

Developing Teamwork Competencies Through Collaborative Technologies in Uzbekistan's 4+2 Dual Teacher-Education Model

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ABSTRACT

The increasing integration of university education and workplace-based learning has created new demands for teacher education systems, particularly in relation to students' ability to collaborate, communicate, assume responsibility, and respond flexibly to authentic professional situations. This article examines the development of teamwork competencies through collaborative technologies within Uzbekistan's emerging 4+2 dual teacher-education model. The study conceptualizes dual teacher education not simply as a redistribution of time between university and school, but as a collaborative learning environment in which teacher educators, school mentors, student teachers, and pupils participate in interconnected professional-learning processes.

Drawing on an experimental methodological framework involving students enrolled in pedagogy and primary education programs, the study identifies four core dimensions of teamwork competence: active participation, communication, responsibility, and conflict management and cooperation. A combination of observation, peer assessment, reflective journals, role-based tasks, scenario-based activities, interviews, and classroom video analysis was employed. The formative intervention incorporated collaborative learning, peer teaching, project-based learning, flipped classroom, gamification, authentic school-based instruction, and two locally developed methods, "Knowledge Collection" and "Power of the Team." Two digital tools, the proposed "HamkorTa'lim" mobile application and "GeoEducationBot" Telegram bot, were conceptualized as mechanisms for communication, assignment management, monitoring, feedback, and coordination between universities and schools.

The analysis suggests that collaborative technologies are most effective when they are embedded within structured pedagogical relationships rather than introduced as technological tools alone. The study argues that the principal contribution of the 4+2 model lies in creating a "third space" between university and school in which theoretical knowledge, professional practice, peer collaboration, and digital communication are continuously connected. The article concludes with implications for teacher education reform in Uzbekistan and other Asian contexts where dual and work-integrated models are increasingly being explored.

Keywords: Uzbekistan; dual education; teacher education; 4+2 model; collaborative learning; teamwork competence; work-integrated learning; teacher practicum; digital education; peer learning; school–university partnership.

INTRODUCTION

Teacher education is increasingly being reconsidered as a process that extends beyond the university classroom.

Contemporary teachers are expected to demonstrate not only subject and pedagogical knowledge but also communication, collaboration, leadership, reflective

practice, conflict management, and problem-solving competencies. These competencies are particularly important because teaching itself is increasingly organized through professional collaboration among teachers, school leaders, families, educational specialists, and communities.

The challenge is therefore not simply how to provide prospective teachers with more knowledge, but how to create institutional environments in which knowledge can be transformed into professional action.

This issue is particularly significant in Uzbekistan, where reforms in teacher preparation increasingly emphasize stronger connections between higher education and educational practice. Recent national developments have expanded the use of dual education and emphasized closer integration between educational institutions and workplaces. Uzbekistan's current dual-education reforms similarly reflect a broader movement toward connecting theoretical instruction with practical training. Within this context, the 4+2 model represents an especially relevant organizational framework. Students spend four days engaged in university-based study and two days undertaking practical activities in schools. The model potentially allows students to move repeatedly between theoretical and practical environments rather than postponing professional practice until the end of their degree.

However, physical movement between university and school does not automatically produce professional competence. Students may possess theoretical knowledge while still experiencing difficulties in classroom communication, professional behavior, lesson planning, classroom management, teamwork, and conflict resolution. The central pedagogical question is therefore how the university-school relationship can be transformed from a logistical arrangement into a collaborative learning system.

Research on teamwork pedagogy indicates that effective teamwork in higher education requires deliberate pedagogical design and cannot be reduced to simply placing students into groups. Riebe, Girardi, and Whitsed identify institutional, educator, student, and resource-related factors that can facilitate or constrain teamwork pedagogy. Sage Journals Research focused specifically on future teachers similarly suggests that cooperative learning can contribute to personal, interpersonal, transversal, pedagogical, and professional competencies, although sustained and structured experiences are necessary.

