
<i>SE1 Instructional strategies SUM</i>	Mann-Whitney U	2230.00		.063	2.00		Rank biserial correlation 0.18
<i>SE2 Classroom management SUM</i>	Mann-Whitney U	1857.50		.006	2.00		Rank biserial correlation 0.27
<i>SE3 Student engagement SUM</i>	Student's t	2.27	143.00	.024	1.94	0.85	Cohen's d 0.39

Note. $H_a: \mu_{\text{User}} \neq \mu_{\text{Non-user}}$

Table 10

Descriptive Statistics for Aggregate and Subcomponent Self-Efficacy Indicators by MugalimAI Use Group

	Group	N	Mean	Median	SD	SE
Self-Efficacy	User	51	80.59	84.00	12.17	1.70
	Non-user	90	75.62	78.00	13.18	1.39
<i>SE1 Instructional strategies SUM</i>	User	59	26.75	28.00	4.50	0.59
	Non-user	92	25.35	25.00	5.37	0.56
<i>SE2 Classroom management SUM</i>	User	54	27.96	28.00	4.88	0.66
	Non-user	94	25.85	26.00	5.35	0.55
<i>SE3 Student engagement SUM</i>	User	53	26.26	28.00	4.96	0.68
	Non-user	92	24.33	24.00	4.93	0.51

Job Satisfaction

Results of group comparisons for job satisfaction indicators at both the aggregate and subcomponent levels are presented in Table 11, while descriptive statistics for users and non-users are provided in Table 12.

At the aggregate level, the results showed a statistically significant difference in overall job satisfaction between MugalimAI users ($M = 10.80$, $SD = 2.88$) and non-users ($M = 9.14$, $SD = 3.16$), $U = 1637.50$, $p = .002$, rank-biserial $r = 0.31$. Overall, teachers who used MugalimAI reported higher levels of job satisfaction than those who did not. The effect size indicated a modest effect.

At the subcomponent level, statistically significant differences were observed across all job satisfaction indicators. For global job satisfaction (JS1), users reported higher scores ($M = 2.21$, $SD = 0.77$) than non-users ($M = 1.67$, $SD = 0.83$), $U = 1663.50$, $p < .001$, rank-biserial $r = 0.35$, reflecting a modest effect.

Similarly, a statistically significant difference emerged for professional purpose and pride (JS2), with users reporting higher levels ($M = 4.56$, $SD = 1.17$) compared to non-users ($M = 3.96$, $SD = 1.39$), $U = 1840.00$, $p = .010$, rank-biserial $r = 0.25$, reflecting a modest effect.

Finally, for emotional engagement with work (JS3), the results also indicated a statistically significant difference between users ($M = 4.06$, $SD = 1.31$) and non-users ($M = 3.52$, $SD = 1.33$), $U = 1826.50$, $p = .010$, rank-biserial $r = 0.25$. These findings suggest that MugalimAI users reported higher emotional engagement with their work compared to non-users. The effect size was modest.

Table 11

Group Differences in Aggregate and Subcomponent Job Satisfaction Measures Between MugalimAI Users and Non-Users

		Statistic	p	Mean difference		Effect Size
Job Satisfaction	Mann-Whitney U	1637.50	.002	2.00	Rank biserial correlation	0.31
<i>JS1 Global satisfaction</i>	Mann-Whitney U	1663.50	< .001	1.00	Rank biserial correlation	0.35
<i>JS2 Professional purpose and pride SUM</i>	Mann-Whitney U	1840.00	.010	1.00	Rank biserial correlation	0.25
<i>JS3 Emotional engagement with work SUM</i>	Mann-Whitney U	1826.50	.010	1.00	Rank biserial correlation	0.25

Note. $H_a: \mu_{\text{User}} \neq \mu_{\text{Non-user}}$

Table 12

Descriptive Statistics for Aggregate and Subcomponent Job Satisfaction Indicators by MugalimAI Use Group

	Group	N	Mean	Median	SD	SE
Job Satisfaction	User	54	10.80	11.00	2.88	0.39
	Non-user	88	9.14	10.00	3.16	0.34
<i>JS1 Global satisfaction</i>	User	57	2.21	2.00	0.77	0.10
	Non-user	90	1.67	2.00	0.83	0.09
<i>JS2 Professional purpose and pride SUM</i>	User	55	4.56	4.00	1.17	0.16
	Non-user	89	3.96	4.00	1.39	0.15
<i>JS3 Emotional engagement with work SUM</i>	User	54	4.06	4.00	1.31	0.18
	Non-user	90	3.52	4.00	1.33	0.14

Overall, the findings indicate that MugalimAI users reported higher job satisfaction at both the aggregate level and across all examined subcomponents, including global satisfaction (JS1), professional purpose and pride (JS2), and emotional engagement with work (JS3).

Taken together, the results of the group comparison analyses indicate systematic differences between teachers who used MugalimAI and those who did not across several dimensions of professional experience. Platform users tended to report lower workload across multiple dimensions, including fewer total working hours, reduced time spent on teaching activities and work outside school hours, as well as lower overall perceived workload. At the level of perceived workload subcomponents, users also reported lower time pressure and work-life imbalance, while no significant group difference was observed in perceived workload intensity. In contrast, MugalimAI users demonstrated higher levels of self-efficacy overall, with group differences particularly evident in classroom management and student engagement, whereas instructional strategies self-efficacy did not differ significantly between users and non-users. Furthermore, users consistently reported higher job satisfaction both at the aggregate level and across all examined subcomponents, including global satisfaction, professional purpose and pride, and emotional engagement with work.

Summary

This chapter examined the relationships between MugalimAI use and teachers' professional experience, as well as differences between teachers who use the platform and those who do not. Addressing the two research questions through complementary analytical approaches allowed for a comprehensive assessment of both associations and group-level differences across workload, self-efficacy, and job satisfaction.

The findings related to RQ1 indicated that the duration and frequency of MugalimAI use were not significantly associated with teachers' professional experience. Neither aggregate indicators nor subcomponent-level analyses revealed statistically significant relationships between platform use and workload, self-efficacy, or job satisfaction.

In contrast, the findings addressing RQ2 revealed systematic and statistically significant differences between MugalimAI users and non-users. Teachers who used the platform reported lower workload, reduced time pressure and work-life imbalance, and higher levels of self-efficacy and job satisfaction. These differences were evident at both the aggregate level and across multiple subcomponents, with effect sizes ranging from small to moderate. Together, these results point to coherent and meaningful differences in professional experience between users and non-users, even in the absence of direct correlations between intensity of use and outcome variables.

The next chapter offers a structured interpretation of these findings in relation to prior research and the Job Demands-Resources framework, addressing both the absence of intensity-related effects within the user group and the broader pattern of differences between users and non-users across workload, self-efficacy, and job satisfaction.

Chapter 5: Discussion

This chapter discusses the findings of the study in relation to the existing empirical literature and the Job Demands-Resources (JD-R) model, which served as the guiding theoretical framework. The study examined how the use of the MugalimAI platform is associated with teachers' professional experience in Kyrgyzstan, conceptualized through three key dimensions: workload, self-efficacy, and job satisfaction.

The discussion interprets the results obtained from two complementary analytical approaches. First, correlational analyses conducted within the subsample of platform users explored whether the duration and frequency of MugalimAI use were associated with variations in professional experience outcomes. Second, group comparison analyses examined how teachers who used the platform differed from non-users across the three dimensions of professional experience. Together, these findings provide a nuanced understanding of how AI-supported lesson-planning tools may function as professional resources in a post-Soviet educational context.

