Determinants of Job Satisfaction and Online Learning Continuation: A Study of Kazakhstani Educators During COVID-19

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Abstract

The COVID-19 pandemic necessitated a rapid transition to online learning (OL), presenting significant challenges for teachers globally. This study aimed to provide a deeper understanding of the determinants of job satisfaction and the readiness of school teachers in Kazakhstan to continue online education after the pandemic. A cross-sectional study was conducted among 1,205 school teachers across Kazakhstan in May 2021. The vast majority of teachers (91.6%) reported technological challenges, and 53.4% faced communication difficulties with students. An increased workload was reported by 61.7% of respondents, with older and more experienced teachers being particularly affected. Age, changes in students' academic motivation, and satisfaction with the work of the Government were significant predictors of job satisfaction. Less than one-third (29.9%) of teachers expressed a willingness to continue OL after the pandemic. Mediation analysis revealed that job satisfaction indirectly influenced teachers' willingness to continue OL through communication challenges. Specifically, the indirect effect of job satisfaction on willingness to continue OL was significant both through communication challenges with colleagues and students. These findings underscore the need to address technological and communication barriers to enhance job satisfaction and ensure the sustainability of online learning in the post-pandemic period.

Keywords: Online learning, barriers, teacher challenges, job satisfaction, educational policy

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Introduction

The COVID-19 pandemic profoundly affected societal structures worldwide (Hosseinzadeh et al., 2022). Governments were forced to implement unprecedented measures to mitigate the crisis, including prolonged isolation (Leach et al., 2021; Pietrabissa & Simpson, 2020). As a result, all societal institutions, including individuals, infrastructure, and technological systems, had to rapidly adapt to new conditions. Education was among the most vulnerable sectors, facing significant disruptions and requiring immediate adaptation to remote learning (Pokhrel & Chhetri, 2021; Du Plessis et al., 2024).

School closures affected over 94% of students globally (Birmingham et al., 2023; Miao et al., 2023), leading to substantial changes in educational delivery. Teachers encountered multiple challenges, including increased workloads, the need to master digital tools, and inadequate infrastructure to support remote learning (Dhawan, 2020; Goudarzi et al., 2023). In Kazakhstan, every school and teacher faced difficulties in maintaining instructional quality, making this issue persistently relevant (Burakanova et al., 2021; Burmistrova & Makoelle, 2023).

The transition to online learning revealed systemic weaknesses. There was no unified national strategy, clear guidelines, or a centralized educational platform to facilitate remote teaching. Schools lacked sufficient digital resources, including high-quality video lessons and effective online assessment tools (Bubb & Jones, 2020; Petek et al., 2023;). Moreover, teachers had to adapt their instructional methods while developing new competencies in digital communication and student engagement (Paul & Jefferson, 2019; Brammer & Punyanunt-Carter, 2022; Williams, 2022).

In some schools, IT teachers or those with advanced digital skills provided peer support, helping colleagues navigate online tools. However, a shortage of specialists and training opportunities limited the effectiveness of this approach. Key barriers included (1) the inability to quickly train teachers in digital pedagogy (Avci, 2023; Carroll & Constantinou, 2023); (2) lack of experience with digital learning platforms (Adam & Metljak, 2022; Wallengren Lynch et al., 2023); and (3) low competition in the teaching profession, which reduced incentives for continuous professional development (Coman et al., 2020; Martin & Bolliger, 2018).

Kazakhstani policymakers encouraged teachers to develop their own materials and adapt to online formats, but often without sufficient support or training. Consequently, curricula originally designed for in-person instruction failed to translate effectively to remote settings (Durrani et al., 2023). Teachers struggled to deliver content, students faced technological and socioeconomic barriers, and many parents lacked the digital literacy needed to support their children's learning.

The shift to remote education also demanded significant changes in instructional formats, assessment methods, and student engagement strategies. Many teachers reported declining instructional quality in certain subjects and struggled to equate online teaching hours with traditional classroom time. Moreover, conventional assessment practices proved inadequate, increasing teachers' workload without reliably measuring student learning outcomes.

By spring 2020, online education in Kazakhstan had largely devolved into teachers assigning homework through electronic diaries, with students submitting tasks via social networks (Barrot et al., 2021; Kuhfeld et al., 2020). A lack of teacher motivation, digital competencies, technical resources, and systemic support exacerbated these challenges, leaving many unresolved (Blikstad-Balas et al., 2022; Lepp et al., 2021). The pandemic exposed deeper structural issues in Kazakhstan's education system, including chronic underfunding, inconsistent reforms, and ineffective management.

While previous studies have explored the challenges faced by teachers during the pandemic (Nugroho et al., 2020), limited research has specifically addressed job satisfaction and teachers' willingness to continue online education in Kazakhstan. This study seeks to fill this gap by using two complementary approaches to evaluate teachers' experiences and identify the factors influencing their satisfaction and readiness to continue online education post-pandemic. The findings will provide evidence-based insights to inform policymakers, educators, and stakeholders, aiding the development of strategies to enhance online teaching and contribute to Sustainable Development Goal 4 (Quality Education).

The study has two primary objectives: (1) to assess teachers' job satisfaction and willingness to continue online teaching and (2) to develop data-driven recommendations for improving online education policies and practices in Kazakhstan. While the present study focuses on Kazakhstan, its findings may hold broader relevance for other countries with similar socioeconomic and infrastructural challenges. Many post-Soviet and low-resource educational systems experienced parallel difficulties in transitioning to online learning, including limited digital infrastructure, uneven teacher training, and weak institutional support. By highlighting these systemic issues, our study contributes to a growing body of research aimed at developing sustainable and equitable approaches to online education in the post-pandemic era.

Problem Statement

The rapid transition to OL during the COVID-19 pandemic posed significant challenges for both students and teachers, especially in regions with limited technological infrastructure. To fully understand these challenges, it is essential to assess job satisfaction and the readiness of school teachers in Kazakhstan to continue online education beyond the pandemic. This study offers a comprehensive examination of these issues.

The research evaluates teachers' satisfaction with their professional activities and their willingness to continue online education using two complementary approaches. The first approach is structural, viewing job satisfaction as the relationship between teachers' expectations, requirements, and aspirations, and the degree to which these are met in terms of both content and working conditions. Teachers were asked to evaluate the importance of various aspects of their work, divided into two categories: (1) the conditions of their professional activity and (2) the teaching process.

The second approach focuses on job satisfaction as an emotional and evaluative attitude toward the teaching profession. This perspective includes an analysis of teachers' value orientations, which underpin their goal-setting, pedagogical design, and interactions with other participants in the educational process. Additionally, factors such as the perceived prestige of the teaching profession and teachers' social well-being – shaped by their social status – are considered key elements in understanding job satisfaction.

Overall, the study highlights a range of challenges faced by teachers in Kazakhstan during the pandemic, including technological readiness, communication difficulties, increased workload, and emotional well-being (Amirova et al., 2023).

Table 1 summarizes the key issues encountered by schoolteachers in Kazakhstan during the COVID-19 pandemic, based on data collected in the present study.

