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STUDENT-CENTERED LEARNING IN TEACHER EDUCATION: ENHANCING ENGAGEMENT AND LEARNING OUTCOMES AMONG PRE-SERVICE PRIMARY SCHOOL TEACHERS

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Abstract: This study examines the role of student-centered learning in teacher education, with particular attention to the preparation of pre-service primary school teachers. The study aims to theoretically substantiate and pedagogically examine how student-centered approaches can enhance student engagement and learning outcomes within teacher education. The research focuses on the integration of learner autonomy, collaborative learning, problem-based activities, reflective learning, and interactive instructional strategies into the preparation of future primary school teachers. Particular attention is given to the transformation of the teacher's role from a primary source of knowledge to a facilitator of learning and the active participation of students in constructing and applying knowledge. The study also considers the pedagogical conditions necessary for implementing student-centered learning effectively in higher education. The findings are expected to contribute to the development of more engaging and responsive teacher education practices and to provide practical implications for preparing future primary school teachers for learner-centered classroom environments.

Keywords: student-centered learning, teacher education, pre-service primary school teachers, student engagement, learning outcomes, learner autonomy, collaborative learning, innovative pedagogy

Introduction. Contemporary higher education is increasingly shifting from teacher-directed instruction toward learning environments in which students actively participate in constructing knowledge, making decisions, collaborating with peers, and reflecting on their own learning. This transformation is particularly important in teacher education, where the pedagogical approaches experienced by future teachers can influence the instructional practices they subsequently adopt in their own classrooms. Preparing pre-service teachers therefore requires more than the transmission of theoretical knowledge; it requires learning experiences that develop autonomy, active participation, reflection, collaboration, and the ability to apply knowledge in authentic educational contexts.

Student-centered learning has emerged as an important pedagogical orientation within this transformation. Unlike traditional teacher-centered instruction, in which the teacher primarily controls the content, pace, and organization of learning, student-centered approaches emphasize learners' active involvement in the educational process. Students are encouraged to take greater responsibility for their learning, participate in collaborative activities, engage with meaningful problems, and connect theoretical knowledge with practical experiences. In teacher education, such an approach is particularly significant because pre-service teachers need opportunities to

experience the pedagogical principles that they will later be expected to implement in primary school classrooms.

The importance of student engagement represents another significant dimension of contemporary teacher education. Engagement encompasses students' behavioral, cognitive, emotional, and participatory involvement in learning. When students are actively engaged, they are more likely to participate in classroom activities, communicate their ideas, collaborate with peers, and invest greater effort in understanding course content. Consequently, the quality of engagement can influence not only students' immediate learning experiences but also their academic achievement and development of professional competencies. For pre-service primary school teachers, sustained engagement is especially valuable because their university learning experiences contribute to the formation of professional attitudes and pedagogical practices.

Student-centered learning is also closely associated with the improvement of learning outcomes. Active learning strategies, collaborative tasks, problem-based activities, reflective practices, project-based learning, and formative assessment can create opportunities for students to apply theoretical concepts rather than merely reproduce information. Such approaches can support deeper understanding, knowledge application, self-regulated learning, and the development of professional competencies. Within teacher education, these outcomes are important because future teachers must be capable of transferring what they learn at university to complex and changing classroom situations.

Despite the growing international interest in student-centered learning, its implementation in teacher education remains associated with a number of pedagogical challenges. These include differences in students' levels of preparedness, limited opportunities for active participation, dependence on traditional instructional practices, insufficient integration of theory and practice, and difficulties in designing learning activities that simultaneously promote engagement and meaningful learning. In addition, the effectiveness of student-centered approaches depends not simply on the use of individual interactive techniques but on the creation of an integrated learning environment in which instructional objectives, teaching strategies, assessment practices, teacher roles, and student responsibilities are aligned.

These issues are particularly relevant to the preparation of pre-service primary school teachers. Primary education requires teachers who can organize interactive learning environments, respond to individual learner differences, encourage participation, and facilitate meaningful learning experiences. Consequently, teacher education institutions need to provide future primary school teachers with opportunities to experience and critically reflect upon student-centered pedagogical practices during their own university education. However, there remains a need for further empirical investigation into how student-centered learning can be systematically implemented in teacher education and how such implementation influences student engagement and learning outcomes among pre-service primary school teachers.