The chapter begins with an overview of the key findings, followed by an interpretation of the null correlational results within the user group (RQ1) and the systematic differences between users and non-users (RQ2). Each dimension of professional experience is discussed in relation to prior research and the theoretical framework, with particular attention to alternative explanations and the limitations of causal inference.

Overview of Key Findings

The study produced a nuanced picture of the relationship between MugalimAI use and teachers' professional experience. Two sets of findings emerged that, taken together, tell a coherent story about how AI adoption in education may operate in a low- and middle-income, post-Soviet context.

First, in response to RQ1—how the use of MugalimAI is related to teachers’ professional experience—correlational analyses among platform users revealed no statistically significant associations between platform use duration or frequency and teachers’ workload, self-efficacy, or job satisfaction, either at the aggregate or subcomponent level. This null finding stands alongside a notable exception: within the user subsample, a strong and significant positive correlation was found between self-efficacy and job satisfaction, suggesting that among teachers who already use MugalimAI, those who feel more professionally capable also report greater job satisfaction.

Second, in response to RQ2—how MugalimAI users differ from non-users—group comparison analyses revealed systematic and statistically significant differences across all three dimensions of professional experience. Compared to non-users, teachers who used MugalimAI reported fewer total working hours, fewer hours spent on teaching, and less work during out-of-school hours. They also reported lower levels of perceived overall workload, including reduced time pressure and work-life imbalance. At the same time, users demonstrated higher overall self-efficacy, particularly in classroom management and student engagement, and higher job satisfaction across all examined subcomponents. These differences were consistent in direction and associated with modest and moderate but practically meaningful effect sizes.

Together, these two sets of findings, null correlational results within users alongside significant group-level differences between users and non-users, call for careful and nuanced interpretation.

RQ1: The Absence of Intensity-Related Relationships Within the User Group

Interpreting the Null Correlation Findings

Several studies have suggested that AI-supported tools can contribute to reduced workload and increased efficiency in lesson planning and administrative tasks (Acevedo,

2025; Belloula, 2025; Hashem et al., 2024; Karpouzis et al., 2024; van den Berg & Du Plessis, 2023; Varuvel Dennison et al., 2025). Other research has linked AI engagement with higher levels of teacher self-efficacy and professional confidence (Eun & Kim, 2024; Lu et al., 2024), as well as greater job satisfaction (Shah et al., 2024; Prasad & Pasupathi, 2025). Based on this body of literature and the JD-R framework, it was theoretically expected that more intensive engagement with MugalimAI, reflected in longer duration of use and higher weekly frequency, would be associated with lower workload and higher levels of self-efficacy and job satisfaction. However, the findings related to RQ1 did not support these expectations.

Nevertheless, the absence of significant correlations between MugalimAI use intensity and professional outcomes among users is a substantively important finding that requires careful interpretation rather than dismissal. A simplistic reading might suggest that the platform has no impact on teacher outcomes; however, this interpretation overlooks several theoretically grounded and methodologically reasonable alternative explanations.

The most plausible interpretation is the existence of a threshold effect. Within the user group, even minimal engagement with MugalimAI may already allow teachers to experience some benefits, particularly workload reduction associated with automated lesson planning. Once teachers begin using the platform regularly enough to experience its core affordances, additional hours or sessions per week may yield diminishing returns. This mirrors evidence from other technology and innovation contexts, where the relationship between intensity of AI implementation and performance follows an inverted U-shape, with benefits plateauing or even declining after a certain threshold of engagement (Gong et al., n.d.). Under this explanation, the null correlations within the user group are

not evidence that the platform lacks impact; they are consistent with a model in which the most decisive variable is whether a teacher uses the platform at all, not how much.

A second explanation concerns what the current indicators actually capture. In this study, platform use was operationalized through duration and frequency. However, empirical research has shown that the impact of AI-supported tools depends not only on how frequently they are used but also on how they are integrated into practice and which tasks they support (Kwak, 2025). Even when teachers report similar frequency of platform use, they may engage with MugalimAI in different ways. Some may rely on the platform for comprehensive lesson planning, including structured lesson plans and instructional materials, while others may use it for more limited purposes, such as reviewing activity ideas or preparing individual lesson components. This variation in patterns of use highlights the importance of considering the quality and depth of technology integration. Prior research indicates that the effectiveness of AI-based educational tools is not uniform but varies depending on classroom conditions, patterns of pedagogical integration, and the instructional domains in which the technology is employed (Kwak, 2025). Taken together, these considerations indicate that differences in how teachers use the platform may influence professional outcomes independently of usage frequency. This suggests that future operationalizations of AI use should move beyond frequency-based indicators.

The Self-Efficacy–Job Satisfaction Link Among Users

One significant finding within the user group deserves particular attention: the strong positive correlation between self-efficacy and job satisfaction ($r_s = .55, p < .001$). This relationship, which is independent of platform use intensity, aligns closely with the interrelational dynamics described in the literature. Mei and Mustapha (2024) identified teacher self-efficacy as a robust predictor of job satisfaction, theorizing that confidence in one's instructional abilities contributes to a deeper sense of professional fulfillment. The

present findings replicate this pattern within the specific context of Kyrgyzstani teachers who use MugalimAI, strengthening the cross-cultural generalizability of this relationship and suggesting that even in an AI-mediated professional context, the classical linkage between competence beliefs and satisfaction holds.

This finding also has indirect implications for understanding how MugalimAI may be associated with teacher well-being. If the platform may contribute to self-efficacy, a question addressed more directly in the group comparison results, its downstream effect on job satisfaction may be partially mediated through this pathway. This interpretation is consistent with the JD-R model's conceptualization of personal resources as buffers against job demands and facilitators of positive outcomes (Granziera et al., 2021). This pattern further reinforces the interpretation that the benefits associated with platform use may operate indirectly through personal resource mechanisms.

RQ2: Systematic Differences Between MugalimAI Users and Non-Users

Workload

The group comparison analyses revealed that MugalimAI users reported substantially lower workloads than non-users across multiple dimensions, including fewer total working hours ($M = 24.56$ vs. $M = 37.60$), fewer hours on teaching activities ($M = 16.37$ vs. $M = 22.19$), and fewer out-of-school working hours ($M = 8.98$ vs. $M = 12.76$). In addition to these objective indicators, users also reported lower overall perceived workload (Overall Perceived Workload). At the subcomponent level, they indicated lower time pressure and overtime necessity (WL1) as well as better work-life balance (WL3), whereas perceived workload intensity (WL2) did not differ significantly between groups.

These findings are broadly consistent with international evidence on AI-supported lesson planning. Varuvel Dennison et al. (2025), in a large-scale study involving over

1,000 teachers in India, found that AI-assisted planning saved teachers an average of two hours per week. Acevedo (2025) reported even larger differences in a West Texas study, where AI-using teachers spent roughly 7-10 hours per week on administrative and planning tasks compared to 15-17.5 hours among non-users. The magnitudes observed in the present study, namely approximately 13 fewer total working hours and 4 fewer hours on out-of-school work, fall within or exceed these international benchmarks, underscoring MugalimAI's potential as an effective workload management resource in the Kyrgyzstani context.