Table 1

Issues Faced by Teachers During the Transition to Online Learning in Kazakhstan (N=500)

	Issues Faced by Teachers During the Transition to OL	n	%
Internet and Technical Issues	Poor Internet Connection: Many teachers reported issues with the speed and stability of internet connections. Example: "Slow internet speed." "Weak internet in rural areas."	179	35.8
	Lack of Equipment: Issues with insufficient or inadequate hardware (computers, laptops, etc.) for both teachers and students. Example: "Lack of personal devices among students."	20	4.0
	Technical Difficulties: Problems with using online platforms and software. *Example:* "It was difficult to master the electronic platform." "Sometimes the platforms failed."	34	6.8
Student Engagement and Discipline	Low Students' Academic Motivation: Reduced motivation among students to participate in online classes. Example: "Students' interest in lessons decreased."	16	3.2
	Problems with partial feedback: reduced engagement and interest in the learning process among a certain number of students and, as a result, a decrease in their performance. Example: "The connection between teacher and student weakened", "Students do not attend lessons."	26	5.2
	Parental involvement challenges. Example: "Parents do homework for their children."	64	12.8
Workload and Time Management	Workload increase: The requirement to prepare and present online lessons has resulted in a notable increase in workload. Example: "The workload doubled.	36	7.2
	Time management: difficulties juggling the demands of distance learning with personal obligations. Example: "More time is spent on preparing and conducting lessons, and working with the Platform takes up a lot of time, I can't control it."	47	9.4
Health Concerns	Computer syndrome: prolonged time spent in front of a computer screen leads to eye muscle fatigue and discomfort. Example: "Eyesight deteriorated sharply", "a sedentary lifestyle has worsened health."	43	8.6%
	Professional stress and burnout among teachers due to online teaching. Example: "I felt psychological stress," "Sometimes, due to the lack of distinction between work and rest, I felt exhausted."	20	4.0
Communication and Relationship Challenges	Reduced student-teacher interaction. Example: "The connection between teacher and student weakened," "Lack of desire to participate in lessons with connected cameras, no visual contact."	25	5.0
	Difficulty in maintaining discipline. Example: "Students do not attend lessons."	15	3.0
Quality of Education	Reduced learning quality: questions about how well online instruction works and how well students comprehend the subject. Example: "The learning process declined," "Knowledge worsened."	29	5.8
	Accurately assessing students' performance and knowledge presents a challenge. Example: "Parents literally do the assignments for them and the grades they receive are undeserved," "It is impossible to assess the actual knowledge and skills of students."	8	1.6
Other Issues	Inequities, digital divide: Students from lower-income families struggled to access lessons due to a lack of devices and internet. Example: "Parents are at work, and children cannot join lessons."	15	3.0
	Inconsistent parental support: Some families deprioritized education, expecting to hire tutors later, leading to missed learning opportunities. Example: "Some parents completely neglected children's education."	15	3.0

Referring to Table 1, secondary school teachers demonstrated various problems in the transition to OL, including inequality of technical capabilities and imperfect technical equipment of secondary schools; the everyday capabilities of teachers, depending on their access to educational resources and the quality of the educational process turned out to be; digital literacy inequality among teachers; increased workload on teachers when teaching remotely, which negatively affected their socio-psychological well-being and health; and a lack of psychological support for teachers to ensure their well-being from the government during critical conditions (Hajar & Karakus, 2024).

Study Rationale

In the context of a severe epidemiological threat, education systems worldwide, including those of Kazakhstan, faced an unprecedented challenge (Kolber, 2023). The forced and rapid transition from traditional formats to online forms of education led to the emergence of the so-called "new reality" in teaching and learning (Singh et al., 2022). Amidst the widespread stress and uncertainty across all levels of education, it became evident that job satisfaction and the readiness of school teachers in Kazakhstan to continue online learning after the pandemic were among the most significant issues of this transition. (Darmody et al., 2021).

Despite the undeniable achievements of Kazakhstan's educational system, several persistent challenges remain. In particular, the effective use of online teaching technologies has not been sufficiently addressed, further underscoring the relevance of this research. There is also a lack of studies in Kazakhstan exploring the role of online teaching in students' learning and its impact on teachers' professional development (Berikkhanova et al., 2023; Karstina, 2021).

International researchers emphasize that integrating online teaching into the educational process can offer several benefits: (1) online learners gain access to a wide range of materials, including multimedia content, which enhances knowledge retention, while allowing students to work at their own pace (Serrano et al., 2019); (2) online learning contributes to higher attendance rates; and (3) it serves as an environmentally friendly option (Panigrahi et al., 2018).

Thus, online programs have the potential to deliver high-quality education in diverse formats. However, for online learning to be truly effective, careful planning, curriculum design, and technological support are essential (Clark & Barbour, 2015; Shumeiko et al., 2024).

In the current epidemiologically unstable global context, the risk of declining motivation and professional engagement among teachers has increased significantly. The relevance and social significance of addressing this issue are underscored by the fact that, during the pandemic, teachers' workload expanded considerably due to the need for rapid training and the subsequent organization of the educational process within a digital environment (Chaleila et al., 2024). However, teachers' motivation has often been reduced to the formal acknowledgment of the social significance of their profession, which, in practice, does little to sustain their drive for efficiency and high-quality performance.

Moreover, assessing the impact of online teaching and the pandemic on teachers' workload and job satisfaction is particularly challenging in Kazakhstan due to the lack of systematic research in this area. Therefore, a focused investigation into the challenges

encountered by teachers during the transition to online learning, specifically how the pandemic affected their workload and job satisfaction, is both timely and necessary.

While job satisfaction is a universal concern for teachers, the challenges in Kazakhstan may be more pronounced due to issues such as increased workload during the pandemic, limited resources, and the lack of widespread professional development opportunities in digital education. The literature on teacher burnout and satisfaction in countries with unstable economies, such as Kazakhstan, can shed light on how these global patterns manifest within the unique educational landscape of Kazakhstan (Bolatov et al., 2021).

This study offers a unique and original contribution to the existing body of literature on online learning by examining the underexplored context of Kazakhstan, a country characterized by specific structural, technological, and pedagogical challenges. While numerous studies have investigated online learning experiences in developed countries (e.g., Wiles et al., 2023; Bolliger & Martin, 2018; Bondie, 2023), there remains a significant research gap concerning teachers' job satisfaction and their willingness to continue online teaching in post-pandemic, resource-constrained environments.

This research is one of the first large-scale empirical studies to analyze the determinants of job satisfaction and readiness to continue online teaching among school teachers in Kazakhstan. Unlike previous studies conducted during the initial emergency remote teaching period, this study focuses on teachers' long-term readiness to continue online education after the pandemic, offering valuable insights into the sustainability of online teaching practices.

The study adopts both structural and emotional-evaluative approaches to examine job satisfaction and employs mediation analysis to explore how communication challenges influence the relationship between teachers' job satisfaction and their willingness to continue online teaching. The findings of this research provide practical recommendations not only for policymakers and stakeholders in Kazakhstan but also for other countries facing similar challenges related to the digital transformation of education. Thus, the study contributes to the broader discourse on the development of sustainable and equitable online learning systems.

Research Questions

Question 1: How has the shift to online instruction affected the workload and job satisfaction of teachers?

Question 2: How did the pandemic affect teachers' perceptions of the academic load and motivation of their students?

Question 3: What role did government support play in influencing teachers' job satisfaction and willingness to continue online learning format?

Objectives

The study examines job satisfaction and the willingness of school teachers in Kazakhstan to continue with OL post-pandemic.