Teacher collaboration is equally significant in the school environment. A systematic review of 82 studies found that collaboration among teachers exists along a continuum and that the depth and structure of collaboration influence its potential contribution to professional learning. DOI This observation is particularly relevant to dual teacher education because student teachers learn not only from university instructors but also through interaction with practicing teachers.

The present study therefore approaches teamwork as a professional competence that must be developed across both university and school settings.

The study addresses the following research questions:

1. What teamwork-related difficulties do student teachers encounter during practical training in the 4+2 dual education model?
2. Which collaborative pedagogical approaches can support the development of teamwork competencies?
3. How can digital technologies strengthen collaboration between students, university instructors, and school mentors?
4. How can authentic school-based university teaching contribute to the professional development of student teachers?

The central argument of this article is that the effectiveness of dual teacher education depends not only on the distribution of students' time between university and school but on the quality of collaboration connecting these two environments.

CONCEPTUAL FRAMEWORK

1. From group work to teamwork competence

Group work and teamwork should not be treated as synonymous. Students can work in groups without developing genuine collaborative competence. Teamwork requires positive interdependence, communication, individual responsibility, shared decision-making, mutual support, and mechanisms for managing disagreement.

For teacher education, teamwork competence is particularly important because teachers routinely

participate in subject departments, professional learning communities, curriculum-development teams, assessment processes, school projects, and multidisciplinary collaborations.

The present study conceptualizes teamwork competence through four dimensions:

- active participation;
- communication;
- responsibility;
- conflict management and cooperation.

These dimensions are complemented by leadership, social activity, and reflective ability during the formative stage.

2. Collaborative learning in teacher education

Collaborative learning provides a pedagogical framework for transforming students from passive recipients of knowledge into active participants in knowledge construction. Systematic evidence from teacher education suggests that cooperative learning can contribute to both professional and interpersonal development, although successful implementation requires structure, time, and sustained pedagogical support.

Recent research also emphasizes the role of digital and video technologies in initial teacher education. Video-based collaborative learning can facilitate reflection, peer feedback, shared interpretation of teaching practices, and professional discussion.

This is particularly valuable in the 4+2 model because students can record, analyze, discuss, and revise their teaching practices across university and school environments.

METHODOLOGY

1. Research design

The study employed a three-stage design:

1. diagnostic assessment;
2. formative intervention;
3. final analytical and generalization stage.

The research was conducted under natural educational conditions with students enrolled in pedagogy and primary education programs.

The experimental structure included experimental and control groups among second- and third-year students. Because of the relatively small number of students in the pedagogy program, students from primary education were additionally included.

The study was designed as a practice-oriented educational intervention rather than as a purely laboratory experiment. This allowed collaborative methods to be implemented in ordinary university and school settings.

2. Assessment dimensions

Four primary criteria were established:

Criterion	Main indicators
Active participation	Initiative, voluntary participation, contribution to group tasks
Communication	Clarity of expression, listening, questioning, responding
Responsibility	Completion of assigned roles, punctuality, reliability
Conflict management and cooperation	Negotiation, compromise, problem-solving, mutual support

Additional formative indicators included leadership, social activity, and reflective ability.

3. Data-collection instruments

The study used multiple instruments in order to reduce dependence on a single source of evidence:

- observation sheets;
- classroom video analysis;
- teacher and mentor diaries;
- speech analysis;
- interactive communication tasks;
- peer-assessment cards;
- role-based checklists;
- task-completion schedules;
- reflection journals;
- scenario-based problem-solving activities;
- role-playing;
- interviews;
- questionnaires.

The use of multiple instruments is particularly important in assessing teamwork because collaboration is a behavioral competence that cannot be adequately captured through a conventional knowledge test alone.

FINDINGS

1. Psychological and professional difficulties

The diagnostic stage identified several recurring difficulties among student teachers.

First, some students demonstrated professional insecurity when entering school environments. Their concerns included fear of making mistakes, anxiety about pupils' reactions, uncertainty about their professional suitability,

and discomfort when interacting with experienced teachers.

Second, students demonstrated difficulties related to professional image and pedagogical etiquette. These included professional dress, language, body language, classroom presence, and maintaining an appropriate balance between friendliness and professional authority.