The absence of a significant difference in perceived workload intensity (WL2) is noteworthy and merits reflection. Workload intensity, which captures the subjective sense that one's work is demanding and difficult to manage, may be less responsive to time savings than other workload indicators. Even if AI tools reduce the number of hours spent on lesson planning, the remaining hours may still feel cognitively demanding due to student behavioral challenges, classroom management pressures, or administrative requirements that fall outside the platform's scope. This interpretation is consistent with the broader understanding that AI tools are more likely to support routine planning and administrative functions, while the most cognitively demanding aspects of teaching, such as classroom interaction, relationship management, and formative assessment, remain largely human-driven (Hafen et al., 2015). Thus, while MugalimAI may contribute to reducing the time burden of teaching, it may not yet address the qualitative intensity of the work itself.

An important alternative explanation for the workload differences must be acknowledged: teachers who use MugalimAI may simply teach fewer hours than non-users, independent of any platform effect. Users reported not only lower perceived workload but also substantially fewer total and teaching hours per week ($M = 24.56$ vs.

$M = 37.60$, and $M = 16.37$ vs. $M = 22.19$, respectively). If users hold part-time positions, teach fewer classes, or work in schools with lighter timetables, their lower workload perceptions may reflect structural employment differences rather than the platform's impact. The study's cross-sectional design cannot disentangle these possibilities, as no data were collected on contract type, teaching load allocation, or school-level scheduling practices. This represents a meaningful limitation that warrants explicit acknowledgment.

Notwithstanding this caveat, several features of the data are more consistent with a platform effect than with a purely structural explanation. First, the differences in out-of-school working hours, a domain over which contract type has less direct bearing, remain significant ($M = 8.98$ vs. $M = 12.76$). Teachers typically have some discretion over how much work they carry home, and a reduction in this boundary-crossing is more plausibly linked to efficiency gains from lesson planning automation than to formal timetabling differences. Second, the perceived workload subcomponent findings (WL1 and WL3) involve subjective judgments about time pressure and work-life balance rather than raw hours, and these too differ significantly between groups. A teacher who works fewer contracted hours would not necessarily report lower time pressure or better work-life balance unless they also experienced fewer competing demands. Third, the differences in self-efficacy and job satisfaction, which have no obvious structural link to weekly teaching hours, point in the same direction as the workload findings and suggest a broader and more coherent pattern of professional well-being that extends beyond hours worked. Together, these considerations support retaining the platform-as-resource interpretation alongside the structural alternative, while acknowledging that the study cannot adjudicate definitively between them.

From the perspective of the JD-R model, these workload findings support the conceptualization of MugaliMAI as a job resource that directly mitigates a central job

demand: the time pressure and administrative load that research consistently links to teacher burnout and attrition (Nguyen & Kremer, 2022). The significant reduction in out-of-school working hours is particularly meaningful, as this spillover of work into personal time is a primary driver of work-life imbalance and emotional exhaustion among teachers (Demerouti et al., 2001). The results suggest that platform use may be linked to a lower spillover of work into personal time, which is an important dimension of teacher well-being.

Self-Efficacy

MugalimAI users reported significantly higher overall self-efficacy than non-users ($M = 80.59$ vs. $M = 75.62$), with the difference concentrated in classroom management (SE2) and student engagement (SE3) rather than in instructional strategies (SE1). This pattern warrants careful interpretation.

The significant difference in classroom management self-efficacy among users is not immediately intuitive for a lesson planning platform, since MugalimAI does not directly address classroom behavior management. A plausible explanation lies in a spillover effect: teachers who enter the classroom with well-structured, curriculum-aligned lesson plans generated by MugalimAI may feel more prepared and in control, which can translate into greater confidence in managing the classroom environment. Research shows that perceived preparedness is a key antecedent of classroom management efficacy (Giallo & Little, 2003). When teachers are not mentally preoccupied with planning inadequacies or improvising instructional sequences, they are likely better positioned to attend to student behavior and maintain an organized learning environment.

Similarly, higher student engagement self-efficacy among users may reflect the indirect pedagogical benefits of AI-assisted planning. MugalimAI is claimed to generate lesson plans that emphasize student-centered, interactive activities aligned with modern

pedagogical frameworks (MugaliAI, n.d.). Regular exposure to such designs may be associated with a broader repertoire of engagement strategies, increasing their confidence in motivating students and fostering active participation. This interpretation resonates with Lu et al.'s (2024) finding that AI-assisted planning helped preservice teachers anticipate instructional challenges and prepare more effectively for classroom interaction, thereby strengthening their teaching confidence.

The absence of a significant difference in instructional strategies self-efficacy (SE1) between users and non-users is arguably the most analytically interesting of the self-efficacy findings. A possible explanation is that instructional strategies self-efficacy is relatively stable and shaped by years of professional experience and formal training, qualities less amenable to change through platform use alone. Given that the sample was predominantly experienced teachers (77% with more than 8 years of experience), many may already have strong foundational confidence in their pedagogical approaches, leaving less room for the platform to make an additional difference. This ceiling effect hypothesis is consistent with the general pattern in self-efficacy research, where highly experienced professionals show less variability in efficacy beliefs tied to core domain competencies (Roberts et al., 2001).

Viewed through the present study's conceptual framework, these self-efficacy findings support the framework's proposition that job resources, including AI tools, may be linked to the reinforcement of personal resources. The observed differences are consistent with the possibility that the use of AI-supported planning tools may be related to higher perceived professional confidence in areas that are closely linked to their daily interaction with students rather than to pedagogical knowledge per se. This is a meaningful distinction: it suggests that the platform's possible contribution to self-efficacy operates

through preparation and classroom-readiness mechanisms rather than through the transmission of subject matter or instructional knowledge, which teachers already possess.

Job Satisfaction

Perhaps the most striking and practically significant finding of the study is the consistent pattern of higher job satisfaction among MugalimAI users across all examined dimensions: overall satisfaction (Overall Job Satisfaction), global content with teaching (JS1), professional purpose and pride (JS2), and emotional engagement with work (JS3). The effect size for overall job satisfaction (rank-biserial $r = 0.31$) was among the largest observed in the study, and the consistency across all subcomponents, rather than only some, suggests a genuine and multifaceted possible association between platform use and teacher well-being.

The finding on professional purpose and pride (JS2) is particularly notable. This dimension captures the sense that teaching is meaningful, worthwhile, and a source of personal pride, a deeply intrinsic form of job satisfaction that is not typically susceptible to surface-level changes in working conditions. Its elevation among MugalimAI users suggests that the platform's benefits may extend beyond mere administrative convenience to touch teachers' sense of professional identity and vocation. One possible mechanism is that by reducing administrative burdens and freeing time for instructional activities, MugalimAI allows teachers to spend more of their working day on the parts of teaching they find most meaningful, which are direct engagement with students, creative curriculum planning, and authentic pedagogical work. Research in occupational psychology, using Self-determination Theory (Deci & Ryan, 1985), consistently shows that autonomy over meaningful tasks is a powerful driver of intrinsic motivation and vocational pride (Galletta et al., 2011; Ye et al., 2025).