Literature Review

The Effectiveness of Online Education

In a world characterized by constant change, the ability and willingness to pursue education and acquire new skills have become two of the most in-demand qualities for specialists in any field. According to Jackson (2015), employers today seek more than just professional qualifications; they value individuals who are familiar with online education, committed to continuous learning, and eager to enhance their skills. The rapidly growing digital economy is generating new employment opportunities for professionals with analytical and technical competencies, while simultaneously increasing competition among employers for talented individuals.

In such circumstances, online education is regarded as one of the most efficient and accessible ways to enhance one's value in the labor market (Tripathy & Devarapalli, 2021). As a result, the number of individuals obtaining academic credentials through online learning platforms is steadily increasing. Hawkridge (2022) and Szymkowiak et al. (2021), emphasize that the Internet and digital learning technologies provide numerous advantages in expanding access to quality education.

Globally, online learning has become an essential tool for improving access to education, particularly in remote areas. In Kazakhstan, this is especially relevant due to significant geographic and infrastructural challenges (Durrani et al., 2024). Rural regions often have limited access to traditional educational resources and qualified teachers. In these contexts, online learning offers an effective way to bridge educational gaps by providing access to quality content and instructors who might otherwise be unavailable. However, Kazakhstan faces challenges such as digital inequality and inconsistent internet access across regions, which can hinder the full effectiveness of online education (Nagima et al., 2023).

Moreover, studies worldwide have shown that online learning can enhance student engagement through interactive tools such as games, quizzes, and multimedia (Abuhassna et al., 2020; Stecuła & Wolniak, 2022). In Kazakhstan, similar advantages have been noted, particularly for students in urban areas where internet access is more reliable (Apakhayev et al., 2024). However, for students in rural areas, the lack of robust internet infrastructure remains a critical barrier to accessing these benefits. This digital divide limits the overall effectiveness of online education in Kazakhstan, making it imperative to explore strategies for improving connectivity and digital literacy (Kerimbayeva et al., 2024).

Moreover, the shift to online education during the COVID-19 pandemic has underscored the potential for online learning to provide a more flexible learning environment, enabling students to learn at their own pace (Sato et al., 2023). In Kazakhstan, where the educational system rapidly transitioned to online learning during the pandemic, this flexibility was crucial in maintaining educational continuity (Helmer et al., 2024). However, challenges such as teacher preparedness and the ability to effectively engage students in an online format were significant obstacles (Darmody et al., 2021). Understanding how these challenges were addressed, or exacerbated, in Kazakhstan is vital for improving the long-term sustainability of online education.

Additionally, online classes tend to be less formal, providing students with a more relaxed environment and reducing stress levels—an aspect that is especially important during tests and quizzes (Awidi & Paynter, 2019).

Online learning offers a solution for those who face barriers to traditional education, including illness, business trips, distance from educational institutions, or physical disabilities. In such cases, online education provides a viable alternative, enabling individuals to acquire new skills and even gain qualifications that may have otherwise been unattainable (Rhim & Han, 2020).

Quality educational platforms have the capacity to serve a large number of students globally, virtually eliminating the issue of class capacity. Furthermore, online learning platforms can invite experts and instructors from different cities and countries to conduct lectures or master classes, thereby enhancing the prestige and value of the education and diplomas they offer.

Students also benefit from the ability to contact experts in various fields in real time, allowing them to receive immediate responses to questions, which accelerates the learning process. Additionally, many students choose online education because it allows them to save time and money without compromising the quality of instruction or the knowledge gained (Boca, 2021; Guncaga et al., 2022).

Determinants of Job Satisfaction of Teachers

In recent years, the study of work attitudes and job satisfaction has become a central focus in many countries (Harrison et al., 2023; Lopes & Oliveira, 2020). This shift is driven by the recognition that, in modern work environments, job satisfaction is influenced not only by material factors but also by the growing impact of human factors. Job satisfaction is determined by an individual's alignment with the values of their profession, including interest in their work and favorable working conditions (Wartenberg et al., 2023).

Research into job satisfaction has only gained significant attention in recent years, and there is a notable gap in studies, especially in countries with unstable economies, such as Kazakhstan (Toropova et al., 2021; Tajibayeva et al., 2023).

Teaching is a "person-to-person" profession, characterized by emotional intensity and high levels of interpersonal interaction. As such, teachers are more vulnerable to the effects of professional burnout (Wang et al., 2020; Budhathoki, 2021).

The success of a teacher's professional activity is closely tied to their ability to manage various pedagogical challenges, including stressful and emotionally charged situations. It also depends on their flexibility in adapting to dynamic work environments, resilience to emotional and physiological stress, and the presence of effective adaptation and compensation mechanisms. Furthermore, the ability to uphold existential and humanistic values plays a crucial role in maintaining job satisfaction (Benevene et al., 2020; Hoque et al., 2023;).

As research shows, job satisfaction is one of the most crucial factors for enhancing efficiency and productivity. In Kazakhstan, a decrease in job satisfaction among teachers can have significant repercussions on their work performance, leading to negative outcomes such as poor labor discipline, increased turnover, absenteeism, and lack of engagement. These issues are particularly pronounced in a rapidly changing educational environment, where teachers must adapt to new technologies and teaching methods, as seen during the transition

to online education. Such conditions can cause heightened stress and emotional discomfort, limiting teachers' ability to perform effectively (Dicke et al., 2020; Baroudi et al., 2022).

Research has shown that social satisfaction is a vital indicator of quality of life in many countries, and Kazakhstan is no exception. The degree to which teachers feel supported and fulfilled in their work can influence their overall quality of life, which, in turn, impacts the effectiveness of the education system (Barauskaite & Streimikiene, 2021; Iwu et al., 2018).

Additionally, in Kazakhstan, data on teachers' satisfaction with their professional activities provides valuable insights into the challenges faced by the education system, especially in rural and underdeveloped areas (Nurgaliyeva et al., 2025). This information not only helps to identify personnel risks and transformation processes within the education sector but also provides a clearer understanding of teachers' readiness for professional development and their willingness to continue online teaching. Given the specific context of Kazakhstan, with its varying levels of technological infrastructure and regional disparities, monitoring teachers' satisfaction and their adaptation to online learning is crucial for ensuring the sustainability and equity of digital education in the country.

Impact of the Pandemic on Teachers' Perceptions of Student Motivation and Academic Performance

Studies have shown that, during remote learning, the lack of direct interaction and face-to-face communication with teachers often led to decreased motivation and engagement among students (Miethlich et al., 2023). In many regions, including Kazakhstan, access to reliable internet and appropriate devices was a significant issue. Such technological barriers hindered students' full engagement with the curriculum, raising concerns about disparities in academic performance. Teachers also struggled to effectively and accurately assess student progress through online assessments. In an online environment, teachers had to rely on limited data from digital platforms, making it difficult to track student engagement and academic progress (Crisci et al., 2019).

Motivating students during the pandemic became one of the most significant challenges teachers faced. Many teachers reported a considerable decline in students' intrinsic motivation, which is essential for academic success (Bright & Vogler, 2024). The pandemic exacerbated stress for both students and teachers, making it even more difficult to maintain high levels of motivation. Teachers observed that many students struggled with anxiety, both academically and personally. The uncertainty surrounding the pandemic and the challenges of remote learning further contributed to this stress. As a result, students' motivation levels decreased, making it harder for teachers to inspire them to keep up with their studies (Sengar & Pandey, 2024).

