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Development of Research Skills in Educational Continuity: An In-Depth Review of Pedagogical Effectiveness, Student Results, and Strategic Reforms in Kazakhstan

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ABSTRACT
The development of research competence is a critical mandate for modern teacher education, yet a significant gap persists between theoretical preparation and practical application. This study investigates the formation of research culture among future and practicing teachers in the Republic of Kazakhstan, aiming to identify key components of research competence (motivational, cognitive, operational), diagnose structural barriers, and propose a model for integrating research activities into Initial Teacher Education (ITE). Employing a descriptive mixed-methods design, the study analyzed data from 55 participants, including secondary school teachers and senior pedagogical students in Almaty. Data were collected via a structured questionnaire assessing research attitudes and skill deficits, followed by semi-structured in-depth interviews and task-based assessments to evaluate operational proficiency. Results indicate a bifurcation in skill formation: 47% of respondents reported developing research skills primarily during university coursework, whereas only 30% attributed their development to school practice, highlighting a disconnect in the practicum experience. The primary barriers identified were “inability to process collected data” (a cognitive-methodological deficit), “difficulties with academic literature,” and “lack of time” (a structural barrier). While participants demonstrated high intrinsic interest in research (motivational component), this was frequently undermined by low methodological self-efficacy and insufficient institutional mentorship. The study confirms a “theory-practice gap” in which university-based theoretical training fails to translate effectively into school settings. To address this, a structural model is proposed that integrates specific data-analysis modules and systematic mentoring into the teaching practicum, ensuring that future teachers possess both the motivation and the operational capacity for professional inquiry.

KEYWORDS
educational process, research skills, research culture, future teacher, teacher education, school practice.

INTRODUCTION

In contemporary teacher education, the development of research skills is increasingly recognized as a fundamental component of professional competence, extending beyond the mere acquisition of subject knowledge. The modern educational landscape requires teachers who are not only consumers of knowledge but also active producers who can investigate pedagogical problems, analyze student data, and implement evidence-based practices (Matjašič et al., 2024). Consequently, the "teacher as researcher" paradigm has become central to ITE programs globally, aiming to equip prospective teachers with the critical thinking and methodological tools necessary for continuous professional development and school improvement (Vigh, 2024; OECD, 2025).

Despite the global emphasis on research-based teacher education, a significant gap remains between policy mandates and the practical reality of teacher training. International literature indicates that while prospective teachers often value research, they frequently lack confidence in their ability to conduct independent inquiry, citing barriers such as insufficient methodological training, a lack of mentorship, and difficulty analyzing empirical data (Koletvinova, 2019; Vigh, 2024). Furthermore, studies suggest that without systematic, curriculum-integrated support, the research competence of future teachers remains theoretical rather than practical, limiting their ability to apply scientific approaches in real classroom settings (Matjašič et al., 2024).

This challenge is particularly acute in the Republic of Kazakhstan, where rapid educational reforms demand a workforce capable of adapting to new content standards and assessment strategies. The current national framework prioritizes developing a "research culture" among educators to drive innovation in secondary schools (Yerzhanova et al., 2025). However, recent national studies highlight a contradiction: while the demand for research-active teachers is high, existing university programs often struggle to provide the sustainable, practical training mechanisms required to foster these skills effectively (ICHEI, 2025; Kuzembayeva et al., 2025; Yerzhanova et al., 2025). Prospective teachers in Kazakhstan face specific hurdles, including a disconnect between theoretical research courses and practical school-based inquiry, which hinders their readiness to perform professional research tasks upon graduation.

Addressing this gap requires a comprehensive analysis of how research skills are currently formed and perceived within pedagogical universities. This study aims to investigate the development of research skills among future teachers by examining their current levels of research engagement, identifying key barriers to their professional growth, and proposing a structural model for integrating research activities into the teacher-training curriculum. By bridging the disconnect between theoretical preparation and practical application, this research contributes to the broader discourse on optimizing teacher education to meet the demands of a rapidly evolving educational environment.

An analysis of scientific, pedagogical, and methodological literature indicates that the problem of motivation and student involvement in research activities has been addressed by Brushlinsky (2003), Vygotsky (1978), Leontiev (1978), and Rubinstein (1989). Issues related to the research-based approach in the training of future teachers are examined in the studies of Zagvyazinsky (2010), Savenkov (2006), and Sydykbayeva (Sydykbayeva et al., 2017). In the works of Abylkasymova (2000), Taubayeva (2006), and Khmel (1998), research-based learning activities are identified as fundamental components of preparing teachers for professional practice.