The higher emotional engagement with work (JS3) among users further corroborates this interpretation. Emotional engagement encompasses enthusiasm, inspiration, and the sense that one's work is energizing rather than depleting. If MugalimAI is associated with the cognitive and temporal drain of lesson preparation and administrative documentation, teachers may have more emotional capacity to invest in the human dimensions of their work, namely student relationships, professional collaboration, and reflective practice. This aligns with the broader prediction of the JD-R model: when job demands are moderated by effective resources, the energy that would otherwise be consumed by coping with demands becomes available for engagement and growth (Demerouti et al., 2001).

These job satisfaction findings are consistent with international evidence. Shah et al. (2024), in a study of university faculty in Pakistan, found that access to AI-based job resources was strongly positively associated with job satisfaction ($r = .65$), with better work-life balance identified as a key mediating factor. Prasad and Pasupathi (2025), examining AI-powered classroom assistants in India, demonstrated that workload management and instructional autonomy were significant predictors of satisfaction. The present study's findings from Kyrgyzstan extend this evidence base to a new geographic and institutional context, providing cross-cultural support for the proposition that AI tools can meaningfully improve teachers' professional well-being.

Self-Selection, Causality, and Alternative Explanations

A critical analytical consideration in interpreting the RQ2 findings concerns the direction of causality and the possibility of self-selection bias. Because the study employed a cross-sectional, non-experimental design, no causal claims can be made. The observed differences between users and non-users could reflect the possible effects of MugalimAI

use on teacher outcomes, as the JD-R framework predicts, but they could also reflect pre-existing differences between the two groups.

Specifically, teachers who voluntarily adopt a paid AI platform may differ systematically from non-adopters in ways that independently predict more positive professional outcomes. Adopters may be more digitally literate, more professionally motivated, more proactively engaged with pedagogical development, or employed in schools with stronger institutional support for technology use. All of these characteristics could plausibly contribute to lower workload perceptions, higher self-efficacy, and greater job satisfaction, independently of whether MugalimAI itself causes these outcomes. Furthermore, as discussed in the workload section, users may also differ from non-users in structural employment terms, holding lighter teaching loads, fewer classes, or more flexible timetables, which could independently account for the observed differences in working hours and perceived time pressure. This self-selection and structural confounds cannot be ruled out with the available data.

However, these alternative explanations do not render the findings uninformative. Several considerations lend plausibility to the interpretation that MugalimAI use contributes to the observed differences beyond selection effects alone. First, the pattern of findings is specific and theoretically coherent. The workload dimensions most closely related to lesson planning, such as time pressure and out-of-school working hours, showed the largest differences between groups. In contrast, perceived workload intensity, which reflects the cognitive demands of teaching that AI tools are less able to address, did not differ significantly. This specificity is more consistent with a platform effect than with a generic motivational or structural advantage among adopters. Second, differences in out-of-school working hours, which is a domain that contract type and formal timetabling do not directly control, remained significant, pointing to discretionary efficiency gains more

plausibly linked to AI-assisted planning. Third, the self-efficacy and job satisfaction differences are consistent in direction with the workload findings, yet have no obvious structural link to weekly teaching hours, suggesting a broader pattern of professional well-being that extends beyond hours worked. Fourth, the findings replicate patterns observed in international studies using experimental or quasi-experimental designs (Lu et al., 2024; Varuvel Dennison et al., 2025), which found directionally consistent effects in more causally credible study designs.

Considered in conjunction with the broader literature, these findings suggest that although self-selection and structural differences between groups cannot be ruled out as alternative explanations, platform use may be meaningfully associated with variation in teachers' professional experiences in the Kyrgyzstani context. The study cannot adjudicate definitively between these explanations, and future longitudinal or quasi-experimental research that controls for employment conditions and pre-existing characteristics could more rigorously address this question.

Summary

This chapter discussed the findings of the study examining how the use of the MugalimAI platform is associated with teachers' professional experience in Kyrgyzstan, conceptualized through workload, self-efficacy, and job satisfaction.

The analysis revealed two key patterns. First, within the group of platform users, the duration and frequency of MugalimAI use were not significantly associated with professional experience indicators. This result suggests that the benefits of AI-supported lesson planning may not follow a simple linear or intensity-based relationship. It may also reflect variation in how teachers integrate the platform into their pedagogical practice, as similar levels of reported use may correspond to qualitatively different patterns of engagement. Taken together, these considerations indicate that access to and meaningful

integration of the platform, rather than the amount of use alone, may be more relevant for understanding differences in professional experience.

Second, systematic differences were observed between users and non-users across all three examined dimensions. Teachers who used MugalinAI reported lower perceived workload, particularly in terms of time pressure and work-life imbalance, higher levels of self-efficacy in classroom management and student engagement, and consistently greater job satisfaction.

These patterns support the interpretation of AI-supported lesson-planning platforms as potential professional resources that may help mitigate specific job demands and reinforce personal resources, thereby contributing to more positive professional experiences. At the same time, the cross-sectional design and the possibility of self-selection bias underscore the need for cautious interpretation and further research using longitudinal or quasi-experimental approaches.

Overall, the findings suggest that AI-supported lesson-planning tools may represent a promising, though not standalone, pathway for improving teachers' professional experience in resource-constrained educational systems undergoing digital transformation.

The following chapter presents the conclusions of the study, synthesizing the key empirical, theoretical, and practical insights, acknowledging the study's limitations, and outlining implications for future research, policy, and practice.

Chapter 6: Conclusion

This research examined how the use of MugalimAI, a locally developed AI-powered lesson-planning platform, is associated with teachers' professional experience in Kyrgyzstan, focusing on three interrelated dimensions: workload, self-efficacy, and job satisfaction. Situated within the broader context of digital transformation in education and guided by the JD-R model, the study addressed an important empirical gap. Although AI is increasingly promoted as a means of improving educational practice, little evidence has been available on how teacher-oriented AI tools relate to the day-to-day professional realities of educators in low- and middle-income, post-Soviet contexts. By focusing on Kyrgyzstan and on a grassroots, locally developed platform rather than a large-scale imported solution, this research contributes context-sensitive evidence to an area that remains underexplored.

Answers to the Research Purpose and Research Questions

The study was guided by two research questions. The first question asked how the use of MugalimAI is related to teachers' professional experience, considering workload, self-efficacy, and job satisfaction. The second question asked in what ways teachers who use MugalimAI differ from those who do not in terms of these professional experience dimensions. To address these questions, the study employed a quantitative, non-experimental, cross-sectional design combining correlational analyses conducted within the user subsample and group comparison analyses between users and non-users.

The findings produced a nuanced but coherent picture. With regard to the first research question, no statistically significant associations were found between the duration or frequency of MugalimAI use and teachers' workload, self-efficacy, or job satisfaction within the user subsample. At both the aggregate and subcomponent levels, more intensive use of the platform was not associated with more favorable professional experience

outcomes. This suggests that the relationship between AI-supported lesson-planning tools and teacher outcomes may not be linear or intensity-based. Rather than increasing proportionally with more frequent or longer use, the benefits of the platform may depend more on access to the tool and its meaningful integration into teachers' routine practice than on the sheer amount of use. At the same time, a strong positive relationship between self-efficacy and job satisfaction was observed among platform users, reinforcing the importance of professional confidence as a core element of teacher well-being.

