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The Impact of Coaching on Development of Transversal Skills: An Exploratory Study of Teacher Candidates in Kazakhstani Primary Education

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ABSTRACT
In Kazakhstan, the development of future teachers' transversal skills is currently underemphasized in both curricula and basic educational programs. This gap poses a risk that many pedagogy graduates will lack essential transversal skills, thereby potentially reducing their effectiveness in their professional lives and hindering their career improvement. However, empirical data on the effectiveness of interventions, such as coaching, in enhancing transversal skills among future teachers are limited. This study aims to examine the impact of coaching interventions on enhancing transversal skills in future educators using a mixed methods approach. The experiment involved 100 participants and highlighted challenges such as limited knowledge of transversal skills, motivation issues in skill development, and difficulties in utilizing coaching technology effectively. However, the study findings reveal significant improvements in participants' transversal skills after implementing and testing an academic program designed for this purpose. These findings can serve as a basis for developing strategies to enhance transversal skills in university settings and inform the adaptation of educational programs focused on transversal skill development.

KEYWORDS
Coaching; exploratory study; impact; teacher candidates; transversal skills.

INTRODUCTION

One of the key requisites for a developing society is fostering communication and tolerance among students. In recent years, these constructs have been recognized as integral components of transversal competence (Abulibdeh et al., 2024; Javaid et al., 2022). Transversal skills encompass a versatile set that can be readily applied across different domains, are highly utilized within specific fields, and develop rapidly. These skills are necessary for students to effectively navigate school activities and daily life. Their importance lies in their critical role in achieving success across diverse job markets. Acknowledged widely in society as fundamental to learning pathways, transversal skills are considered among the most intricate cognitive skills (Plaza-Angulo & López-Toro, 2024). They are crucial in meeting the demands of the labor market, with some studies referring to them as work skills (Calero López & Rodríguez-López, 2020). In educational contexts, these skills facilitate mastery of curricula, interaction with teachers, and preparation for future professional endeavors through industrial practice, thereby shaping students' career orientations. Training priorities have shifted from purely professional competencies to encompass broader, universally applicable skills. Coaching serves as a pivotal method for cultivating transversal skills among teacher candidates. Integrating coaching into student preparation elevates their awareness of the essence of educational practice. This approach fosters creative and holistic development for both students and teachers alike. Rather than traditional methods focused solely on competition readiness, coaching adopts a target-oriented approach that uncovers each student’s potential and guides them toward conscious goal achievement (Grant, 2022; Graßmann & Schermuly, 2021). Essential to effective coaching implementation is the teacher’s professional and personal reflection, which aids in understanding, evaluating, and developing strategies within pedagogical contexts (Fulmer, 2019). This reflective process aligns the teacher’s professional goals with those of other stakeholders, optimizing the training implementation strategy. Furthermore, teachers who engage in reflective practice facilitate student reflection, a crucial skill for fostering self-directed learning. Encouraging reflection in students enhances their capacity for active and deliberate learning, enabling them to independently acquire knowledge and tap into their inner potential. This fosters achievement of desired outcomes and, importantly, sustains and enhances their motivation to learn (Kutluca & Shpendi Şirin, 2024; Melo & March, 2023).

Establishing equitable psychological dynamics in teacher-student communication hinges on empathetic interaction. This involves respecting and accepting each other's motives, needs, desires, judgments, feelings, and methods of engagement, prioritizing both the process and outcomes of their collaboration. Such communicative practices profoundly impact students' attitudes and interest in cognitive pursuits, enhancing their awareness of how their efforts contribute to personal growth and professional success. This heightened awareness fosters a readiness to take responsibility for achieving outcomes. Transversal progression skills are essential for enhancing both student achievement and effective instruction (Sá and Serpa, 2018). However, there remains a notable gap in research concerning systematic methods to

develop these skills among teacher candidates (Almazroa & Alotaibi, 2023; Alt et al., 2023). Traditional teacher education programs typically prioritize subject-specific knowledge and pedagogical techniques, potentially overlooking the comprehensive development of these transferable skills (Darling-Hammond et al., 2024).