Therefore, the present study focuses on student-centered learning within teacher education and examines its potential contribution to enhancing engagement and learning outcomes among pre-service primary school teachers. The study seeks to identify pedagogical approaches and conditions that support active student participation and meaningful learning in teacher preparation programs.

The study addresses the following research questions:

RQ1. How can student-centered learning be effectively implemented in the preparation of pre-service primary school teachers?

RQ2. How does student-centered learning influence student engagement among pre-service primary school teachers?

RQ3. What impact does student-centered learning have on the learning outcomes of pre-service primary school teachers?

Methods. Research Design. This study employed a mixed-methods research design to examine the implementation of student-centered learning in teacher education and its influence on student engagement and learning outcomes among pre-service primary school teachers. The design combined quantitative and qualitative approaches to obtain a more comprehensive understanding of students' academic participation, learning experiences, and educational outcomes. The quantitative component was used to examine changes in student engagement and learning outcomes, while the qualitative component focused on students' perceptions and experiences of student-centered learning.

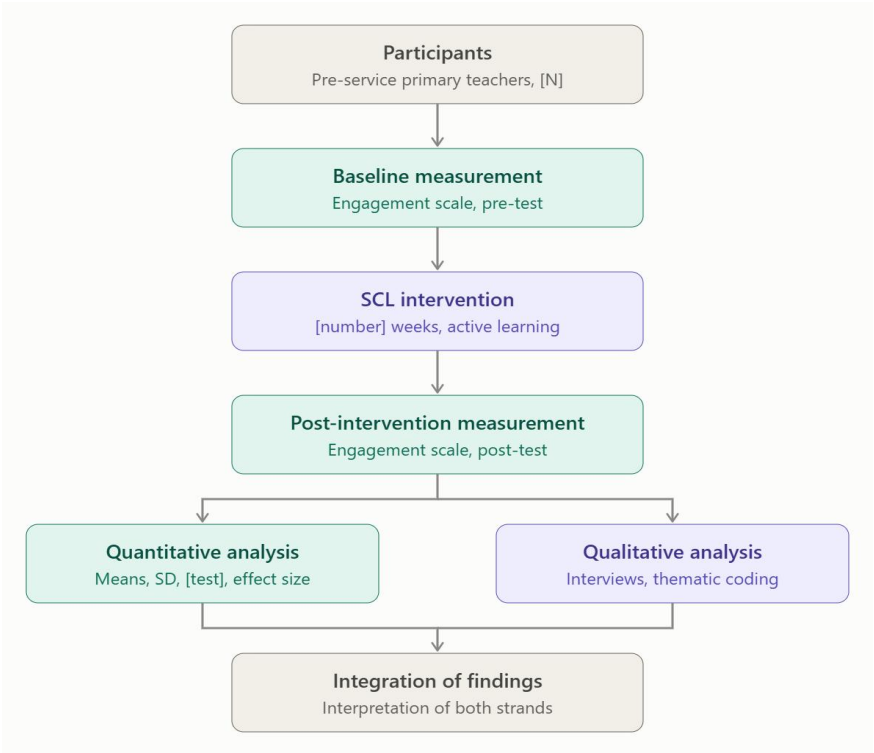
Participants and Research Context. The study was conducted with pre-service primary school teachers enrolled in a teacher education program at a higher education institution in Uzbekistan. The participants were university students preparing for professional careers in primary education. A total of [N] students participated in the study, including [number] female and [number] male students, with an age range of [age range] years.

The participants were selected based on their enrollment in [name of course/program], which provided an appropriate context for implementing student-centered instructional practices. The study was conducted during [semester/academic year] over a period of [number] weeks/months.

Student-Centered Learning Intervention. The instructional intervention was designed around the principles of student-centered learning, emphasizing active participation, learner autonomy, collaboration, reflection, and the practical application of theoretical knowledge. Rather than positioning the instructor as the primary source of information, the instructional model emphasized the teacher's role as a facilitator who guides students in constructing and applying knowledge.