Based on the analysis of the current state of theory and practice, it has been established that there is a contradiction between the modern school's demand for teachers who are ready to apply research skills in their professional activities and the existing capabilities of pedagogical universities to train teachers with well-developed research competencies.

THEORETICAL FRAMEWORK

The theoretical foundation of this study rests on the paradigm of the "teacher as researcher," originally conceptualized by Stenhouse (1975), who argued that curriculum development is fundamentally based on the teacher's capacity to test and refine their own practice systematically. This concept is further supported by Schön's (1983) theory of the "reflective practitioner," which posits that professional competence is not merely the application of standardized knowledge, but a dynamic process of "reflection-in-action." In the context of modern teacher education, this framework has evolved into the concept of Research-Based Teacher Education (RBTE), in which inquiry is not merely an add-on but a central pedagogical stance (Makuvire et al., 2023; Matjašič et al., 2024; Munthe & Rogne, 2015).

Components of Research Competence

Contemporary literature defines "research competence" as a multidimensional construct that extends beyond mere technical skill. A critical analysis of recent studies identifies three primary components essential for prospective teachers:

•Motivational-Value Component: This involves the teacher's attitude toward research and their intrinsic motivation to engage in inquiry. Studies indicate that while pre-service teachers often view research as "important," they frequently lack the professional identity to see themselves as knowledge producers (Katayev, 2023; Vigh, 2024).

•Cognitive-Methodological Component: This refers to the theoretical knowledge of research methods and data analysis. International literature consistently highlights this as a major deficit area, with students reporting high anxiety regarding quantitative data processing and methodological design (Matjašič et al., 2024; OECD, 2025).

•Operational-Activity Component: This encompasses the practical ability to design studies, collect data, and write academic texts. Recent findings suggest a significant "theory-practice gap," where students can pass research exams but fail to apply these skills to solve real classroom problems during their practicum (Yerzhanova et al., 2025).

Barriers to Research Engagement

Despite the theoretical consensus on the value of teacher research, empirical studies reveal persistent structural barriers. A widely cited challenge is the lack of institutional support and mentorship. Teachers frequently report that research is viewed as an "additional burden" rather than an integral part of their professional role, exacerbated by a lack of time and excessive administrative workloads (Sakarkaya, 2023; PhilAir, 2025). Furthermore, the transition from university to school practice is often disjointed; while universities focus on academic thesis writing, schools prioritize immediate pedagogical delivery, leaving the "teacher-researcher" identity underdeveloped (Munthe & Rogne, 2015).

Critical Analysis and Research Gap

While existing literature extensively covers the importance of research skills (Stenhouse, 1975) and the barriers to their implementation (Sakarkaya, 2023), there is a paucity of research focusing on the stages of skill formation specifically within the context of the university-to-school transition in Central Asia. Most studies provide a static snapshot of teacher attitudes (self-efficacy surveys) rather than analyzing the longitudinal development of these skills through specific curriculum interventions.

This study builds upon the work of Katayev (2023) and Yerzhanova et al. (2025) but differs in that it moves beyond a mere diagnosis of "lack of skills." Instead, it proposes a structural model that aligns the period of formation (university vs. school practice) with specific developmental stages. By identifying exactly when and where the breakdown in research training occurs—specifically in the domains of data processing and independent inquiry—this research aims to provide an evidence-based framework to guide the restructuring of ITE programs to ensure sustainable professional growth.

An essential component of teachers' research culture is the ability to formulate problems and define a study's goals and objectives. In addition, this component includes skills in information search and analysis, as well as proficiency with modern information technologies. One of the fundamental principles of teachers' research culture is the use of empirical data and scientific methods, which helps avoid bias and subjectivity in the analysis of research results. The formation of a research culture also contributes to increasing the effectiveness of pedagogical practice. Teachers' engagement in research activities enables them to identify students' individual needs and create conditions for the development of their creative potential.

In the modern world, education plays a key role in the development of society and the economy. The future of society largely depends on the quality of education provided to younger generations. In this context, there is a growing demand for qualified teachers who can effectively educate students prepared to meet the challenges of a rapidly changing world. Research skills constitute an essential component of teachers' professional qualifications, enabling them to adapt to changes and to teach their students more effectively.

Studies in psychology and pedagogy indicate that teachers' research skills are a key factor in successful student learning. Research skills include the ability to search for information,

analyze and evaluate data, engage in critical thinking, make informed decisions, and apply acquired knowledge in practice.

The Harvard Graduate School of Education conducted a notable study in this field. An analysis of educational research showed that essential research skills include question formulation, hypothesis development, data analysis, problem-solving, idea exchange, decision-making, and the practical application of knowledge (Wagner, 2008).