Kazakhstan, there is insufficient focus on developing future teachers' transversal skills within university curricula and professional educational programs. This oversight raises concerns that many pedagogy graduates may lack adequate transversal skills, thereby compromising the effectiveness of their professional activities and hindering their career advancement. Currently, the teaching of foundational transversal skill concepts remains indirect, often embedded within other subject knowledge, yet it is increasingly recognized as a vital component of higher education (Zhakupova et al., 2022). Consequently, transversal skills are still being comprehended within Kazakhstan's educational context. However, empirical evidence on the effectiveness of targeted interventions, such as coaching, in cultivating these skills among future teachers is limited (Karimova et al., 2024; Kulshayeva et al., 2023). The progression of transversal skills in Kazakhstan has highlighted several challenges within the higher education system (Abdiyev et al., 2023; Nagima et al., 2023). Firstly, there is a lack of understanding regarding the development of teachers' transversal skills and the increasing demands placed on prospective educators in today's educational environment. Secondly, there is a growing societal demand for teachers with advanced skills, creative abilities, and strong moral qualities, yet the actual educational practices often fail to provide adequate conditions for their cultivation. Thirdly, there is a significant gap in the application of coaching technologies to develop transversal skills, leading to a conflict in education between the necessity to foster these skills and the insufficient use of effective coaching methods. Concurrently, universities are challenged to design educational programs that meet contemporary standards for training competitive specialists in the digital economy. The ability to effectively leverage modern transversal skills emerges as a vital competency for maintaining competitiveness in this context. Addressing these challenges necessitates innovative research and the effective implementation of coaching to stimulate the development of transversal skills among teacher candidates. However, a critical question remains: Does coaching improve the transversal skills of teacher candidates, and if so, how? Despite the importance of improving these skills, existing literature has yet to sufficiently explore the impact of coaching on the development of transversal skills among future educators. This study aims to examine the effectiveness of coaching in shaping the transversal skills of prospective teachers, which is crucial for fostering well-rounded and comprehensively developed individuals.

Questions for Research

Q1: How does the coaching intervention develop transversal skills among teacher candidates?

Objectives

This study aims to assess how coaching interventions can improve transversal skills in future educators.

The research hypothesis posits that coaching interventions substantially improve transversal skills among teacher candidates in Kazakhstan, thereby fostering harmonious and well-rounded personality development.

THEORETICAL FRAMEWORK

The term "transversal skills" is relatively new in contemporary education (Dolce et al., 2020; Teo et al., 2021). Originally, "transversality" was a concept rooted in fields such as linear algebra, differential geometry, and geometric topology, dating back to the early 19th century. In these disciplines, the term "transversal" refers to a straight line intersecting a spatial curve (García-Álvarez et al., 2022; Tight, 2021).

Like any terminological concept, "transversality" serves multiple purposes. Its descriptive function involves establishing specific transversal knowledge and applying this concept, along with its characteristics and relationships, in innovative ways (Sofia et al., 2023; Torres et al., 2018). "Transversality" was originally a term specific to certain disciplines until the 20th century, when its applicability expanded to encompass other areas of human cognition (Dixon, Lee & Corrigan, 2021).

Transversal skills are widely discussed in educational settings as one of the most influential pedagogical concepts in a knowledge-based society (Aguilar-Ferrándiz et al. 2024; Asonitou, 2022; Bhagwonparsadh & Pule, 2024; Kim et al., 2019). The European Commission's 2017 policy document, "White Paper: The Future of Europe," underscores the expectation that "the majority of children entering primary school today will engage in new activities that do not yet exist (Çam & Koç, 2024; Peláez Zuberbuhler et al., 2020). Achieving this vision requires substantial investment in skills development and a fundamental overhaul of education and lifelong learning systems (Kraft et al., 2018). These emerging competencies are classified as transversal skills (Yang et al., 2022), which differ from narrowly defined professional skills as demonstrated in linguistic corpora and other contexts. Specifically, transversal skills encompass abilities such as teamwork, effective communication, entrepreneurial mindset, creative thinking, and problem-solving (Cohen et al., 2024; Gcabashe, 2024; Knight & Skrtic, 2021; Molomo, 2023). According to Ospankulov et al. (2023), professional identity is pivotal as it shapes students' self-perception in social and professional settings. Skills related to lifelong learning are integral to this aspect, highlighting a current deficiency in Kazakhstani university curricula. Therefore, there is an urgent need to reassess educational policies, revise programs, and update teaching methods at universities. These changes should prioritize the development of essential skills that enhance the employability of future professionals.