The intervention incorporated several student-centered practices, including collaborative learning, problem-based activities, case analysis, group discussion, peer learning, reflective tasks, project-based activities, and formative feedback. These activities were designed to encourage students to participate actively in the learning process, communicate their ideas, solve pedagogical problems, and connect theoretical concepts with prospective professional practice.

Particular attention was given to activities relevant to primary teacher education. Students were encouraged to analyze classroom situations, develop possible instructional solutions, design learning activities for primary school pupils, and reflect on the pedagogical decisions they made. This approach was intended to create a learning environment in which pre-service teachers could experience student-centered pedagogy from the perspective of learners while simultaneously developing an understanding of its potential application in future primary classrooms.



Research Instruments. Data were collected using several complementary instruments. Student engagement was examined through [student engagement questionnaire/observation checklist/validated scale], covering dimensions such as behavioral participation, cognitive involvement, emotional engagement, and active contribution to learning activities.

Learning outcomes were assessed through [pre-test and post-test/course assessment/performance tasks] designed to measure students' understanding and application of the relevant course content. Where applicable, the assessment included both knowledge-based and practice-oriented tasks. In addition, qualitative data were collected through [semi-structured interviews/open-ended questionnaires/reflection journals/focus-group discussions]. These data provided information about students' perceptions of student-centered learning, their experiences with collaborative and problem-based activities, and the factors that supported or constrained their participation.

Data Collection Procedure. Data collection was conducted in several stages. First, baseline information concerning students' engagement and learning outcomes was obtained before the implementation of the student-centered learning practices. Second, the intervention was implemented during regular instructional sessions over [number] weeks. During this period, students participated in collaborative, problem-based, reflective, and other active learning activities.

Following the intervention, the same or equivalent assessment procedures were administered to identify changes in students' engagement and learning outcomes. Qualitative information was collected throughout and/or after the intervention to capture students' perceptions of the learning process.

The combination of quantitative and qualitative data enabled the researchers to examine both measurable changes and students' subjective experiences of student-centered learning.

Research component	Instrument / data source	Data collection time	Data analysis
Student engagement (behavioral, cognitive, emotional, active contribution)	[Student engagement questionnaire / observation checklist / validated scale]	Before and after the intervention	Means and standard deviations; [paired-samples t-test / Wilcoxon signed-rank test]; effect size
Learning outcomes (knowledge and practice-oriented tasks)	[Pre-test and post-test / course assessment / performance tasks]	Before and after the intervention	Means and standard deviations; [paired-samples t-test / Wilcoxon signed-rank test]; effect size
Students' perceptions and experiences of SCL	[Semi-structured interviews / open-ended questionnaires / reflection journals / focus-group discussions]	During and/or after the intervention	Thematic analysis (familiarization, coding, pattern identification, theme development, interpretation)

Data Analysis. Quantitative data were analyzed using descriptive and inferential statistical procedures appropriate to the research questions and sample characteristics. Descriptive statistics, including means and standard deviations, were used to summarize students' engagement and learning outcomes. Where pre- and post-intervention measurements were available, changes between the two measurement points were examined using [paired-samples t-test/Wilcoxon signed-rank test/other appropriate statistical test]. Effect sizes were also considered where appropriate to determine the practical magnitude of observed changes.

Qualitative data were analyzed thematically. The analysis involved familiarization with the collected responses, initial coding, identification of recurring patterns, development of broader themes, and interpretation of the relationships among the identified themes. Particular attention was given to students' perceptions of active participation, autonomy, collaboration, problem-solving, teacher support, and the perceived influence of student-centered learning on their academic development.

Ethical Considerations. Ethical principles were observed throughout the research process. Participation was voluntary, and participants were informed about the purpose and procedures of the study. Students were informed that their participation or non-participation would not negatively affect their academic standing. Confidentiality and anonymity were maintained during data collection, analysis, and reporting. The collected information was used exclusively for research purposes.