Another study conducted by the University of Oxford (Ko et al., 2013) demonstrated that teachers with well-developed research skills are more effective at educating their students. Such teachers are better able to apply modern teaching methods, analyze and evaluate instructional materials, work collaboratively in teams, cooperate with other educators, and effectively integrate research findings into their professional practice.

Several scholars have also examined teachers' research culture. Among them, Jerome Freiberg investigated pedagogical culture in the context of developing teachers' research culture (Rogers & Freberg, 2019). For understanding the role of teachers' research culture, the psychological and pedagogical ideas of one of the founders of humanistic pedagogy and psychology, Abraham Harold Maslow, are particularly significant. Maslow developed an original psychological and pedagogical concept based on a synthesis of contemporary socio-economic and philosophical ideas, including the Theory of Hierarchy of Needs and the Theory of Self-Actualization. In his works, Maslow analyzed and substantiated the contradictions of the education system from both theoretical and practical perspectives, as a psychologist and educator (Maslow, 1999; Maslow, 2001).

Kenneth Leithwood investigated the influence of school leadership on the formation of teachers' research culture (Leithwood & Poplin, 1992). James W. Pellegrino focused on studies related to the development of teachers' research culture in the United States (Pellegrino, 2003).

The works of Shashenkova, Research Activity in the Context of Multilevel Education (Shashenkova, 2005) and Makotrova, Formation of Educational and Research Culture of Gymnasium Students (Makotrova, 2001), deserve special attention. These studies present general approaches to developing a research culture among both students and teachers.

Several scholars in Kazakhstan have also investigated issues related to research culture, including Babadzhanova (2008), Aitzhanova (2010), Akhmetova (2002), Kuanyshbekova (2009), Toktaganova (2011), Baidullina (2012), Kulikova (2021), Saparova (2014), Zhienkulova (2013), and Kerimkulova (2015). Their studies focused on the formation of teachers' research culture across various regions of Kazakhstan. They included analyses of school practices, identification of challenges and difficulties, and the development of recommendations to improve the educational process.

Several examples of international scientific and pedagogical studies conducted over the past decade and related to the formation of teachers' research culture can also be highlighted (Sarmurzin et al., 2025; Sarsenbayeva et al., 2024). The study Developing Teachers' Research Skills through a School–University Partnership (2018), conducted in the United Kingdom,

examined how partnerships between schools and universities can promote the development of teachers' research skills. The management of teachers' professional development should focus on deepening subject knowledge, improving understanding of the learning process, gaining deeper insight into students' needs, and appropriately defining learning goals and outcomes while taking into account students' cultural, linguistic, and socio-economic characteristics. It also emphasizes teachers' intellectual development and leadership (Popova & Ikonnikova, 2020).

Another study, *Building Teacher Research Capacity: The Role of School Leaders (2020),* conducted in Australia, explored how school teachers can develop research skills and foster a research culture within their schools (Rickinson et al., 2020). This work presented a systematic review of the literature on teachers' use of research skills as a means of professional development and as a foundation for establishing a research culture in schools (Kirsten, 2020).

The cumulative analysis of the theoretical frameworks and empirical studies reviewed above underscores a critical dissonance in contemporary teacher education: while the normative value of the "teacher-researcher" is universally acknowledged and grounded in robust psychological theory, the practical mechanisms for fostering this competence—particularly during the pivotal transition from university to school—remain insufficiently examined in the Central Asian context. The existing literature identifies the "what" of research culture (motivation, tools, reflection). However, it offers limited insight into the "how" of its continuous formation amidst the structural constraints of the school environment. Consequently, there is an urgent need to identify the specific barriers disrupting this educational continuity empirically and to propose a structural model that aligns the academic preparation of future teachers with the professional realities they face.

Aim and Questions of the Study

This study aims to examine the formation of research culture and research skills among future and practicing teachers and to identify key components and conditions that support their development within teacher education programs in Kazakhstan.

RQ1: What key components of research culture and research skills can be identified in the existing theoretical and empirical literature on teacher education?

RQ2: To what extent do future and practicing teachers demonstrate these components of research culture in the context of pedagogical universities and school practice in Almaty?

RQ3: What difficulties do teachers and students report when engaging in research activities?

RQ4: What stages and pedagogical conditions can be proposed to develop research skills during teacher education systematically?