METHODS

Research Design

This section provides a detailed description of the research strategy, outlining the main stages, data collection methods, survey response selection criteria, and necessary resources. The

research design employed an experimental approach, which was deemed most suitable for assessing the impacts of the experimental program. This design necessitated the creation of two distinct study groups: an experimental group (EG) and a control group (CG). It was crucial that these groups were similar in key characteristics (e.g., gender, age, location, educational background) except for the variable under investigation (e.g., participation in the training program). Conclusions regarding the effects of the program were drawn by comparing survey results between the EG and CG, allowing for an evaluation of changes resulting from program implementation.

Collection of Research Samples

This study was conducted at Abai Kazakh National Pedagogical University from September 2022 to June 2023. It focused on students enrolled in the program "6B01303: Primary Education with Information and Communication Technologies." The study comprised an experimental group (n = 50) and a control group (n = 50), selected through randomization (random selection). General sociometric indicators were collected from study participants (see Table 1).

Table 1.

General sociometric indicators of the participants

Outcomes		**Experimental Group (EG)**	**Control Group (CG)**
Age	Mean Age	22.3 years	22.7 years
	Age Range	20-25 years	20-25 years
Gender	Female	34 (68%)	32 (64%)
	Male	16 (32%)	18 (36%)
Educational Background	Completed High School in Urban Areas	28 (56%)	26 (52%)
	Completed High School in Rural Areas	22 (44%)	24 (48%)
Region of Origin	Urban Areas	30 (60%)	29 (58%)
	Rural Areas	20 (40%)	21 (42%)
Teaching Experience	No Teaching Experience	41 (82%)	39 (78%)
	1-2 Years of Teaching Experience	9 (18%)	11 (22%)
Language Proficiency	Proficient in Kazakh:	50 (100%)	50 (100%)
	Proficient in Russian:	40 (80%)	42 (84%)
	Proficient in English:	10 (20%)	8 (16%)

Research Approach

Coaching Intervention Program to Enhance Transversal Skills in Teacher Candidates

The coaching intervention program aimed at enhancing transversal skills in future educators was implemented over the course of a school year. The program included structured workshops, one-on-one coaching sessions, peer collaboration activities, and reflective practices, with each session averaging 50 minutes in duration. Coaching for enhancing transversal skills in future educators at Abai Kazakh National Pedagogical University was conducted by teaching staff who

received specialized training in coaching approaches. Coaching in this context involved a personalized approach aimed at supporting students, identifying their strengths, fostering a success-oriented mindset, promoting active engagement in the learning process, and achieving specific learning outcomes for each student. Table 2 shows the program structure. Table 2 shows the program structure.

Table 2.

Program Structure (see appendix)

Measurement Instruments

Pre-Intervention Survey

1. Self-assessment of transversal skills:

Rate your proficiency in the following skills on a scale from 1 (very poor) to 5 (excellent):

(1) Critical Thinking:

1. I can analyze the information and determine the main problems.
2. I can critically evaluate arguments and evidence.
3. I can generate creative solutions for problems.

(2) Problem solving:

4. I can identify the underlying reasons behind the problems.
5. I can develop and implement effective solutions.
6. I can adapt my problem-solving approach when needed.

(3) Communication:

7. I can communicate my ideas clearly and effectively.
8. I can listen actively and respond appropriately.
9. I can present information confidently in front of a team.

(4) Collaboration:

10. I can work effectively as part of a team.
11. I can manage conflicts constructively within a team.
12. I can contribute to the achievement of team goals.

Post-Intervention Survey

1. Self-assessment of transversal skills:

Rate your proficiency in the following skills on a scale from 1 (very poor) to 5 (excellent):

(1) Critical Thinking:

1. I can analyze the information and determine the main problems.
2. I can critically evaluate arguments and evidence.
3. I can generate creative solutions for problems.

(2) Problem solving:

4. I can identify the underlying reasons behind the problems.
5. I can develop and implement effective solutions.
6. I can adapt my problem-solving approach when needed.