The research procedures were conducted in accordance with the ethical requirements of the participating higher education institution and applicable principles of educational research.

Results. The analysis of the collected data indicates that the implementation of student-centered learning was associated with positive changes in the engagement and learning outcomes of pre-service primary school teachers. The findings are presented according to the main dimensions of the study: student engagement, learning outcomes, and students' perceptions of the learning process.

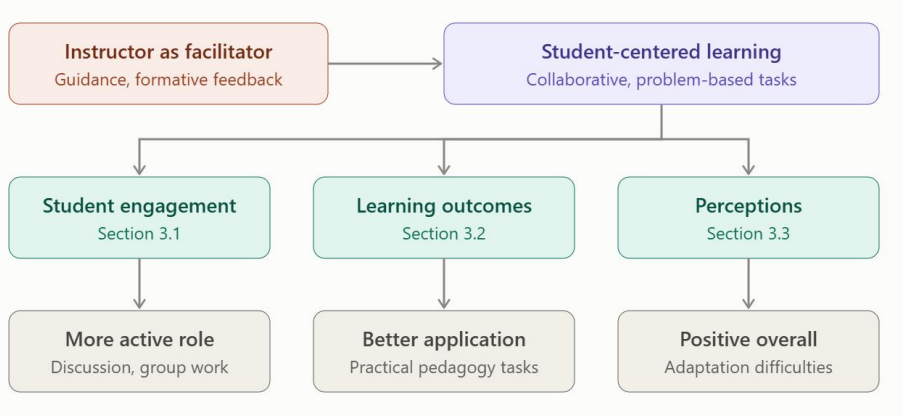
Changes in Student Engagement. The analysis demonstrated changes in the level of student engagement following the implementation of student-centered learning activities. In particular, students demonstrated greater involvement in classroom discussions, collaborative tasks, problem-based activities, and reflective learning assignments.

The quantitative analysis showed an increase in the overall engagement score from [pre-intervention mean] to [post-intervention mean]. The observed change was particularly evident in [behavioral/cognitive/emotional] engagement. Students became more actively involved in completing learning tasks, expressing their opinions, asking questions, and participating in collaborative activities. Classroom observations further indicated that students gradually assumed a more active role in the learning process. Rather than relying primarily on instructor explanations, participants increasingly engaged in peer discussion, independent preparation, group problem-solving, and presentation of their own solutions. This finding is consistent with previous research showing that student-centered and active learning environments can strengthen engagement among pre-service teachers.

Learning Outcomes. The comparison of students' learning outcomes before and after the implementation of student-centered learning revealed [an increase/no statistically significant change] in students' academic performance.

The mean assessment score increased from [pre-test mean] before the intervention to [post-test mean] after the intervention. The statistical analysis produced a [t-value/statistical value] with a significance level of [p-value], indicating [a statistically significant/no statistically significant] difference between the two measurement points.

The improvement was particularly noticeable in tasks requiring students to apply theoretical knowledge to practical pedagogical situations. Students demonstrated greater ability to interpret educational problems, justify pedagogical decisions, design learning activities, and connect theoretical concepts with prospective teaching practice.



These findings suggest that student-centered learning may contribute not only to students' participation but also to the development of learning outcomes that require the application of knowledge. Similar evidence has been reported in teacher education research, where active and learner-centered instructional approaches have been associated with improvements in learning performance and engagement.

Students' Perceptions of Student-Centered Learning. The qualitative analysis revealed several recurring themes concerning students' experiences of student-centered learning. The main themes included active participation, learner autonomy, collaboration, practical application of knowledge, and instructor support.

Participants generally perceived student-centered activities as providing greater opportunities to express their opinions and participate directly in the learning process. Collaborative tasks were viewed as useful for exchanging ideas and learning from peers, while problem-based activities helped students connect theoretical knowledge with practical teaching situations.

At the same time, some students reported difficulties associated with adapting to a less teacher-directed learning environment. These difficulties included uncertainty about independent decision-making, differences in individual participation, and the need for greater preparation before classroom activities. Similar challenges have been identified in research examining pre-service teachers' experiences with student-centered instruction.