In contrast, the findings related to the second research question revealed systematic differences between MugalimAI users and non-users. Teachers who used the platform reported lower workload across several indicators, including fewer total working hours, fewer hours spent on teaching activities, less work outside school hours, lower perceived overall workload, lower time pressure, and less work-life imbalance. They also reported higher overall self-efficacy, with statistically significant differences particularly evident in classroom management and student engagement. In addition, MugalimAI users consistently demonstrated higher job satisfaction, both overall and across all examined subcomponents, including global satisfaction, professional purpose and pride, and emotional engagement with work. Although the observed effect sizes were mostly small to moderate, the consistency of the pattern across multiple dimensions makes the findings substantively meaningful.

Taken together, these results suggest that MugalimAI use is associated with more favorable professional experience outcomes, even though greater intensity of use within the user group was not linked to stronger outcomes. This is an important distinction. The study does not support a simple "more use equals more benefit" interpretation. Instead, it points to the possibility that AI-supported lesson-planning tools may function as enabling professional resources once they are adopted and incorporated into practice at a basic,

meaningful level. In this sense, the findings are consistent with a threshold-based rather than dose-dependent interpretation of technology use.

Theoretical Implications: Extending the JD-R Model to AI-Supported Teaching

The present study contributes to the theoretical application of the JD-R model in educational technology research by clarifying how AI-supported tools may function as professional resources in contemporary teaching environments. Building on prior work that conceptualizes administrative workload as a key job demand and access to professional tools as a job resource (Granziera et al., 2021), the findings extend this perspective to the case of AI-assisted lesson planning in a low- and middle-income, post-Soviet educational context.

The study contributes to JD-R theory in three interrelated ways. First, the findings highlight the importance of distinguishing between access to a professional resource and the intensity of its use. The absence of statistically significant associations between the duration and frequency of platform use and professional experience outcomes suggests that the benefits of AI-supported planning may not follow a linear dose-response pattern. Instead, the results are consistent with a threshold interpretation, whereby access to and basic integration of the resource may be sufficient to reduce the gap between job demands and perceived capabilities. This nuance introduces an underexplored dimension into JD-R research by suggesting that the effectiveness of certain resources may depend less on the volume of use and more on whether they are meaningfully incorporated into professional routines.

Second, the findings refine theoretical understanding of the mechanisms through which technological resources may support personal resources, particularly self-efficacy. Rather than directly transforming teachers' pedagogical knowledge or instructional competence, AI-supported lesson planning may operate by enhancing preparedness,

reducing cognitive load during instruction, and structuring pedagogical action. In this sense, the resource may influence professional experience by altering the conditions under which existing competencies are enacted, thereby indirectly strengthening teachers' confidence in managing classroom processes and engaging students. This mechanism-based interpretation aligns with the JD-R model's proposition that job resources can reinforce personal resources through improved task conditions rather than through skill acquisition alone.

Third, the study points to the context-sensitive nature of resource buffering effects. The Kyrgyzstani educational context, characterized by high administrative demands, limited professional development infrastructure, and uneven access to institutional support, provides a setting in which the protective function of job resources may be particularly salient. The findings suggest that AI-supported tools may play a more pronounced role in mitigating workload pressures and supporting professional well-being in environments where alternative forms of support are constrained. This perspective extends JD-R applications beyond highly resourced educational systems and highlights the importance of considering systemic conditions when evaluating the potential impact of technological resources.

Taken together, these theoretical implications suggest that AI-supported planning tools may be conceptualized not only as instruments of efficiency but also as contextually embedded professional resources that reshape the relationship between job demands, personal resources, and professional outcomes.

Contextual Significance and Implications for Practice, Policy, and Platform Development

The findings of this study carry important contextual significance for understanding the role of AI-supported tools in shaping teachers' professional experience

in Kyrgyzstan and similar low- and middle-income educational contexts. In systems characterized by high administrative workload, limited institutional support, and ongoing digital transformation, AI-based lesson-planning platforms may function as accessible and scalable professional resources. The observed associations between MugalimAI use and lower perceived workload, higher self-efficacy, and greater job satisfaction suggest that such tools may represent a promising avenue for supporting teachers' working conditions and professional well-being, even in the absence of comprehensive systemic reforms. Taken together, the patterns discussed above are not only theoretically meaningful but also carry important implications for educational systems undergoing digital transition.

Implications for Educational Practice

At the level of school practice, the findings highlight the potential value of integrating AI-supported planning tools into teachers' routine workflows. Reduced out-of-school working hours and lower perceived time pressure among platform users indicate that AI tools may help teachers manage workload more efficiently and protect personal time, which is widely recognized as critical for sustaining motivation and preventing burnout. In addition, the observed differences in self-efficacy related to classroom management and student engagement suggest that better instructional preparation may indirectly enhance teachers' confidence in handling complex classroom dynamics.

For school leaders, these results point to the importance of creating supportive conditions for the meaningful adoption of educational technologies. This includes providing time for experimentation, encouraging peer exchange on effective platform use, and aligning AI tools with existing pedagogical priorities rather than treating them as isolated technical solutions. Importantly, the absence of intensity-related effects among users suggests that ensuring initial access and basic integration may be more consequential than promoting high-frequency use.

Implications for Education Policy

At the policy level, the findings contribute to ongoing debates about the role of AI in teacher support systems. In contexts where large-scale structural reductions in workload are difficult to implement, AI-enabled tools may represent a cost-effective strategy for mitigating specific job demands, particularly those related to lesson preparation and administrative documentation. Policymakers may therefore consider incorporating AI-based professional resources into broader digital transformation strategies, teacher professional development frameworks, and national initiatives aimed at improving teacher retention and well-being.

However, the results also underscore the need for cautious interpretation. Because the study design does not allow causal conclusions, policy decisions should avoid assuming that AI tools alone can resolve systemic workload challenges. Instead, technology adoption should be embedded within holistic approaches that address teaching load allocation, administrative expectations, and school-level organizational culture.

Implications for Platform Developers

The study also offers actionable insights for developers of AI-supported educational platforms. First, the apparent threshold effect suggests that platforms should prioritize ease of onboarding, intuitive interfaces, and immediate practical value, enabling teachers to experience benefits early in their adoption process. Second, the findings indicate that usage frequency alone may not determine professional outcomes; therefore, developers should focus on supporting qualitatively meaningful integration into pedagogical practice, for example, by providing adaptive lesson design options, contextual recommendations, and tools that facilitate classroom interaction and engagement.

Third, the absence of differences in perceived workload intensity highlights a critical area for future innovation. While current AI tools appear effective in reducing time

demands, they may be less capable of addressing the cognitive and emotional complexity of teaching. Developers may therefore explore features that support formative assessment, differentiated instruction, classroom management strategies, and reflective teaching practices. Such developments could extend the impact of AI tools from administrative efficiency toward deeper pedagogical and professional support.

Overall, the findings suggest that AI-supported lesson-planning platforms have the potential to function as meaningful job and personal resources within the JD-R framework. Their successful integration, however, depends not only on technological design but also on supportive school environments, informed policy strategies, and continuous collaboration between educators and developers.

Limitations of the Study

Several limitations of the present study must be acknowledged when interpreting its findings. These limitations relate to the research design, sampling strategy, measurement approach, and analytical scope.

The most fundamental limitation is the cross-sectional, non-experimental design. Because data were collected at a single point in time and no random assignment was possible, the study cannot establish causal relationships between MugalimAI use and the observed differences in workload, self-efficacy, and job satisfaction. The direction of any effect cannot be determined: although the JD-R framework and the international literature support the interpretation that platform use contributes to better professional outcomes, it is equally possible that teachers who are already more satisfied, more confident, or less burdened are more likely to voluntarily adopt and sustain use of a paid AI tool. Longitudinal and quasi-experimental designs are needed to address this limitation in future research.