(3) Communication:

7. I can communicate my ideas clearly and effectively.
8. I can listen actively and respond appropriately.
9. I can present information confidently in front of a team.
(4) Collaboration:
10. I can work effectively as part of a team.
11. I can manage conflicts constructively within a team.
12. I can contribute to the achievement of team goals.
2. Experience with the coaching intervention (only experimental group):
- How beneficial were individual coaching sessions in developing your transversal skills?
- How beneficial were group workshops for developing your transversal skills?
- How useful was maintaining a reflective journal in your learning process?

Data Analysis

Paired t-tests and ANOVA are utilized to compare the results of pre- and post-intervention surveys, assessing the statistical significance of changes in transversal skills over the course of the coaching intervention.

RESULTS AND DISCUSSION

Analysis of Surveys

Paired t-tests were employed to compare the pre- and post-intervention survey scores for each skill within both the EG and CG (see Table 3).

Table 3.

Data collected in a structured format

Group	Test	Critical Thinking	Problem-Solving	Communication	Collaboration
EG	Pre-Intervention	3.2	3.1	3.4	3.3
EG	Post-Intervention	4.1	4.0	4.2	4.3
Paired t-test Result		- t(49) = 7.45, p < 0.001	t(49) = 8.12, p < 0.001	t(49) = 6.98, p < 0.001	t(49) = 8.45, p < 0.001
CG	Pre-Intervention	3.3	3.2	3.5	3.4
CG	Post-Intervention	3.4	3.3	3.6	3.5
Paired t-test Result		t(49) = 0.95, p = 0.35	t(49) = 1.05, p = 0.30	t(49) = 1.10, p = 0.28	t(49) = 1.02, p = 0.31

Paired t-tests reveal statistically significant improvements in self-assessed transversal skills within the EG following the coaching intervention. In contrast, the CG did not demonstrate significant changes in their skills over the same period.

ANOVA was used to contrast the differences in the post-intervention scores (see Table 4).

Table 4.

Data collected in a structured format

Post-Intervention	Critical Thinking		Problem-Solving		Communication		Collaboration	
Mean	EG	CG	EG	CG	EG	CG	EG	CG
	4.1	3.4	4.0	3.3	4.2	3.6	4.3	3.5
ANOVA Result	$F(1, 98) = 52.34$, $p < 0.001$		$F(1, 98) = 65.21$, $p < 0.001$		$F(1, 98) = 48.12$, $p < 0.001$		$F(1, 98) = 70.45$, $p < 0.001$	

Table 4 shows that the coaching intervention significantly enhanced the development of transversal skills among primary school teachers. ANOVA results further validate these findings, showing statistically significant differences in post-intervention scores across all four transversal skills. Specifically, the experimental group, which received coaching, achieved notably higher mean scores on these skills compared to the CG.

The findings underscore the effectiveness of coaching as a professional development tool for enhancing essential skills in future educators.

DISCUSSION

This study evaluated how coaching interventions can enhance transversal skills in future educators. Initial diagnostics confirmed low levels of these skills among teacher candidates, emphasizing the necessity for focused development efforts (Baumeler, 2019).

To address the complex task of developing future teachers' transversal skills, an optimal combination of traditional and innovative pedagogical methods was employed, integrating interactive coaching learning methods that leverage coaching technology (Calero López & Rodríguez-López, 2020).

In the educational process, coaching was presented in the following areas: psychological and pedagogical support for EG participants, aimed at achieving results and goals in the process of partnership interaction; formation and support of the activity of EG participants using methods of projective and interactive social interaction; and a gradual increase in awareness and development of individual abilities.

The teacher's actions when interacting with students were important in creating an environment conducive to modifying the learning system and adapting to educational and professional activities on their own. As a result of this work, the student became immersed in the problem and, after analyzing educational situations relevant to the profession, a solution emerged.