Classroom management in the online environment posed a significant challenge for teachers. Many teachers noted that the typical strategies they used in physical classrooms, such as keeping students engaged through group activities or offering individual assistance, were difficult to replicate online (Long et al., 2022). To maintain student engagement, teachers had to quickly adapt their strategies to the online format. However, effectively incorporating these tools into lessons proved challenging, especially for teachers who were less familiar with technology or lacked adequate resources (Ortan et al., 2021).

Government Policies and Support

During the pandemic, governments worldwide, including Kazakhstan, took measures to help teachers transition to online education. A key government initiative was improving technological infrastructure. In countries with large rural populations or underdeveloped regions, like Kazakhstan, limited internet access and outdated devices created major obstacles to online learning (Nurgaliyeva et al., 2024). In response, the government allocated funds to improve internet access, particularly in underserved areas, and to provide digital devices to schools and students. These efforts equipped teachers with essential tools and enabled students to attend online classes with fewer disruptions (Nguyen et al., 2024).

In addition to improving technological infrastructure, governments introduced financial incentives to encourage teachers' involvement in online education. These incentives included stipends, bonuses, and funding for extra hours spent converting traditional classroom content into digital formats. Teachers received compensation for extra time spent creating online materials, interacting with students, and mastering digital platforms. These financial measures helped ease teachers' financial stress during the pandemic and played a key role in maintaining morale (Martin et al., 2024).

Professional development programs were another key element of government support. Teachers had to rapidly adapt to online teaching by acquiring new skills and mastering various digital tools. In response, governments and educational institutions launched training programs and webinars to help teachers develop skills in online assessment, digital classroom management, and virtual pedagogy (Rivera-Vargas et al., 2021). In Kazakhstan, educational bodies offered free online courses to help teachers gain proficiency in virtual learning platforms like Moodle and Zoom (Tlepbergen et al., 2022). These programs eased teachers' technological anxiety and boosted their confidence in delivering effective online education (Schirmer & Lockman, 2022).

Moreover, ongoing professional development programs fostered teachers' professional growth and job satisfaction. Continuous learning opportunities made teachers feel supported and valued. Recognizing their efforts boosted morale and fostered a more positive attitude toward online teaching.

Government support directly influenced teachers' morale and job satisfaction. Despite the challenges of shifting to online learning, many teachers appreciated the tangible support they received. Research has shown that financial incentives, professional development, and improved access to resources can significantly enhance job satisfaction (Maqableh & Alia, 2021). Teachers who received additional training felt more prepared for online teaching and were more open to adopting it as a long-term option.

However, the effectiveness of government policies varied. Teachers with limited technology access or inadequate training often felt overwhelmed and unsupported (Mushtaha et al., 2022). Such disparities influenced teachers' attitudes toward online learning. Teachers lacking sufficient resources or training faced greater challenges transitioning to online education, resulting in higher stress and lower job satisfaction. Conversely, teachers with adequate resources and training were more likely to see online learning as a sustainable and effective approach (Tsai et al., 2021).

Teachers' willingness to continue online learning post-pandemic largely depends on the support they received. Studies show that teachers who felt well-supported by their governments were more likely to adopt online learning long-term (Trust & Whalen, 2021).

Financial incentives, professional development, and improved technology fostered a positive perception of online learning. Conversely, unsupported or unprepared teachers were less likely to continue online education, citing concerns about tool effectiveness and reduced student connection. Government policies, resources, and training were pivotal in shaping teachers' pandemic experiences (Williamson et al., 2020). Government support through technology, training, and financial incentives boosted teacher morale, job satisfaction, and willingness to continue online learning. However, uneven distribution of support influenced teachers' perceptions of online education and their post-pandemic motivation (Ali & Nath, 2023).

Despite extensive global research on online learning during the COVID-19 pandemic, limited evidence exists regarding the Kazakhstani context – particularly concerning how job satisfaction, communication challenges, and different forms of support (governmental, technological, and professional development) influence teachers' willingness to continue online teaching post-pandemic. Building on existing international findings, the present study addresses this gap by examining these relationships using a large sample of Kazakhstani educators. By doing so, it aims to contribute to a better understanding of the specific needs of teachers in Kazakhstan and to inform the development of targeted interventions to support online education in similar contexts. The following section outlines the methodology used to explore these factors in greater detail.

Methods

Study Design
To investigate the underexplored relationships between job satisfaction, communication challenges, and willingness to continue online learning (OL), we conducted a cross-sectional study with school teachers across Kazakhstan. The study aimed to examine the challenges and experiences faced by teachers during the transition to OL due to the COVID-19 pandemic, and to identify key predictors of both their job satisfaction and their intentions to continue using online teaching methods in the future (Maricuțoiu et al., 2023; Paudel et al., 2024). Data were collected using a structured questionnaire developed in Google Forms that was distributed online in May 2021.

Study Participants
The study population consisted of 1205 school teachers from different regions of Kazakhstan. The sample included a significant majority of female teachers (87.1%, n=1050). The age of the participants ranged from 19 to 85 years, with a mean age of 39.3 years (SD=11.9). The average work experience of participating teachers was 15.4 years (SD = 11.6), with values ranging from 0 to 49 years. Participants were recruited from various teaching levels, including primary, middle, and high schools, and represented diverse teaching subjects. Categorizing by teaching subjects, the largest group taught primary school subjects (25.2%), followed by linguistics (33.2%). Geographically, the majority of the participants were from Astana City (36.8%) and North Kazakhstan (29.0%). Regarding additional responsibilities, 59.0% (n=711) of the teachers were heads of their classes, while 41.0% (n=494) did not hold this position. In terms of family structure, nearly half of the teachers (47.2%) reported not having children under 18 years old. The socio-demographic data of the study participants are presented in Table 2.

Table 2

Study population (N=1,205)

Variable	n	%
Gender		
Male	155	12.9
Female	1,050	87.1
Teaching level		
Primary school	530	44.0
Middle school	392	32.5
High school	283	23.5
Teaching subject		
Primary school subjects	304	25.2
Math and ICT	144	12.0
STEM	123	10.2
Linguistics	400	33.2
History and Low	60	5.0
Sport	79	6.6
Psychology and related	30	2.5
Other	65	5.4
Residence		
Astana City	444	36.8
Almaty City	13	1.1
Central KZ	5	0.4
North KZ	349	29.0
East KZ	38	3.2
South KZ	138	11.5
West KZ	218	18.1
Head of the class		
No	494	41.0
Yes	711	59.0
Having children under 18 years of age		
No	569	47.2
1 child	222	18.4
2-3 children	334	27.7
4-5 children	69	5.7
≥6 children	11	0.9

Data Collection and Measures

Data were collected using a structured questionnaire that was distributed to the participants online. The questionnaire was designed to capture detailed information on the following variables:

- **Socio-demographic characteristics:** gender, age, work experience, teaching level, teaching subject, geographical residence, additional responsibilities (e.g., head of the class), and family structure (e.g., number of children under 18 years old).

- **Challenges faced during OL:** Participants were asked whether they experienced specific challenges in five key areas: technological support, communication with students, communication with colleagues, communication with school administration, and communication with family members. These items were presented as binary

(Yes/No) response options, allowing for the identification of the proportion of teachers who encountered each type of challenge during the transition to OL.