RESEARCH DESIGN

Methodology

To systematically investigate the development of research competence within the framework of educational continuity, this study employed a descriptive mixed-methods design (Creswell &

Plano Clark, 2018). Specifically, a convergent parallel design was utilized, necessitating the concurrent collection and independent analysis of quantitative and qualitative data, followed by the integration of findings during the interpretation phase, as described by Cohen et al. (2018). The rationale for selecting this approach lies in the complexity of "research culture" as a pedagogical construct. While quantitative data help identify overall trends in skills and barriers within the target population, qualitative research is crucial for exploring the contextual details and lived experiences behind these statistical patterns (Creswell & Creswell, 2018). By triangulating these distinct data streams, the study enhances the validity and robustness of the conclusions, mitigating the limitations associated with mono-method approaches (Johnson et al., 2007).

Participants and Sampling Strategy

The study was conducted within the educational ecosystem of Almaty, Republic of Kazakhstan, bridging the gap between higher education preparation and secondary school practice. A purposive sampling strategy was employed to select participants with direct experience with teacher research training (Cohen et al., 2018). The total sample consisted of 55 respondents (N = 55), stratified into two primary groups to facilitate comparative analysis:

For the comparative analysis, the respondents were divided into two main groups: university lecturers and secondary school teachers. The participants' ages ranged from 24 to 58 years, with an average age of 38.6 years. The majority of respondents were women (72.7%), reflecting the gender-specific characteristics of the teaching profession in Kazakhstan, while men accounted for 27.3% of the sample.

The participants' professional experience ranged from 2 to 30 years, with an average teaching experience of approximately 12 years. Among university lecturers, most had experience in research activities and participation in academic publications, whereas school teachers possessed substantial practical experience in implementing educational research within the teaching process.

The duration of participation in the study ranged from 4 to 8 weeks and included the stages of questionnaires, interviews, and analysis of the participants' professional experience. All respondents participated voluntarily and were informed about the aims of the study, data confidentiality, and their right to withdraw from the research at any stage.

The practicing school teachers included in the study were educators currently employed in secondary schools in Almaty. This group was selected in order to provide a retrospective analysis of the usefulness of their university education as well as to evaluate the relevance of research-related training to the practical demands of contemporary school education.

Practicing School Teachers: Educators currently employed in Almaty secondary schools, selected to provide retrospective insights into the utility of their university training and the practical demands of school-based research. Pre-service Teachers: Senior undergraduate and graduate students enrolled in teacher education programs at the Institutes of Pedagogy and Psychology, and of Mathematics, Physics, and Computer Science.

This group represents the “formation” stage and provides data on the current effectiveness of the curriculum. This stratified approach ensures that the study captures the “educational continuity” referenced in the research objectives, allowing for a direct comparison between the intended curriculum (university) and the enacted curriculum (school).

Instrumentation

Two complementary instruments were developed and validated to operationalize the components of research competence defined in the theoretical framework:

Quantitative Survey: A structured questionnaire was administered to the full participant cohort. The instrument was designed to assess three core dimensions of research culture: the Motivational-Value Component (interest and engagement), the Cognitive-Methodological Component (theoretical knowledge), and the Operational-Activity Component (practical skills). Items utilized Likert-type scales and multiple-choice formats to quantify self-efficacy and the frequency of specific research tasks (e.g., data processing, academic writing). To ensure the instrument's psychometric rigor, a multi-stage validation process was employed (Boateng et al., 2018; Taherdoost, 2016). The content validity of the survey was established through expert review by a panel of pedagogical experts and senior faculty members, who evaluated the items for theoretical alignment with the 'Teacher as Researcher' model and clarity of wording (Cohen et al., 2018). To assess the reliability of the scale, Cronbach’s alpha was calculated for the three subscales (Motivational-Value, Cognitive-Methodological, Operational-Activity), yielding acceptable internal consistency indices for educational research purposes (Tavakol & Dennick, 2011).

Semi-Structured Interview Protocol: To deepen the inquiry, semi-structured interviews were conducted with a purposively selected subset of participants, including experienced teachers and high-performing students identified as “experts” in the learning process. The interview guide featured open-ended questions designed to elicit detailed narratives regarding systemic barriers (e.g., “lack of time,” “administrative pressure”) and the specific disconnects between university theory and school reality.

Data Collection and Analysis Procedure

In accordance with the convergent parallel design, quantitative and qualitative data were collected during the same timeframe to ensure temporal consistency in the participants' perspectives.

Quantitative Analysis: Survey responses were analyzed using descriptive statistics. Frequencies and percentages were calculated to establish the hierarchy of “difficulties” and the distribution of “interest” across the sample. These data were visualized in bar charts to identify dominant trends.

Qualitative Analysis: Interview transcripts underwent thematic analysis. The data were coded to identify recurring patterns related to professional identity and methodological challenges. Codes were aggregated into broader themes that provided explanatory context for the survey results.