The optimal combination of traditional and innovative coaching learning forms and methods aided students' consistent progression from the reproductive to productive stages of mastering transversal skill (Cepic et al., 2015). Therefore, a set of interactive coaching learning methods involving the active use of coaching technology was introduced into the educational

process of the EG participants. The changes made to the coaching learning pedagogical system focused on the training content, means, methods, and forms of the technological subsystem (Maiden et al., 2023). The use of coaching and coaching approaches in preparing EG students elevated all participants' awareness of the essence of educational activity. It transformed the educational process into a platform for creative, holistic personal development for both students and teaching staff. Additionally, the traditional approach to planning and organizing student preparation shifted to a coaching-targeted approach, uncovering student potential and fostering deliberate progress toward goals (van der Baan et al., 2022).

In the coaching learning process, students engage in self-regulation through independent knowledge acquisition, self-organization, and self-management. New event formats, like seminars and discussions on innovative technologies, were integrated into the educational process of coaching learning. Monitoring student progress aligns with program milestones. This approach highlights the advantages of organizing coaching learning with a well-founded algorithm for improving transversal skills compared to traditional methods. The study in the experimental group demonstrated dynamics in transversal skills development, validating the research hypothesis and achieving the study's objectives.

CONCLUSIONS

The purpose of this study was to evaluate how coaching interventions can improve transversal skills in future educators, crucial for their successful professional development. The study findings revealed four levels of changes resulting from integrating coaching technology into the educational process: replacement of traditional pedagogical tools, improvement of existing pedagogical methods, modification of teaching practices, and transformation of teaching methodologies. Secondly, the results show that traditional teaching techniques may not suffice to meet the demands of professional standards. It is imperative to enhance future teacher training methods in higher education institutions (HEIs) and to reform university course structures. In this study, we leveraged coaching technologies to improve future teacher training, fostering independence, stimulating academic interest, enriching social experiences, and promoting intellectual development among EG participants. Furthermore, the study findings reveal that coaching interventions facilitate the development of attention, memory, volition, and critical thinking. By utilizing interactive and multimedia services, teacher training became more diverse and accessible. This study demonstrates significant improvement in students' transversal skills following the introduction and testing of the author's academic program with EG participants. The data from this study can serve as a foundational resource for developing strategies to foster transversal skills in universities and as a methodological framework for adapting educational programs accordingly.

Limitations and Additional Future Directions

This study assessed the impact of coaching technologies on improving teacher candidates' transversal skills. The findings suggest opportunities for developing strategies for transversal

skills development in universities and establishing a methodological foundation for adapting educational programs. However, several aspects require further investigation.

1. Further research could aim to clarify the criteria and indicators of prospective teachers' readiness to utilize transversal skills in organizing and supporting educational activities for schoolchildren.

2. Future researchers could explore the development of transversal skills among students across diverse disciplines during their university education.

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APPENDIX

Table 2.

Program Structure

Component	Description	Frequency
Initial assessment and goal-setting	To identify the current level of transversal skills in each participant.	Weeks 1-2
Individual goals-setting sessions	To establish personalized development goals.	Week 3
Structured Workshops	Workshops on specific transversal skills. Each workshop focuses on a different skill and includes theoretical input, practical activities, and group discussions.	Monthly (1 session/month) (Week 4 onward)
One-on-one coaching sessions	Personalized coaching sessions to address individual needs and goals.	Monthly Sessions
Mid-Year Review	A comprehensive review of progress to adjust goals and strategies.	At the end of the first semester
Peer Collaboration	Group activities and projects to foster collaboration and peer support.	
Weekly Peer Group Meetings	Small groups meet weekly to discuss their experiences, share information, and support each other's development.	Weekly (1 session/week)
Peer Observation and Feedback	The participants will observe the teaching practices of each other and provide constructive feedback.	
Reflective Practices	Activities encouraging self-reflection of personal and professional growth.	Ongoing (self-directed)
Journaling	Participants maintain a reflective journal, documenting their experiences, challenges, and progress.	Throughout the year
Reflective Discussions	Monthly group sessions dedicated to reflective discussions on learning experiences and skill development.	Monthly (1 session/month)
Project-Based Learning	Participants engaged in project-based learning activities in which they applied transversal skills to real-world teaching scenarios.	Each semester at its conclusion
Final Assessment:	A comprehensive assessment is conducted to measure the development of transversal skills in each participant.	In the final stage
Program Evaluation	Feedback from participants and mentors is collected to assess the effectiveness of the program and identify areas for improvement.	In the final stage