- **Previous experience with OL**: Participants were asked about their prior exposure to online learning before the COVID-19 pandemic. Specifically, they were asked three Yes/No questions regarding whether they had previous experience with OL as a student, as a teacher, and with using educational online resources (e.g., digital platforms, video lessons, or e-learning tools). These items were used to assess teachers' baseline familiarity with online education before the emergency shift to OL during the pandemic.

- **Impact of OL on academic load:** To evaluate how the transition to OL affected workload, participants were asked to assess perceived changes in both their own academic load and that of their students. The response options for each item were "Decreased," "Not changed," or "Increased." These items were designed to capture teachers' subjective experience of workload shifts during the pandemic, both from their perspective and in terms of the demands placed on students.

- **Impact of OL on student motivation:** Participants were asked to report their perceptions of how students' academic motivation changed following the shift to online learning. They were given three response options: "Decreased," "Not changed," or "Increased." This item aimed to capture teachers' observations of student engagement and enthusiasm during the remote learning period, reflecting one of the key factors influencing the effectiveness of online education.

- **Job satisfaction:** Overall job satisfaction and satisfaction with the work of the Ministry of Education and Science during the pandemic were calculated with 11-point satisfaction scale (from 0 – "not satisfied at all" to 10 – "very satisfied").

The questionnaire included both closed- and open-ended questions to allow for quantitative and qualitative analysis. In particular, participants were asked to describe the challenges they faced during the transition to OL in an open-ended format. These responses were then coded and categorized thematically to identify common issues such as internet connectivity problems, lack of equipment, increased workload, and communication difficulties. Out of the total 1,205 participants, 500 teachers provided responses to this open-ended question, which formed the basis for the qualitative analysis presented in Table 1.

Statistical Analysis

Descriptive statistics were used to summarize the socio-demographic characteristics of the participants. Means and standard deviations were calculated for continuous variables, while frequencies and percentages were reported for categorical variables. To explore preliminary associations between various online learning challenges and socio-demographic characteristics, bivariate analyses were conducted using chi-square tests and independent t-tests. These tests helped identify patterns that informed the selection of variables for multivariate analysis. To identify predictors of job satisfaction and willingness to continue with online learning post-pandemic, multiple regression models were applied. Linear regression was used for the continuous outcome variable (job satisfaction), while binomial logistic regression was used for the binary outcome (willingness to continue OL). These models allowed for simultaneous assessment of multiple predictors, controlling for potential confounding variables. Mediation analysis was conducted using the jAMM (jamovi

Advanced Mediation Models) module, which allows for robust estimation of direct and indirect effects (Gallucci, 2020). This module was used to test a parallel mediation model assessing whether challenges in communication with students and colleagues mediated the relationship between job satisfaction and willingness to continue online learning. The analysis was based on standard confidence intervals (CI) to evaluate the indirect effect. The level of significance was set at $p<0.05$. To reduce the risk of Type I error due to multiple testing in regression models, a Bonferroni correction was applied. Given the inclusion of 33 predictors in the model, the threshold for statistical significance was adjusted from $p<0.05$ to $p<0.00152$. Confidence intervals (95%) were reported for all regression and Standard Error (SE) for all mediation estimates to indicate statistical precision. All statistical analyses were performed using Jamovi software (version 2.6.17).

Ethical Considerations

The study was approved by the Ethical Committee of the Academic Council at Abai Kazakh National Pedagogical University, Kazakhstan, on 12 September 2023 (Ref. No. 4). Informed consent was obtained from all participants before they completed the questionnaire. Participants were assured of the confidentiality of their responses and the voluntary nature of their participation.

Based on the methodology described above, the next section presents the key findings related to job satisfaction, communication challenges, and teachers' willingness to continue online learning.

Results

The study explored the challenges and experiences of school teachers during the transition to OL amid the COVID-19 pandemic. Study participated highlighted several key challenges and previous experiences with online education (Table 3).

Table 3

Challenges and Experience of School Teachers in Online Learning During the COVID-19 Pandemic

Challenges	n	%
Challenges in technological support	1104	91.6
Challenges in communication with students	644	53.4
Challenges in communication with colleagues	299	24.8
Challenges in communication with school administration	147	12.2
Challenges in communication with family	334	27.7
Previous experience with OL like a student	226	18.8
Previous experience with OL like a teacher	163	13.5
Previous experience with educational online-resources before pandemic	879	72.9
Probability of educational online-resources usage after pandemic	835	69.3
Agreement to continue work in online format	360	29.9

A vast majority of the teachers (91.6%) reported facing challenges with technological support. More than half of the respondents (53.4%) experienced challenges in communicating with their students during online learning. A substantial portion of teachers (75.2%) indicated they did not face difficulties in communicating with their colleagues, while 24.8% did encounter communication challenges. Moreover, the majority (87.8%) did not have issues

communicating with school administration, while 72.3% of the teachers did not report problems in communicating with their families.

A large majority (86.5%) had no prior experience with teaching online before the pandemic. Moreover, 81.2% of the teachers had no experience with online learning as students. This indicates that most of the teachers had no experience working in the OL format. At the same time, prior to the pandemic, 72.9% of the teachers had used educational online resources.

The study examined the impact of the COVID-19 pandemic on the academic load and motivation of both teachers and students during the switch to online learning (OL). The results are presented in Table 4.

Table 4

Academic Load and Student's Academic Motivation After Switching to Online Learning

	Decreased		Not changed		Increased	
Variable	**n**	**%**	**n**	**%**	**n**	**%**
Teacher's academic load	110	9.1	351	29.1	744	61.7
Student's academic load	493	40.9	373	31.0	339	28.1
Student's academic motivation	710	58.9	191	15.9	304	25.2

The majority of teachers (61.7%, n=744) reported an increase in their academic load after switching to online learning. Teachers who indicated an increased workload had an older age (F=3.51, p=0.031) and more work experience (F=4.63, p=0.010). STEM teachers (68.3%) and mathematics and ICT teachers (66.0%) indicated the largest increase in workload, while physical education teachers (46.8%) noted the least (χ^2=23.9, p=0.047).

Around forty percent (40.9%) of teachers observed a decrease in their students' academic load, while 28.1% noted an increase in the students' academic load. Teachers of history and law (48.3%), languages (45.3%) and teachers of mathematics and ICT (43.1%) were more likely to note a decrease in the educational load for students. At the same time, an increase in the educational load for schoolchildren was more often noted by teachers-psychologists (43.3%) and STEM teachers (36.6%).

A significant portion of teachers (58.9%) perceived a decrease in students' academic motivation after switching to OL duo to the COVID-19 pandemic. This perception was reported more frequently by middle school (63.3%) and primary school teachers (59.2%) than by high school teachers (52.3%; χ^2 = 11.0, p = 0.027).

The level of job satisfaction of teachers during the pandemic varied; the average value was 8.23±1.95. At the same time, the level of satisfaction with the work of the Ministry of Education and Science during the pandemic was significantly lower – 7.52±2.52 (t=10.8, p<0.001). Predictors of teacher's job satisfaction are presented in Table 5.