Integration: The results were merged in the discussion phase. Statistical findings (e.g., high reported anxiety regarding data analysis) were contextualized using qualitative excerpts that explained the root causes (e.g., insufficient statistical training in university curricula), thereby answering the research questions with greater depth (Creswell & Plano Clark, 2018).

Ethical Considerations and Validity

The study adhered to rigorous ethical standards. Informed consent was obtained from all participants, and measures were implemented to ensure anonymity, particularly for teachers reporting on institutional challenges. Validity and reliability were strengthened through methodological triangulation, in which the convergence of survey and interview data cross-validated the findings (Cohen et al., 2018). The survey items were reviewed for content validity by pedagogical experts to ensure alignment with the "Teacher as Researcher" theoretical model.

FINDINGS

The findings of this study are presented below, organized by the specific research questions (RQs) that guided the investigation. Quantitative survey data is synthesized with qualitative insights from participant interviews to provide a holistic view of the research culture among teachers in Kazakhstan.

RQ1: What key components of research culture and research skills can be identified in the existing theoretical and empirical literature on teacher education?

Based on the theoretical analysis of the current educational landscape and the synthesis of expert literature, the study identified the following integral components of a teacher's research culture (Lebedeva et al., 2022). These components served as the foundation for the subsequent empirical measurement:

- Research interest: The foundational motivational component, characterized by curiosity toward new knowledge and active information seeking.
- Critical thinking: The cognitive ability to analyze, evaluate, and compare information sources to make reasoned pedagogical decisions.
- Methodological competence: The operational knowledge of research methods, including the selection of appropriate tools and the evaluation of results.
- Ability for self-analysis: The capacity for reflection and continuous professional growth through the analysis of one's own teaching practice.
- Communication skills: The ability to effectively present research findings and engage in constructive dialogue with the professional community.
- Organizational skills: The capability to plan, monitor, and execute research tasks effectively within the school environment.

RQ2: To what extent do future and practicing teachers demonstrate these components of research culture in the context of pedagogical universities and school practice in Almaty?

To address the second research question, the study analyzed participant responses regarding their attitudes toward research and the timing of their skill formation.

Attitudes toward Research: When asked to describe their attitude toward research activity, the majority of respondents indicated a positive inclination, yet this was frequently conditional. The analysis of survey responses revealed that, while participants generally selected the option "I am very interested in engaging in research activities," this was often accompanied by the caveat of structural constraints. A significant portion of respondents chose the option: "I would like to engage in research activities, but I do not have enough time." This suggests that the *Motivational-Value* component is present but is suppressed by external factors. Qualitative data reinforce this finding. Participants expressed a desire to improve their practice but felt overwhelmed by daily duties. As one teacher stated during the interview:

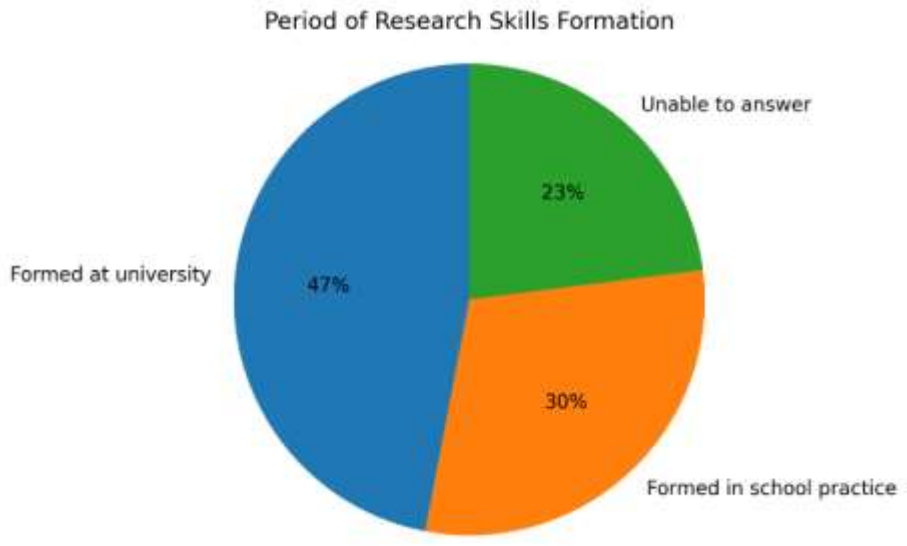
> *"I understand that research is important for my professional growth, and I want to try new methods. However, with 25 hours of teaching and the additional paperwork required by the administration, I simply do not have the physical time to conduct proper experiments or analyze data deeply."*

Preferred Research Methods: Regarding the methods of research considered most acceptable, participants favored passive, consumption-oriented methods over active, production-oriented ones. The answers generally focused on "Reading scientific literature and processing/analyzing it" as the primary method of engagement. More complex, generative methods, such as "Experiments and practical investigations followed by data analysis," were selected less frequently. This indicates a "consumer" rather than "producer" orientation toward research. A qualitative opinion from a pre-service teacher highlights this hesitation:

> *"I feel comfortable reading articles and summarizing them for class. Yet, when it comes to designing my own experiment or hypothesis, I feel unsure. We read a lot, but we rarely 'do' the research ourselves in a real setting."*

Figure 1.