Second, the operationalization of platform use through duration and frequency indicators may not adequately capture the quality or depth of engagement. As discussed in the context of the RQ1 null findings, two teachers who report an identical frequency of use may differ substantially in what they actually do with the platform. Future studies would benefit from richer, more granular measures of platform engagement, such as self-reported task types, perceived quality of AI outputs, and degree of output adaptation.

Third, the small subsample available for correlational analyses ($n = 47$) substantially limited statistical power for addressing RQ1. This means that moderate associations between usage intensity and outcome variables, which may exist and be practically meaningful, could not be reliably detected, and the null findings under RQ1 should not be interpreted as conclusive evidence against such associations. Future research with larger user samples is needed to adequately test dose-response relationships within platform users.

Fourth, as discussed in the workload section, the absence of data on teachers' contract type, official teaching load, and school-level scheduling practices is a meaningful gap. The observed differences in total and teaching hours between users and non-users may partly reflect structural employment differences rather than platform-induced time savings. Future studies should collect and control for these variables to isolate the net contribution of AI tool use to workload perceptions.

Finally, the study's sample, while geographically diverse within Kyrgyzstan, relied on a non-probability sampling approach combining purposive, convenience, and self-selection elements. The predominance of experienced, mid- to late-career, female teachers and the overrepresentation of Chuy Oblast (46%) limit the generalizability of findings to different demographic groups and regions. The findings should be interpreted as

contextually relevant evidence rather than as representative estimates for the entire Kyrgyzstani teaching population.

Directions for Future Research

The findings and limitations of this study point to several important directions for future research on the relationship between AI-supported educational tools and teachers' professional experience, particularly in low- and middle-income and post-Soviet educational contexts. Future studies should build on the specific patterns identified in the present research in order to clarify underlying mechanisms, strengthen causal inference, and refine theoretical understanding of how AI functions as a professional resource.

First, the absence of statistically significant relationships between the intensity of MugalimAI use and teachers' professional experience outcomes suggests the need to examine non-linear and threshold-based models of technology effects. Future research should move beyond frequency- and duration-based operationalizations of AI use and explore whether the benefits of AI-supported planning emerge once a minimal level of engagement is reached, after which additional use yields diminishing returns. Longitudinal designs that track teachers before and after platform adoption, as well as studies employing growth modeling or repeated measures, would be particularly valuable for testing such dynamics and identifying potential plateau effects in workload reduction, self-efficacy development, and job satisfaction.

Second, the finding that platform users reported substantially fewer total working hours and fewer out-of-school working hours highlights the importance of controlling for objective teaching load and employment conditions in future studies. Because the present cross-sectional design could not distinguish between platform-related efficiency gains and structural differences in workload allocation, future research should incorporate detailed indicators such as the number of teaching hours, class size, subject load, contract type, and

school scheduling practices. Quasi-experimental designs, including natural experiments based on phased platform implementation at the school or district level, may offer stronger evidence regarding the causal impact of AI-supported tools on workload perceptions and professional well-being.

Third, the pattern of self-efficacy findings, characterized by significant differences between users and non-users in classroom management and student engagement but not in instructional strategies, points to the need for mechanism-oriented research on how AI tools influence different dimensions of professional confidence. Future studies could examine whether AI-supported lesson planning enhances teachers' sense of preparedness, reduces cognitive load during instruction, or expands their repertoire of engagement strategies, thereby indirectly strengthening specific self-efficacy domains. Mixed-methods approaches combining survey data with classroom observations, teacher interviews, and instructional artifact analysis would be particularly useful for unpacking these pathways.

Fourth, given the consistent and multidimensional differences in job satisfaction observed between platform users and non-users, future research should investigate mediating processes linking AI use to professional well-being. For example, structural equation modeling could be employed to test whether workload reduction and enhanced self-efficacy function as mediators of the relationship between AI-supported planning and job satisfaction. Such analyses would contribute to refining theoretical applications of the JD-R model in digitally mediated teaching environments.

Finally, further research is needed to examine contextual moderators of AI effectiveness, including school leadership support, digital infrastructure, professional development opportunities, and teachers' baseline digital competence. Comparative studies across regions, school types, or countries could help determine whether the resource-buffering effects of AI tools are particularly salient in contexts where alternative

professional supports are limited. By situating AI adoption within broader institutional and cultural environments, future research can move toward a more comprehensive understanding of how technology interacts with systemic conditions to shape teachers' professional experience.

Concluding Remarks

In conclusion, this study argues that AI-supported lesson-planning tools such as MugalimAI should be understood not merely as technical innovations, but as potentially meaningful professional resources within contemporary teaching environments. In the Kyrgyzstani context examined here, the use of MugalimAI was associated with lower workload, higher self-efficacy, and greater job satisfaction, even though the intensity of use did not predict these outcomes within the user group. This pattern suggests that the value of AI in education may lie less in maximizing usage and more in ensuring relevant, accessible, and meaningful integration into teachers' professional practice. As education systems continue to adopt AI-driven tools, the central question should not only be whether such technologies are innovative, but whether they genuinely support the people who teach. This study suggests that, under the right conditions, they may.

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Appendices

Appendix A: Completed Generative AI Declaration Form



Thesis Title: Transforming Teacher Experience through AI: A Quantitative Study of
MugalimAI's Effects on Teachers' Workload, Self-Efficacy, and Job Satisfaction

Declaration of the Use of Generative AI

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

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

(If you have used generative AI tools, please complete the rest of this form.)

During the preparation of this thesis, I used ChatGPT and Claude to improve the academic style, clarity, conciseness, and coherence of the text. All ideas, arguments, structure, and sources were developed and selected independently by me; the tools were used solely to support the expression of my original content in appropriate academic language.

I also declare that I

- ☒ am aware of the capabilities and limitations of generative AI tool(s),
☒ have verified that the content generated by AI systems and adopted by me is factually correct,
☒ 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 generative AI tools in this work, and
☒ acknowledge that there may be disciplinary consequences if I have breached NU Student Code of Conduct or not followed NUGSE's guidelines regarding appropriate AI use.

Name: Alena Oseledko

Date: April 27, 2026

Signature:

Appendix B: Recruitment Announcement Text Posted on MugalimAI Instagram

Page

Уважаемые учителя!

Приглашаем вас принять участие в исследовании студентки Назарбаев

Университета о том, как платформа MugalimAI влияет на нагрузку,

удовлетворённость работой и уверенность учителей.

Важно знать:

- Опрос полностью анонимный. Данные обрабатываются конфиденциально.

Имена, школы и личная информация не собираются

- Займёт ~15 минут
- Все ответы конфиденциальны

👉 Сканируйте QR-код в карусели, чтобы принять участие.

Ваш вклад помогает развивать цифровые инструменты для образования в Кыргызстане.

Appendix C: Recruitment Letter for MugalimAI Users (English Version)

Subject: Invitation to Participate in a Master’s Research Study

Dear Teacher,

You are warmly invited to take part in a research study entitled “*Transforming Teacher Experience through AI: A Quantitative Study of MugalimAI’s Effects on Teachers’ Workload, Self-Efficacy, and Job Satisfaction.*” This study is being conducted as part of a Master’s thesis at Nazarbayev University. Its purpose is to better understand how digital tools like MugalimAI influence teachers’ daily work and professional well-being.