Third, students experienced methodological difficulties involving lesson planning, time management, assessment, age-appropriate instruction, and classroom organization.

These findings suggest that the transition from university to school should not be understood as a simple transfer of theoretical knowledge. It is a process of professional socialization.

2. Classroom engagement

Classroom-management problems were particularly visible when students worked with older pupils. In some cases, pupils questioned the relevance of lessons, used mobile phones during instruction, talked during lessons, or resisted student teachers' authority.

The intervention therefore emphasized a progression from attention to participation, from participation to respect and motivation, and finally toward long-term responsibility.

The model can be represented as:

**ATTENTION → PARTICIPATION → RESPECT →
MOTIVATION → RESPONSIBILITY**

Rather than treating discipline as a purely administrative problem, the model treats classroom engagement as a pedagogical and relational process.

For example, mobile phones can be transformed from sources of distraction into learning instruments through simulations, online research, digital quizzes, and collaborative tasks.

This approach is consistent with the broader argument that educational technology produces meaningful benefits only when embedded within purposeful pedagogical design.

3. The “Knowledge Collection” method

The “Knowledge Collection” method was designed around

collaborative knowledge construction.

Students first independently investigate different aspects of a topic. They then present their findings to peers, compare information, identify gaps, add new sources, and jointly produce an expanded knowledge collection.

The method consists of five stages:

1. individual knowledge collection;
2. group presentation and discussion;
3. collaborative expansion;
4. group synthesis and peer assessment;
5. reflection and revision.

Its significance lies in the relationship between individual responsibility and collective knowledge. Each student becomes responsible for contributing something that the group does not yet possess.

4. The “Power of the Team” method

The second original methodological approach, “Power of the Team,” combines flipped learning with peer teaching.

Students first study assigned material independently. An initial assessment is then used to identify differences in understanding. Students are subsequently organized into temporary learning groups.

Students with stronger understanding of particular topics assume mentor or “lecturer” roles, while other students receive peer support. Roles are not fixed; they may change as learning progresses.

The method follows the sequence:

INDIVIDUAL PREPARATION → DIAGNOSTIC ASSESSMENT → DYNAMIC GROUPING → PEER TEACHING → REASSESSMENT → REFLECTION

The approach changes the role of the university teacher from the primary transmitter of information to a facilitator and methodological supervisor.

5. Collaborative teaching in authentic school environments

One of the most significant innovations proposed by the study is the transfer of selected university seminars and practical sessions into partner schools.

In this model, a university instructor conducts a model lesson in an authentic classroom while student teachers observe and analyze professional decisions.

Students subsequently discuss:

- how the lesson was structured;
- how pupils were motivated;
- how questions were handled;
- how disruptive behavior was addressed;
- how assessment was conducted;
- how unexpected classroom situations were managed.

This model creates a bridge between university pedagogy and school practice.

Research on collaboration between practicing teachers and pre-service teachers similarly indicates that prospective teachers can benefit from collaborative professional relationships, particularly when they are treated as active partners rather than passive observers.

DIGITAL COLLABORATION IN THE 4+2 MODEL

1. “HamkorTa’lim”

The proposed “HamkorTa’lim” application is conceived as a digital coordination environment linking students, university instructors, and school mentors.

Potential functions include:

- group management;
- assignment distribution;
- document exchange;
- communication;

- task monitoring;
- feedback;
- collaborative learning activities;
- assessment records.

The pedagogical value of such a platform lies not simply in digitizing existing procedures but in creating continuity between university and school.

2. “GeoEducationBot”

The proposed “GeoEducationBot” Telegram bot is intended to support practical-training coordination and monitoring.

Potential functions include:

- student-group management;
- task distribution;
- submission of completed work;
- communication with supervisors;
- feedback;
- attendance monitoring.

Location-based monitoring, if implemented, should operate only within applicable institutional rules, data-protection requirements, and informed-consent procedures.

The two digital tools are therefore conceptualized as complementary:

HamkorTa’lim = learning and communication environment

GeoEducationBot = coordination and monitoring mechanism

DISCUSSION

The findings support a broader interpretation of dual teacher education. The 4+2 model should not be understood merely as a timetable in which four days belong

to the university and two days belong to the school.