Period of Formation of Core Research Skills, Survey Results



Period of Skill Formation: The study also sought to determine where these skills were primarily developed. As shown in Figure 1, the majority of respondents (47%) indicated that their research skills were formed during their university education. Only 30% reported that these skills were developed through school practice, while nearly one-third (23%) were unable to provide a definite answer. This finding points to a significant discontinuity. The qualitative data illuminates why school practice is not serving as a site of formation. A young specialist noted:

"At the university, we learned about research methods in theory, and I thought I knew them. Still, when I came to the school for practice, the focus was entirely on lesson plans and discipline. My mentor did not do research, so I did not either. The skills I learned in lectures just faded away because I never used them."

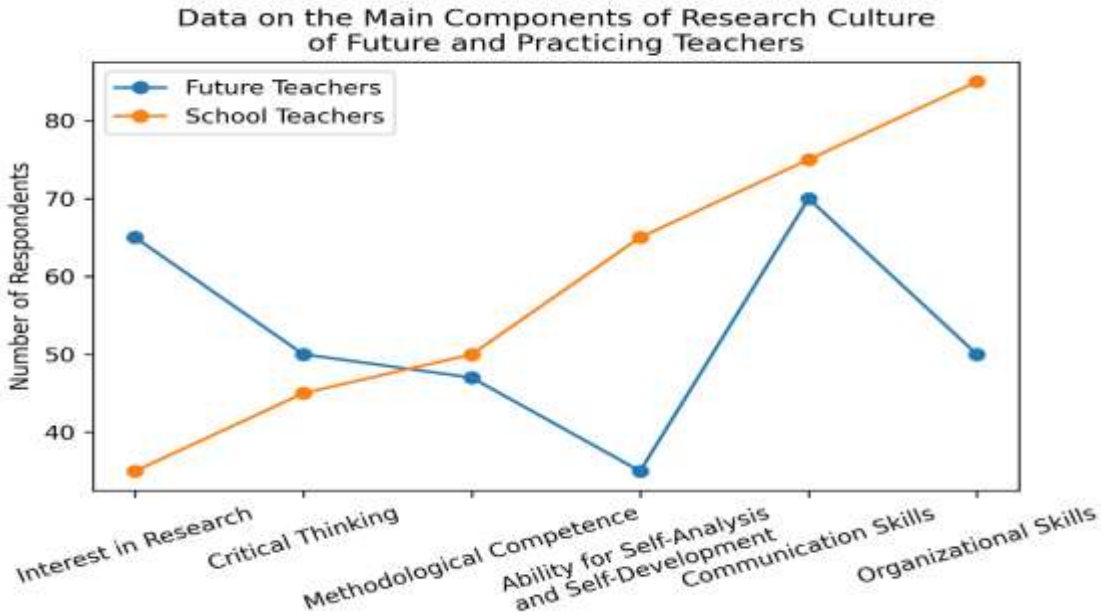
RQ3: What difficulties do teachers and students report when engaging in research activities?

The analysis of barriers revealed a hierarchy of difficulties that hinder effective research engagement. When asked "What difficulties did you experience while engaging in research activities?" the answers generally focused on three critical areas:

1. Data Processing: The most frequently cited difficulty was the "Inability to process the collected data." This corresponds to a deficit in the *Operational-Activity* component.
2. Academic Literature: Participants also frequently selected "Difficulties in working with academic literature," suggesting challenges with scientific literacy and language.
3. Organization: "Inability to organize the research process" and "Lack of free time" were dominant structural barriers.

Figure 2.

Survey Results



These quantitative results (summarized in Figure 2) highlight a gap in methodological preparation. The qualitative interviews provide "thick description" of these statistical trends. Regarding the inability to process data, one respondent admitted:

"I have gathered surveys from parents and students, so I have the raw information. However, I do not know how to process them correctly to get valid results. I get stuck when I have to use Excel or SPSS; I was not taught how to do that practically, only theoretically. I feel a lack of knowledge in using statistical programs."

Another participant highlighted the organizational difficulty:

"It is not that I do not want to do it. It is that I do not know where to start. There is no clear algorithm or guide in our school for how to run a research project alongside teaching. I feel lost in the process."