As a teacher who uses MugalimAI, your voice is especially valuable. By sharing your experience, you will help us see not only how the platform supports teachers, but also what can be improved to better meet teachers’ needs.

What participation involves:

- Completing an online questionnaire (about 15 minutes).
- Your answers will remain strictly anonymous and confidential. No names, emails, or IP addresses will ever be collected. Each response is stored under a code only, so nobody—including the researcher or the platform—will know who gave which answers.
- Participation is fully voluntary. You may skip any question or stop at any time without any consequences.

Why your participation matters:

- Your insights will contribute to research aimed at strengthening teacher support and well-being in Kyrgyzstan.
- The findings may guide future improvements to platforms like MugalimAI, making them more helpful for teachers and inform policymakers, developers, and educational organizations working to create more effective and teacher-centered digital tools.

- By taking part, you will help advance the responsible and meaningful integration of AI in Kyrgyzstani education.

- Most importantly, this study puts teachers' voices at the center of academic research.

👉 If you would like to take part, simply click this link: [survey link]

If you have any questions, please feel free to contact the researcher:

Alena Oseledko

Graduate School of Education, Nazarbayev University

✉ alena.oseledko@nu.edu.kz

In rare cases, if you feel the need to discuss the study with someone other than the researcher, you may contact my supervisor:

Dr. Daniel Hernández-Torrano

Graduate School of Education, Nazarbayev University

✉ daniel.torrano@nu.edu.kz

Thank you very much for considering this invitation and for the important work you do every day as a teacher. Your contribution to this study is deeply appreciated.

Sincerely,

Alena Oseledko

Appendix D: Recruitment Letter for School Principals (English Version)

Dear [Name / School Director],

My name is Alena Oseledko, and I am a Master's student at the Graduate School of Education, Nazarbayev University. I am conducting a research study entitled *“Transforming Teacher Experience through AI: A Quantitative Study of MugalimAI's Effects on Teachers' Workload, Self-Efficacy, and Job Satisfaction.”* This study has been reviewed and approved by Nazarbayev University's Research Ethics Committee, which ensures that the research is conducted ethically, safely, and with full respect for participants' rights.

The purpose of this research is to explore how digital platforms such as MugalimAI relate to teachers' professional experience. This study will provide valuable insights into teachers' workload, job satisfaction, and self-efficacy, helping to highlight the voices of teachers in Kyrgyzstan and contributing to future improvements in teacher support systems and the effective use of educational technologies in the region.

Your role as a school leader is crucial for making this study possible. By sharing the questionnaire with teachers in your school, you will help ensure that their perspectives are represented in a study that may inform both practice and policy.

You may wonder why your school has been invited to take part in this study. The reason is that we aim to include a diverse group of schools in Kyrgyzstan so that the findings reflect teachers' experiences as broadly and accurately as possible. Your school was selected as part of this effort to ensure that the voices of teachers from different contexts are represented. Please note that participation is voluntary, and the study is not intended to evaluate or compare individual schools.

The questionnaire includes 29-34 questions and takes approximately 15 minutes to complete. The survey covers teachers' professional experiences, including their workload,

job satisfaction, and confidence in their teaching practice. The questions are general and reflective, focusing only on teachers' own perceptions rather than on school performance or student outcomes.

The study includes both teachers who use MugalimAI and those who do not, as comparing these two groups is essential for understanding the platform's role in teaching practice. This means that participation is valuable and welcome regardless of whether or not a teacher has experience with MugalimAI. Every teacher's perspective will help create a fuller and more accurate picture of professional life in Kyrgyzstan's schools.

Participation is voluntary and completely anonymous. The survey does not ask for any personal details such as names, phone numbers, or even the school's name. All responses will be used only in a general, combined form. Neither teachers, nor you as the school leader, nor the school itself can be linked to the answers. In other words, there is absolutely no risk to anyone's privacy or to your school's reputation.

As a token of appreciation, I would be glad to share a summary of the study's findings with you after its completion. This may provide your school with useful insights into teachers' professional well-being and experiences.

I would be very grateful if you could share the recruitment link with teachers in your school. A sample invitation message and the link to the survey are attached for easy distribution.

[LINK]

Your role as a school leader is limited to sharing the survey invitation with teachers. To ensure fairness and voluntary participation, we kindly ask that the link be shared with all teachers in your school. Please note that participation is entirely voluntary and anonymous, and you will not be informed about who chooses to participate. Teachers

should feel completely free to decide whether to participate or not and how to answer questions.

If you have any questions or would like further information, please feel free to contact me at alena.oseledko@nu.edu.kz.

In rare cases, if you feel the need to discuss the study with someone other than the researcher, you may contact my supervisor:

Dr. Daniel Hernández-Torrano

Graduate School of Education, Nazarbayev University

 daniel.torrano@nu.edu.kz

Thank you very much for your time and for supporting teachers' voices in this important study.

Sincerely,

Alena Oseledko

Master's student

Graduate School of Education

Nazarbayev University

Appendix E: Recruitment Letter for Teachers (English Version)

Dear Teachers,

You are invited to take part in a research study entitled “*Transforming Teacher Experience through AI: A Quantitative Study of MugalimAI’s Effects on Teachers’ Workload, Self-Efficacy, and Job Satisfaction.*” This study is being conducted as part of the Master’s program at the Graduate School of Education, Nazarbayev University. Your participation is highly valuable whether or not you have used the MugalimAI platform, as all teachers’ perspectives are essential for this study.

 What participation involves:

- Completing an online questionnaire, which will take approximately 15 minutes.
- The survey is anonymous: you will not be asked to provide your name, phone number, or school. Your responses will be used only in aggregated form.
- Participation is voluntary: you may skip any question or stop the survey at any time.
- We kindly ask you to respond as sincerely and honestly as possible, as the accuracy and quality of the study depend on it. There is no need to embellish your answers—the survey is completely anonymous and cannot in any way affect you or your school.

 About the questionnaire:

The survey contains 29-34 questions designed to examine your professional experience. It covers three key aspects:

1. Workload – how you perceive your workload and how it affects your work;
2. Professional self-efficacy – your confidence in your teaching skills and abilities;
3. Job satisfaction – how satisfied you are with your professional work and working conditions.

💡 Why your participation matters:

- Your insights will contribute to research aimed at strengthening teacher support and well-being in Kyrgyzstan.
- The findings may inform policymakers, developers, and educational organizations working to create more effective and teacher-centered digital tools.
- By taking part, you will help advance the responsible and meaningful integration of AI in Kyrgyzstani education.
- Most importantly, this study puts teachers' voices at the center of academic research.

👉 To participate, please follow this link: [link]

If you have any questions, please feel free to contact me:

Alena Oseledko

Graduate School of Education, Nazarbayev University

✉ alena.oseledko@nu.edu.kz

In rare cases, if you wish to discuss the study with someone other than the researcher, you may contact my supervisor:

Dr. Daniel Hernández-Torrano

✉ daniel.torrano@nu.edu.kz

Thank you very much for considering this invitation and for the important work you do every day. Your contribution to this study is highly valued.