Its deeper educational potential lies in the creation of a connected learning ecology.

In such an ecology:

University knowledge + school practice + peer collaboration + mentor guidance + digital communication = professional learning

This perspective is consistent with wider research on work-integrated learning in teacher education, which emphasizes the importance of connecting pre-service teachers’ university preparation with authentic professional contexts.

The study also indicates that collaboration must be structured. Simply placing students into groups does not guarantee teamwork. Roles, responsibilities, assessment mechanisms, reflection, and teacher facilitation are necessary.

This conclusion is consistent with research showing that teamwork pedagogy is influenced by educator, student, institutional, temporal, and resource factors. SSage Journals

The Uzbek context adds another dimension. The expansion of dual education means that universities and schools increasingly need mechanisms for coordinating responsibilities and expectations. Uzbekistan's recent policy trajectory demonstrates a continuing effort to connect education with practical professional environments.

The proposed model therefore has potential relevance beyond a single institution. It may provide a framework for other teacher-education systems in Central Asia where universities are seeking stronger links with schools and professional practice.

PROPOSED INTEGRATED MODEL

The study proposes the following integrated model for teamwork development:

THEORETICAL PREPARATION

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COLLABORATIVE UNIVERSITY LEARNING

↓

AUTHENTIC SCHOOL PRACTICE

↓

PEER AND MENTOR COLLABORATION

↓

DIGITAL COMMUNICATION AND MONITORING

↓

REFLECTION AND ASSESSMENT

↓

PROFESSIONAL IMPROVEMENT

The model is cyclical rather than linear. After professional practice, students return to university learning with new questions and experiences. These experiences then become the basis for further collaborative learning.

This cyclical movement represents one of the central advantages of dual teacher education.

LIMITATIONS

Several limitations should be acknowledged.

First, the study was conducted within a relatively limited student population, which restricts the generalizability of the findings.

Second, some of the proposed digital tools remain methodological designs rather than fully validated technological interventions. Their effectiveness should therefore be examined through independent usability and learning-outcome studies.

Third, teamwork competence is multidimensional and difficult to measure through a single instrument. Future research should therefore employ validated scales together with behavioral observation and longitudinal data.

Finally, the quantitative results of the experimental and control groups should be reported using the actual dataset.

Statistical values should not be estimated retrospectively.

CONCLUSION

This study argues that the development of teamwork competence should become an explicit objective of dual teacher education rather than an incidental outcome of group activities.

The 4+2 model creates a potentially productive connection between university knowledge and school-based professional practice. However, this potential is realized only when universities and schools function as interconnected learning environments.

The collaborative approaches proposed in this study—including “Knowledge Collection,” “Power of the Team,” “Show and Learn,” Project-Based Learning, flipped learning, peer teaching, gamification, and collaborative teaching in authentic school environments—provide complementary mechanisms for developing teamwork competence.

The proposed digital tools further strengthen this framework by connecting communication, task management, monitoring, assessment, and feedback.

The central principle emerging from the study can be expressed as follows:

DUAL EDUCATION + STRUCTURED COLLABORATION + AUTHENTIC PRACTICE + DIGITAL SUPPORT = STRONGER PROFESSIONAL TEAMWORK COMPETENCE

For Uzbekistan, this model has particular significance because the continuing expansion of dual and work-integrated education requires not only organizational reform but also pedagogical mechanisms that connect universities, schools, mentors, and students.

The study therefore recommends that future teacher-education reforms place greater emphasis on university-school partnerships, structured peer learning, authentic teaching experiences, reflective assessment, and ethically designed digital collaboration.

Future research should conduct longitudinal experimental studies with larger samples, validated teamwork scales, pre- and post-intervention comparisons, effect-size

calculations, and qualitative interviews with students, teacher educators, and school mentors. Such research would provide stronger evidence regarding the sustainability and transferability of collaborative technologies in dual teacher education across Uzbekistan and other Asian educational contexts.

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