RQ4: What stages and pedagogical conditions can be proposed to develop research skills during teacher education systematically?

Based on the empirical findings—specifically the "theory-practice gap" and the "operational deficit" in data processing—this study proposes a structural model for the systematic development of research skills. This model answers RQ4 by outlining six distinct stages designed to ensure educational continuity (Koletvinova & Bichurina, 2019):

1. Familiarization with the Theoretical Foundations of Scientific Research

The initial stage focuses on acquiring methodological literacy, which serves as the cognitive foundation for all subsequent inquiry. Future teachers must first systematically internalize the basic categories of pedagogy, the logic of the scientific method, and the ethical principles governing educational research (Zagvyazinsky, 2010). This involves more than rote memorization; teacher education programs must include specialized disciplines that explicitly teach students how to formulate a research problem, define hypotheses, and select appropriate quantitative or qualitative designs (Creswell & Creswell, 2018). Without this theoretical scaffolding, students are likely to experience "methodological anxiety" when later confronted with real-world data.

2. Practical Work with Research Tools

Following theoretical grounding, the curriculum must transition to the operational application of specific research instruments. Mere knowledge of methods is insufficient; students require "instrumented practice" in which they can safely experiment with designing questionnaires, conducting mock interviews, and using observation protocols in controlled environments (Cohen et al., 2018). This stage specifically addresses the "operational-activity" deficit identified in the survey, where respondents reported significant difficulties with data processing. By incorporating tasks that require digital analysis tools (such as SPSS or Excel) into coursework, universities can build the technical self-efficacy required for independent inquiry (Savenkov, 2006).

3. Conducting Independent Research

The third stage marks the shift from guided practice to autonomous investigation. To develop robust research competencies, students must be provided with opportunities to independently plan and execute a complete research cycle within the framework of their educational programs (Koletvinova, 2019). This stage requires the student to synthesize their theoretical knowledge

and practical skills to address a specific pedagogical contradiction. By navigating the logistical challenges of data collection and participant recruitment, students move beyond passive learners and begin to construct their professional identity as “teacher-researchers” (Stenhouse, 1975).

4. Analysis and Interpretation of Research Results

One of the most critical and challenging stages is the rigorous processing of empirical evidence. As indicated by the survey results, a significant portion of teachers struggle with “inability to process data,” highlighting a need for focused training in this domain. Future teachers must learn not only how to calculate statistics or code qualitative transcripts but also how to interpret these findings in the context of existing literature (Creswell & Plano Clark, 2018). This stage emphasizes the development of critical thinking, ensuring that conclusions are drawn strictly from the data rather than from anecdotal assumptions or bias (Zagvyazinsky, 2010).

5. Reflection and Discussion

Research is inherently a communicative act that requires defense and peer review. Consequently, the fifth stage involves the structured reflection on and discussion of research outcomes. After completing their inquiries, students must engage in professional dialogue, presenting their findings to peers and mentors for critique (Schön, 1983). This reflexive process enables students to identify limitations in their study design, internalize feedback, and articulate the practical significance of their work. It fosters a culture of open inquiry and continuous professional improvement, which is essential for the modern educator (Leithwood & Poplin, 1992).

6. Application of Research Skills in Practice

The final, cumulative stage is the transfer of research competence into the school's authentic professional environment. Students must demonstrate the ability to apply their research skills during teaching practicums or the final qualification thesis to solve actual classroom problems (Yerzhanova et al., 2025). This stage bridges the gap between the “academic” research of the university and the “action” research required in schools. By using research tools to diagnose student needs and evaluate instructional effectiveness, the teacher validates the utility of the research competence, ensuring it becomes an integral part of their professional repertoire rather than a forgotten academic requirement (OECD, 2025).

DISCUSSION

The findings of this study highlight a critical “competence-performance gap” in the research training of future teachers in Kazakhstan. While the survey data indicates a high level of aspirational interest in research, it simultaneously reveals significant operational and structural barriers—specifically in data processing and time management—that prevent this interest from translating into professional practice. This discussion contextualizes these findings within the broader discourse on Research-Based Teacher Education (RBTE) and validates the proposed structural model as a necessary intervention to bridge the identified gaps.