Table 5

Predictors of Teacher's Job Satisfaction During the COVID-19 Pandemic (linear regression: R^2=0.315, Adjusted R^2=0.296, p<0.001)

Predictor	Standardized Estimate	95% CI	p
Gender (Female – Male)	-0.042	-0.211 – 0.127	0.628
Age[a]	-0.202	-0.315 – -0.089	<0.001
Work experience	0.072	-0.042 – 0.187	0.214
Teaching subject			
Math & ICT – PSS	-0.239	-0.453 – -0.025	0.029
STEM – PSS	-0.227	-0.460 – 0.006	0.056
Linguistics – PSS	-0.173	-0.340 – -0.005	0.043
History and Low – PSS	-0.126	-0.408 – 0.155	0.379
Sport – PSS	-0.182	-0.448 – 0.084	0.180
Psychology and related – PSS	-0.138	-0.475 – 0.199	0.422
Other – PSS	-0.221	-0.487 – 0.045	0.104
Teaching level			
Middle school – Primary school	0.001	-0.149 – 0.151	0.989
High school – Primary school	-0.031	-0.195 – 0.133	0.711
Residence			
Almaty City – Astana City	0.394	-0.079 – 0.868	0.103
Central KZ – Astana City	0.275	-0.478 – 1.028	0.474
North KZ – Astana City	0.123	-0.002 – 0.248	0.054
East KZ – Astana City	-0.067	-0.351 – 0.217	0.645
South KZ – Astana City	0.081	-0.089 – 0.252	0.348
West KZ – Astana City	0.149	0.000 – 0.297	0.050
Having children <18 y.o.	-0.021	-0.071 – 0.029	0.412
Head of the class (Yes – No)	-0.030	-0.145– 0.085	0.609
Challenges in technological support (Yes – No)	0.121	-0.054 – 0.297	0.173
Challenges in communication with students (Yes – No)	-0.023	-0.142 – 0.096	0.704
Challenges in communication with colleagues (Yes – No)	0.018	-0.120 – 0.156	0.800
Challenges in communication with school administration (Yes – No)	-0.046	-0.220 – 0.129	0.609
Challenges in communication with family (Yes – No)	-0.031	-0.160 – 0.097	0.631
Previous experience with OL like a student (Yes – No)	0.005	-0.139 – 0.150	0.944
Previous experience with OL like a teacher (Yes – No)	-0.008	-0.172 – 0.155	0.920
Previous experience with educational online-resources before pandemic (Yes – No)	0.004	-0.107 – 0.115	0.946
Probability of educational online-resources usage after pandemic (Yes – No)	-0.139	-0.249 – -0.028	0.014
Changes in the teacher's academic load	0.026	-0.025 – 0.077	0.321
Changes in the student's academic load	-0.012	-0.063 – 0.039	0.641
Changes in the student's academic motivation[a]	0.091	0.039 – 0.145	<0.001
Satisfaction with the work of the Government[a]	0.497	0.446 – 0.549	<0.001

Statistically significant after Bonferroni correction (adjusted alpha = 0.00152)
Note: PSS - Primary School Subjects; CI = Confidence Interval

The results of the linear regression analysis identify several predictors of job satisfaction among school teachers during the COVID-19 pandemic. The model explained a significant portion of the variance in job satisfaction, with $R^2=0.315$. After applying a Bonferroni correction to account for multiple comparisons (adjusted alpha = 0.00152 for 33 predictors), age, changes in students' academic motivation, and satisfaction with the work of the Government remained statistically significant. Thus, there was a significant negative association between age and job satisfaction, indicating that older teachers reported lower job satisfaction. There was a positive association between perceived increases in students' academic motivation and teacher job satisfaction. Moreover, satisfaction with the work of the Government was the strongest predictor of job satisfaction, with higher satisfaction with the government's response significantly associated with higher job satisfaction among teachers. Other predictors, including teaching subject (e.g., Math & ICT and Linguistics), and

probability of using educational online resources post-pandemic, showed nominal significance (p<0.05) but did not remain significant after Bonferroni correction. These findings may still be of interest but should be interpreted with caution. Variables such as gender, work experience, teaching level, having children under 18 years old, being head of the class, challenges in technological support, communication with students, colleagues, school administration, and family, previous experience with online learning (as a student or teacher), and changes in teacher's academic load, were not significantly associated with job satisfaction.

Less than one-third (29.9%) of teachers agreed to continue the OL format after the end of the pandemic (Table 3).

The logistic regression model identified several predictors of teachers' willingness to continue using OL after the pandemic (R^2_{McF} = 0.194, p < 0.001). After applying a Bonferroni correction to account for multiple comparisons (adjusted α = 0.00152), three variables remained statistically significant (Table 6). Teachers who reported fewer difficulties in communication with students were significantly more likely to support the continued use of OL, suggesting that effective student interaction plays a critical role in shaping positive attitudes toward remote education. An increase in students' academic motivation during the pandemic was also associated with a greater likelihood of teachers endorsing online learning post-pandemic. In addition, teachers who indicated a higher probability of using educational online resources in the future were more inclined to support the continuation of OL practices. Other factors, including the presence of children under the age of 18, difficulties in communicating with family members, and satisfaction with the government's response to the pandemic, showed nominal significance at the p<0.05 level, but did not remain statistically significant after correction for multiple testing.

Table 6

Predictors of Teacher's Agreement to Continue Online Learning Format After Pandemic (Binominal Logistic Regression: R^2_{mcf}=0.194, P<0.001)

Predictor	OR	95% CI	p
Gender (Female – Male)	1.008	0.629 – 1.616	0.973
Age	0.993	0.965 – 1.021	0.610
Work experience	1.001	0.972 – 1.030	0.972
Teaching subject			
Math & ICT – PSS	1.045	0.545 – 2.003	0.894
STEM – PSS	1.886	0.958 – 3.712	0.066
Linguistics – PSS	2.135	1.301 – 3.504	0.003
History and Low– PSS	1.887	0.825 – 4.315	0.132
Sport – PSS	1.717	0.806 – 3.658	0.161
Psychology and related – PSS	2.010	0.785 – 5.152	0.146
Other – PSS	2.159	1.021 – 4.568	0.044
Teaching level			
Middle school – Primary school	0.711	0.465 – 1.085	0.114
High school – Primary school	0.881	0.557 – 1.394	0.588
Residence			
Almaty City – Astana City	0.627	0.147 – 2.671	0.528
Central KZ – Astana City	0.000	–	0.970
North KZ – Astana City	0.595	0.409 – 0.867	0.007
East KZ – Astana City	0.681	0.281 – 1.649	0.395
South KZ – Astana City	1.215	0.751 – 1.967	0.427
West KZ – Astana City	0.819	0.524 – 1.280	0.381
Having children <18 y.o.	1.160	1.006 – 1.338	0.041

|			
Head of the class (Yes – No)	0.794	0.569 – 1.107	0.173
Challenges in technological support (Yes – No)	0.776	0.465 – 1.294	0.331
Challenges in communication with students (Yes – No)[a]	0.310	0.220 – 0.438	<0.001
Challenges in communication with colleagues (Yes – No)	0.720	0.449 – 1.153	0.172
Challenges in communication with school administration (Yes – No)	1.249	0.678 – 2.301	0.476
Challenges in communication with family (Yes – No)	0.618	0.401 – 0.952	0.029
Previous experience with OL like a student (Yes – No)	1.234	0.816 – 1.864	0.319
Previous experience with OL like a teacher (Yes – No)	1.297	0.814 – 2.065	0.274
Previous experience with educational online-resources before pandemic (Yes – No)	0.868	0.623 – 1.207	0.400
Probability of educational online-resources usage after pandemic (Yes – No)[a]	1.789	1.264 – 2.532	0.001
Changes in the teacher's academic load	0.899	0.715 – 1.131	0.364
Changes in the student's academic load	1.168	0.968 – 1.411	0.105
Changes in the student's academic motivation[a]	1.444	1.216 – 1.714	<0.001
Satisfaction with the work of the Government	1.085	1.006 – 1.169	0.034
Job Satisfaction during the COVID-19 Pandemic	1.007	0.918 – 1.104	0.885

[a]*Statistically significant after Bonferroni correction (adjusted alpha = 0.00152)*
Note: PSS - Primary School Subjects; OR = Odds Ratio; CI = Confidence Interval

Although the regression analysis did not show a link between job satisfaction and the agreement to continue the online learning format, the mediation model revealed a number of interesting results. Thus, the mediation analysis examined the indirect effects of job satisfaction on teachers' agreement to continue OL through challenges in communication with colleagues and students during the COVID-19 pandemic (Figure 1).