Sincerely,

Alena Oseledko

Appendix F: Data Collection Instrument: Full Questionnaire (English Version)

Section 1: Demographic and Professional Background

1. What is your age?
☐ Under 25 ☐ 25–34 ☐ 35–44 ☐ 45–54 ☐ 55 or older
2. What is your gender?
☐ Female ☐ Male ☐ Prefer not to say
3. How many years of teaching experience do you have?
☐ Less than 1 year ☐ 1–3 years ☐ 4–7 years ☐ 8–15 years ☐ More than 15 years
4. What subject(s) do you currently teach?
☐ Mathematics ☐ Kyrgyz language ☐ Russian language ☐ Literature ☐ History ☐ Physics
☐ Chemistry ☐ Biology ☐ Geography ☐ Foreign language ☐ Computer science ☐ Physical education
☐ Other (please specify): _____
5. What is the type of school you currently work in?
☐ Urban ☐ Rural
6. In which region of Kyrgyzstan is your school located?
☐ Batken Oblast ☐ Chuy Oblast ☐ Jalal-Abad Oblast ☐ Issyk-Kul Oblast
☐ Naryn Oblast ☐ Osh Oblast ☐ Talas Oblast
7. Do you use the MugalimAI platform?
☐ Yes ☐ No

Section 2: MugalimAI Use

Note. Questions 8–10 are completed by Group “Users” participants only.

8. For how many months have you been using the MugalimAI platform?
Response: _____
9. On average, how many times per week do you use MugalimAI?
Response: _____
10. On average, how many hours do you spend using the platform per week?
Response: _____

Section 3: Teacher Workload

Teacher Workload Survey (2019)

11. In your most recent full working week, approximately how many hours did you spend in total on teaching, planning lessons, marking, covering for absence, interacting with other teachers, participating in staff meetings, pastoral care, and other activities related to your job?
Response: _____
12. Of this total, approximately how many hours did you spend on teaching in your most recent full working week?
Response: _____
13. You said earlier that you worked [INSERT RESPONSE FROM Q11] hours in your last working week. Approximately how many of those hours were spent working during weekends, evenings, or other out-of-school hours?

Response: _____

To what extent do you agree or disagree with the following statements about your working hours?

Item	Strongly disagree	Tend to disagree	Neither agree nor disagree	Tend to agree	Strongly agree
14. I can complete my assigned workload during my contracted working hours.	☐	☐	☐	☐	☐
15. I have an acceptable workload.	☐	☐	☐	☐	☐
16. Overall, I achieve a good balance between my work life and my private life.	☐	☐	☐	☐	☐

Section 4: Teacher Self-Efficacy

Ohio State Teacher Efficacy Scale (OSTES; Tschannen-Moran & Hoy, 2001)

Item	Nothing	Very little	Some influence	Quite a bit	A great deal
17. To what extent can you use a variety of assessment strategies?	☐	☐	☐	☐	☐
18. To what extent can you provide an alternative explanation or example when students are confused?	☐	☐	☐	☐	☐
19. To what extent can you craft good questions for your students?	☐	☐	☐	☐	☐
20. How well can you implement alternative strategies in your classroom?	☐	☐	☐	☐	☐
21. How much can you do to control disruptive behavior in the classroom?	☐	☐	☐	☐	☐
22. How much can you do to get children to follow classroom rules?	☐	☐	☐	☐	☐
23. How much can you do to calm a student who is disruptive or noisy?	☐	☐	☐	☐	☐
24. How well can you establish a classroom management system with each group of students?	☐	☐	☐	☐	☐
25. How much can you do to get students to believe they can do well in schoolwork?	☐	☐	☐	☐	☐
26. How much can you do to help your students value learning?	☐	☐	☐	☐	☐
27. How much can you do to motivate students who show low interest in schoolwork?	☐	☐	☐	☐	☐
28. How much can you assist families in helping their children do well in school?	☐	☐	☐	☐	☐

Section 5: Job Satisfaction

PIRLS 2016 Teacher Job Satisfaction Scale (IEA, 2016)

How often do you feel the following way about being a teacher?

Item	Very often	Often	Sometimes	Never or almost never
29. I am content with my profession as a teacher.	☐	☐	☐	☐
30. I find my work full of meaning and purpose.	☐	☐	☐	☐
31. I am enthusiastic about my job.	☐	☐	☐	☐
32. My work inspires me.	☐	☐	☐	☐
33. I am proud of the work I do.	☐	☐	☐	☐

Section 6: Net Promoter Score

Note. Question 34 is completed by Group “Users” participants only.

34. On a scale of 0 to 10, how likely are you to recommend MugalimAI to a friend or colleague?

0	1	2	3	4	5	6	7	8	9	10
<i>Very unlikely</i>				<i>Unlikely</i>			<i>Likely</i>		<i>Very likely</i>	

Appendix G: Informed Consent Form (English Version)

Dear Teacher,

You are warmly invited to participate in an important research study entitled “Transforming Teacher Experience through AI: A Quantitative Study of MugalimAI’s Effects on Teachers’ Workload, Self-Efficacy, and Job Satisfaction.” My name is Alena Oseledko. This study is part of my Master’s thesis at Nazarbayev University. Its goal is to understand how the MugalimAI platform relates to teachers’ professional experiences and to explore ways educational technologies can better support teachers like you in Kyrgyzstan. Your voice matters—by sharing your experience, you will help shape the future of teacher support and digital tools in education. Your participation is valuable whether or not you have used the MugalimAI platform, as all teachers’ perspectives are essential for this study.

About the Questionnaire: The questionnaire includes 29–34 questions depending on whether you use MugalimAI. It focuses on general information about your work (subject, type of school, region etc.) and three key areas of professional experience:

- Workload – your perception of work demands and how they affect your daily teaching.
- Professional Self-Efficacy – your confidence in your teaching skills and abilities.
- Job Satisfaction – your overall satisfaction with your professional role and work.

Participation: If you choose to participate, you will complete the online questionnaire, which will take approximately 15 minutes.

Risks: This study involves minimal risk. The main risk is a breach of confidentiality; however, strong measures are in place to protect your privacy (see below). No sensitive or personally identifying information will be collected, and participation will not affect your

employment, professional standing or school image, since your participation is completely anonymous.

Benefits: While there is no direct personal benefit, your participation will help us understand how platforms like MugalimAI influence teachers' workload, self-efficacy, and job satisfaction. The insights you provide may guide future improvements to digital teaching tools and support teachers in Kyrgyzstan and beyond. The findings will also contribute to the broader research community and Nazarbayev University.

Compensation: There is no monetary compensation, but a summary of the study's findings will be shared upon request after the research is completed.

Confidentiality & Privacy: All responses are strictly confidential and anonymous. The survey is hosted on Qualtrics, which allows disabling IP collection and other identifying metadata. No names, contact details, or school identifiers are collected. Data are stored on a password-protected computer accessible only to the researcher. Results will only be reported in aggregate form.

Voluntary Nature of the Study: Participation is entirely voluntary. You may choose not to participate, skip any question, or withdraw at any time without any penalty or negative consequences.

Points of Contact: If you have questions, comments, or experience any research-related concerns, please contact me.

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If needed, you may also contact my supervisor or the Ethics Committee:

Dr. Daniel Hernández-Torrano – daniel.torrano@nu.edu.kz

Nazarbayev University Institutional Research Ethics Committee – resethics@nu.edu.kz

Statement of Consent: By clicking “I Agree” below, you confirm that you are at least 18 years old, have read and understood this consent form, and voluntarily agree to participate in this study.

☐ I Agree

☐ I Disagree