The Paradox of Motivation: Interest vs. Self-Efficacy

A primary finding of this study is the dichotomy between the respondents' high reported interest in research and their concurrent citation of “lack of motivation” (often self-described as laziness) and “lack of experience” as major barriers. International literature suggests this is not a contradiction of intent, but a crisis of *self-efficacy*. Matjašič et al. (2024) note that while pre-service teachers recognize the theoretical value of research (“teacher as researcher”), they often lack the “epistemic agency” to view themselves as legitimate producers of knowledge. When the university curriculum places a high value on research, but students have low practical competence, the result is task avoidance, which students may erroneously label as “laziness” (Bandura, 1997; Vigh, 2024). This reinforces the necessity of the proposed *Stage 1 (Theoretical Foundations)* not merely as information transmission, but as a phase of professional identity formation where students learn to see research as a practical tool for classroom problem-solving rather than an abstract academic duty.

The Methodological Bottleneck: Data Processing and Analysis

The survey results identify “inability to process collected data” and “difficulties working with academic literature” as the most significant hurdles. This aligns with the global phenomenon of “statistics anxiety” in teacher education, where students often feel overwhelmed by the transition from qualitative observation to quantitative analysis (Chew & Dillon, 2014; Onwuegbuzie & Wilson, 2003). The finding that data processing is a primary stressor validates the inclusion of *Stage 2 (Practical Work with Tools) and Stage 4 (Analysis and Interpretation)* in our model.

However, the literature on “Data Literacy” suggests that this training must evolve. Mandinach and Gummer (2013) argue that teachers do not need to be statisticians, but they must be “data literate” enough to make instructional decisions. Therefore, Stage 2 of our model should prioritize modern digital tools (such as SPSS or AI-assisted analysis software) that lower the cognitive load of calculation, allowing students to focus on interpretation (Yerzhanova et al., 2025). The recent integration of AI tools in Kazakhstani education (e.g., ChatGPT Edu) offers a promising avenue to mitigate these processing difficulties by acting as a scaffold for novice researchers (Madiyev, 2025, as cited in local policy reports).

The “Wash-Out Effect” and the University-School Disconnect

The finding that 47% of respondents identify the university as the primary site of skill formation, compared to only 30% in school practice, provides empirical evidence of the “theory-practice gap” in the local context. This distribution suggests that research skills are largely compartmentalized within the university setting and insufficiently reinforced during school placements.

This phenomenon is described in the literature as the “wash-out effect” (Zeichner & Tabachnick, 1981; Lawson, 1989), in which the conformist pressures and survival needs of the school environment erode the research-oriented mindset acquired at the university. If school mentors do not model research-based practice, students quickly abandon inquiry in favor of

imitation. This finding critically underscores the importance of *Stage 6 (Application of Research Skills in Practice).* Our data suggest that this stage cannot simply be a "final exam"; it must be an immersive, mentored experience in which the school and university collaborate to validate research as a daily professional activity, rather than an academic hurdle (Munthe & Rogne, 2015; Sakarkaya, 2023).

Structural Barriers: The Impact of Administrative Load

Respondents identified "lack of free time" and "inability to organize the research process" as persistent difficulties. While often dismissed as time-management issues, comparative data from the OECD TALIS surveys (2018, 2024) confirm that "administrative workload" is the primary source of teacher stress globally, particularly in systems undergoing rapid reform, such as Kazakhstan (OECD, 2019).

The "teacher-researcher" model assumes a level of professional autonomy and time that is often absent in the reality of schools. Sakarkaya (2023) argues that without institutional support and "protected time" for inquiry, research sustainability is impossible. Therefore, implementing our proposed model requires not only curricular changes within the university but also a systemic dialogue with school administrators to reduce bureaucratic burdens, thereby creating the "cognitive space" required for Stage 5 (Reflection and Discussion).

Conclusion and Recommendations

This article examines one possible direction for improving methodologies aimed at developing research skills in future teachers. The results of the theoretical analysis, as well as the evaluation of the conducted pedagogical experiment, allow the following conclusions to be drawn.

Research skills are effectively developed when students engage in both educational and scientific research activities in accordance with the proposed stages. It has been substantiated that the formation of research skills should be organized with due consideration of the structure of learning and cognitive activity, the internal structure of the skills being developed, and the content of academic disciplines.

The conducted study convincingly demonstrates the necessity of purposeful development of research skills as an essential component of professional teacher education. Research skills not only enhance the quality of university-level education but also provide an effective tool for successful scientific and pedagogical activity. Possessing such skills and being actively involved in research also contribute to the personal development and overall cultural growth of future teachers. Specialists with these competencies are particularly in demand in today's labor market.

Based on the findings, several recommendations can be formulated for teacher education programs. First, curricula should explicitly include modules on research methodology, data analysis, and critical engagement with scientific literature, supported by guided practical research projects. Second, systematic mentoring by experienced researchers and school mentors should be organized to scaffold students' research activities. Third, collaboration

between universities and schools should be strengthened in order to create authentic contexts in which future teachers can apply and refine their research skills.

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