Figure 1

Mediation Model: Communication Challenges as a Mediator Between Job Satisfaction and Willingness to Continue Online Learning
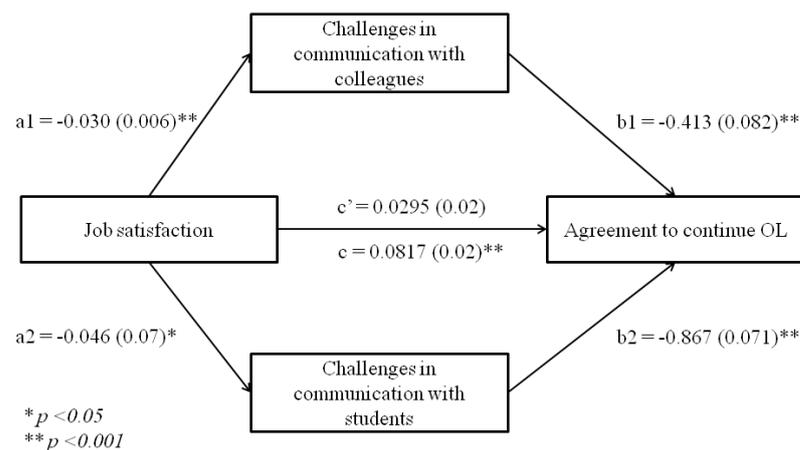
The direct effect of job satisfaction on agreement to continue OL format was not significant. Indirect effect [Job satisfaction] → [Challenges in communication with colleagues] → [Agreement to continue OL] was 0.012 (SE = 0.004, 14.9%), p < 0.001. Moreover, indirect effect [Job satisfaction] → [Challenges in communication with students] → [Agreement to continue OL] was 0.040 (SE = 0.007, 49.0%), p < 0.001. These findings highlight the importance of effective communication in the context of online

learning. Even though job satisfaction did not directly affect teachers' willingness to continue with OL, it played a crucial role in mitigating communication challenges, which in turn influenced their agreement to continue with the online format. The results of the study reveal significant challenges in terms of technological readiness and emotional well-being, which are consistent with previous research (Van der Spoel et al., 2020). In the following section, these findings are discussed in relation to broader trends in online education during the pandemic, and recommendations for improving teacher satisfaction and readiness for continued online education are provided.

Discussion

The study aimed to understand the scope of the challenges caused by the emergency transition to online learning by examining data on job satisfaction and teachers' willingness to continue online education after the pandemic. A comprehensive analysis of job satisfaction and the readiness of school teachers in Kazakhstan to continue online education after the pandemic provided a holistic view of the issue. The study assessed teachers' satisfaction with their professional activities and their willingness to continue online education post-pandemic based on several factors. This approach allowed for an objective evaluation from teachers across different regions of Kazakhstan.

Key challenges associated with the shift to OL included technical difficulties, internet access issues, inadequate technical resources, a lack of skills among both teachers and students in using various platforms, and insufficient physical space for effective learning. The high percentage of teachers (91.6%) reporting challenges with technological support underscores the critical need for robust infrastructure and comprehensive training in digital tools and platforms. This finding aligns with previous research indicating that inadequate technological support is a significant barrier to effective online teaching (Shrestha et al., 2022; Yeh & Tsai, 2022; Trust & Whalen, 2021). Moreover, the lack of experience among both teachers and students, coupled with the teachers' unfamiliarity with strategies for engaging different categories of students in a virtual environment, further complicated the transition (König et al., 2020; Kovacs et al., 2021). Correspondingly, the lack of previous online teaching experience (86.5%) and learning experience (81.2%) before the pandemic further hindered the transition period, highlighting the need for continuous professional development in digital pedagogy.

Organizing educational activities in a virtual environment presents a significant challenge. This is due to technology serving as a new mediator of activities, which fundamentally alters the nature of interactions, including those between all participants in the educational process (Blume, 2020; Delcker & Ifenthaler, 2021). In this study, more than half of the teachers reported difficulty communicating with their students.

Despite some emerging positive changes in learning conditions, the overall level of digital development and the infrastructure of schools likely does not meet either the current demands or the expectations of parents and teachers regarding the appropriate level of material and technical resources. One of the most pronounced issues in the digitalization of general education is the differentiation between institutions based on their access to digital equipment and software. This issue is particularly evident when comparing urban and rural schools, as well as gymnasiums (lyceums) and regular schools.

According to the data obtained, the vast majority of teachers view the pandemic and the shift to online teaching as stressful (DeCoito & Estaiteyeh, 2022; Klapproth, 2020; Lau et al., 2022). The increase in academic workload for teachers (61.7%) after transitioning to OL is concerning, suggesting that the digital shift may have added to the workload rather than reducing it. The transition to OL also had a negative impact on teachers' professional motivation. Many teachers expressed concern that, should education shift fully or partially online in the future, they would prefer to avoid such a scenario.

Naturally, this stressful situation affected the quality of education. Many teachers lacked the necessary technical and pedagogical skills to effectively integrate digital technologies into their teaching practices. To address this, universities quickly organized training sessions for both teachers and students on how to effectively use the university's electronic educational environment, work with the MOODLE system, and utilize other online platforms for learning. However, the online education system was essentially rebuilt "on the fly," which meant that methods for implementing courses were not fully developed. Not all educational materials could be adapted to the online format in such a short time, and opportunities for conducting practical classes were significantly reduced and had to be implemented in alternative formats. These challenges had a negative impact on the overall quality of education (Bergdahl & Nouri, 2021; Mankki, 2022; Kupers et al., 2022).

The issue of professional stress among teachers in OL is not new to psychology. According to a meta-analysis of contemporary international studies, teachers are more susceptible to stress compared to professionals in other fields. Longitudinal studies examining the relationship between professional stress factors and their symptomatic responses, conducted in Australia, Sweden, Finland, the United Kingdom, Israel, and the United States, found that long-term stress in teachers' workplaces is linked to a wide range of affective disorders. This stress lowers self-esteem and job satisfaction, can trigger psychosomatic symptoms, and may even lead to various forms of deviant behavior (Baker et al., 2021; Folkman et al., 2023; Pressley et al., 2021; Robinson et al., 2023).

Several studies have also examined the prevalence and nature of distress and burnout among teachers during specific timeframes, such as the first two months of quarantine restrictions or the initial month after returning to teaching following a lockdown during the COVID-19 pandemic (Birkelund & Karlson, 2023; Engzell et al., 2021). Interestingly, the results of these studies are inconsistent. For instance, a study by American researchers indicated that the majority of teachers did not experience emotional disturbances or increased anxiety after returning to their regular work schedules (DornViruleg et al., 2020; Redding & Nguyen, 2024).

Other data, obtained by Finnish scientists, showed that after returning to normal working conditions during the first few months of the COVID-19 pandemic, teachers experienced high levels of professional stress (Oksanen et al., 2022; Salmela-Aro & Lavonen, 2023;). In a comparative American study examining the impact of changes in working conditions before and during the pandemic (2019–2020, 2020–2021) on school and higher education teachers, it was found that teachers displayed a strong sense of belonging to the professional community and a relatively low level of isolation (Gicheva, 2022; Kraft et al., 2020). The absence of emotional burnout (or its low level) was observed both before and after the pandemic.

Job satisfaction among teachers during emergency situations can be improved by making appropriate adjustments (Dicks et al., 2022). The current study identified several predictors of job satisfaction among teachers during the pandemic, with age, teaching subject, and satisfaction with the government's response being significant factors. The negative association between age and job satisfaction suggests that older teachers may have found the transition more challenging, possibly due to less familiarity with digital tools. The lower satisfaction reported by teachers of Math & ICT and Linguistics compared to those teaching primary school subjects highlights subject-specific challenges in online learning. Satisfaction with the government's response emerged as the strongest predictor of job satisfaction, emphasizing the importance of effective government support and communication during crises. For instance, a study conducted among German teachers found that resource support from colleagues was particularly positively associated with job satisfaction (Stang-Rabrig et al., 2022). Moreover, teachers who perceived an increase in students' academic motivation also reported higher job satisfaction, suggesting that student engagement plays a crucial role in teachers' professional fulfillment, which may also be linked to their sense of self-efficacy (Zakariya & Wardat, 2023).

Less than one-third (29.9%) of teachers expressed a willingness to continue with OL post-pandemic. Significant predictors of this willingness included having children under 18 years of age, challenges in communication with students and families, changes in students' academic motivation, and satisfaction with the government's response. Mediation analysis revealed that job satisfaction, mediated by effective communication, significantly influenced teachers' willingness to continue OL.

Study Limitations

This study has several limitations that should be considered when interpreting the findings. First, the use of a cross-sectional design restricts the ability to make causal inferences. While the statistical methods used, such as regression and mediation analysis, are appropriate for examining associations, they cannot establish temporal relationships between variables. Future research using longitudinal or experimental designs could provide deeper insights into the directionality and long-term impact of the observed relationships. Second, the study relied on self-reported data, which introduces the possibility of several response biases, including social desirability bias, recall bias, and non-response bias. Although the survey was anonymous and pilot-tested to enhance clarity, responses may still reflect participants' perceptions rather than objective realities. Additionally, the lack of triangulation with administrative data or observational methods may limit the reliability of some measures. Third, while the study controlled for a wide range of demographic and professional factors, there may be unmeasured confounding variables, such as school leadership quality, local education policy, or individual personality traits, that could influence both job satisfaction and willingness to continue online learning. The decision to use standard confidence intervals rather than bootstrapped estimates in the mediation analysis may also limit the robustness of those particular findings.

Despite these limitations, the study offers valuable insights into the online teaching experiences of school teachers in Kazakhstan, a context underrepresented in the global literature. The findings underscore the importance of continued investment in technological infrastructure, targeted professional development, peer collaboration, and transparent government support. Future research should consider mixed-methods approaches to capture both the measurable outcomes and lived experiences of teachers. Exploring the impact of online learning on student outcomes, as well as differences across subjects, grade levels, and

school environments, would further enrich the understanding needed for effective policy development.

Recommendations

To address the challenges faced by teachers in Kazakhstan during the transition to online learning (OL) and to inform the development of more sustainable online education practices, several interconnected strategies should be considered. These recommendations draw on the correlational findings of the present study and are supported by relevant literature.

First, enhancing technological infrastructure and providing ongoing training are crucial steps. Given that a large proportion of teachers (91.6%) reported technological difficulties, improving internet connectivity, particularly in rural regions, is essential to reducing barriers to participation in online education (Bhandari, 2020). In parallel, ensuring that teachers have access to necessary digital devices and timely technical support can help address common challenges related to digital equity (Ezra et al., 2021). Furthermore, as the majority of teachers in this study (86.5%) had limited prior experience with online learning, continuous professional development focused on digital pedagogy would likely be beneficial, supporting teachers' confidence and competence in virtual environments (Ramli et al., 2024).

Supporting communication and collaboration is another important focus area. More than half of the teachers reported difficulties in communicating with students, suggesting a need for strategies such as regular check-ins and virtual office hours to strengthen teacher-student interaction (McTigue et al., 2023). In addition, developing structured peer support networks can foster collaboration among teachers, which has been shown to enhance well-being and job satisfaction (Wu et al., 2025).

Addressing increased workload and emotional stress is also essential. Our study identified associations between age, increased workload, and job satisfaction, with 61.7% of teachers reporting an increased workload. While causality cannot be inferred, monitoring and managing workload expectations could help alleviate stress, particularly among older educators (Hongsa & Polyong, 2024). In line with this, providing mental health support through counseling services or stress-reduction programs may help mitigate the emotional strain some teachers experienced during the pandemic (Beames et al., 2023).

Fostering student motivation and engagement should also be prioritized. Teachers in this study perceived a decline in student motivation (58.9%), suggesting the need to incorporate more interactive teaching methods, such as gamification and collaborative learning approaches, to maintain student interest and participation (Nadeem et al., 2023). Additionally, involving parents more actively in the online learning process, despite not being a primary focus of this study, has been highlighted in previous research as a valuable strategy to support student engagement and learning outcomes (Ilmanto et al., 2021).

Finally, improving government support and educational policies appears to be a critical factor. Satisfaction with the government's pandemic response emerged as the strongest predictor of teacher job satisfaction in our model, highlighting the importance of transparent and supportive policies to promote teacher morale and trust (Glaveli et al., 2024). Moreover, as only 29.9% of teachers expressed willingness to continue online learning after the pandemic, introducing financial incentives or career development opportunities may

encourage greater adoption and integration of online learning into future teaching practice (Najjar et al., 2025).

These recommendations are based on correlational findings and should be interpreted with caution, as no causal relationships can be inferred from this study. Nonetheless, they provide a foundation for further research, discussion, and policy development aimed at supporting teachers and enhancing the sustainability of online education in Kazakhstan.

Conclusion

This study highlights the multifaceted challenges faced by school teachers in Kazakhstan during the transition to OL amid the COVID-19 pandemic. Addressing technological and communication barriers, managing increased workloads, and enhancing job satisfaction are critical for improving the effectiveness and sustainability of OL. Policymakers and educational leaders must consider these factors when designing support systems and professional development programs for teachers to better prepare for potential future disruptions.

Although this study is situated within the context of Kazakhstan, its implications extend beyond national borders. Many education systems in resource-constrained or post-Soviet settings face comparable challenges, particularly in terms of digital readiness, teacher support, and policy gaps. The patterns identified in this study, such as the role of job satisfaction, communication barriers, and government support, may inform cross-national efforts to strengthen the sustainability of online learning.

Declarations

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