Role of the Instructor. The findings also highlighted the changing role of the instructor within the student-centered learning environment. The instructor was increasingly perceived not simply as a provider of information but as a facilitator who organized learning activities, provided guidance, monitored students' progress, and offered formative feedback. Students particularly emphasized the importance of timely feedback and instructional support when completing collaborative and problem-based tasks. This finding corresponds with recent research emphasizing the importance of meaningful interaction, guided scaffolding, and learner autonomy in teacher education.

Discussion. The findings of the present study indicate that student-centered learning can provide a meaningful pedagogical framework for enhancing the engagement and learning outcomes of pre-service primary school teachers. The observed changes in students' participation, interaction, and academic performance suggest that learning environments that provide students with greater opportunities to actively construct knowledge may be more conducive to meaningful learning than approaches based predominantly on the transmission of information.

One important finding concerns the relationship between student-centered learning and student engagement. The increased participation of pre-service primary school teachers in discussions, collaborative tasks, problem-based activities, and reflective assignments indicates that engagement is not simply a matter of students being physically present in class. Rather, it involves active behavioral participation, cognitive investment, interaction with others, and willingness to take responsibility for learning. This interpretation is consistent with recent systematic research demonstrating that student engagement in higher education is a multidimensional construct and that behavioral measures alone do not fully capture the complexity of students' engagement.

The findings are also consistent with previous research on student-centered learning and teaching in higher education. A systematic mapping review of empirical studies found that student-centered learning is associated with a broad range of pedagogical practices, with considerable attention given to student activation and engagement. At the same time, the review identified a need for greater attention to student agency and autonomy. The present study supports this perspective by indicating that engagement can be strengthened when students are provided with opportunities to make decisions, exchange ideas, solve problems collaboratively, and participate actively in the construction of knowledge.

Another significant finding concerns learning outcomes. The improvement observed in students' performance, particularly in tasks requiring the application of theoretical knowledge to practical pedagogical situations, suggests that student-centered learning may support deeper forms of learning. This is important in teacher education because the professional preparation of future teachers cannot be limited to the acquisition of declarative knowledge. Pre-service teachers must also learn how to interpret educational situations, select appropriate pedagogical responses, design learning activities, and justify instructional decisions.

This interpretation is supported by broader evidence concerning student-centered instructional practices. A large-scale meta-analysis reported that more student-centered instructional conditions were associated with higher achievement than less student-centered conditions, with a moderate overall effect. Although that evidence was not limited to teacher education, it provides a broader basis for understanding why active participation and learner involvement may contribute to improved learning outcomes.

The findings further highlight the importance of the instructor's role in a student-centered environment. Student-centered learning does not imply the disappearance of the teacher from the instructional process. Instead, the teacher's role changes from primarily transmitting information to designing learning experiences, providing scaffolding, monitoring progress, facilitating interaction, and giving formative feedback. Recent research involving pre-service teachers similarly emphasizes learner autonomy, meaningful interaction with peers and instructors, self-organization, and guided scaffolding as important elements of effective learning environments.

The results also suggest that student-centered learning should not be understood as a single teaching technique. Its effectiveness appears to depend on the integration of several complementary practices, including collaborative learning, problem-based activities, reflection, peer interaction, formative assessment, and opportunities for independent learning. Recent research on higher education engagement likewise indicates that instructional support, assessment and feedback, course delivery, learning materials, and interactional conditions can influence student engagement. Therefore, implementing student-centered learning requires a coherent pedagogical design rather than the occasional use of isolated interactive activities.

For teacher education, these findings have particular practical significance. Pre-service primary school teachers learn not only through the explicit content of their university courses but also through the instructional models they experience as students. When future teachers participate in collaborative, reflective, problem-oriented, and autonomy-supportive learning environments, they have an opportunity to experience the pedagogical principles that they may later apply in primary classrooms. In this sense, student-centered teacher education can function simultaneously as professional preparation and as a form of pedagogical modeling.

The study therefore contributes to the existing literature by connecting student-centered learning specifically with the preparation of pre-service primary school teachers and by considering student engagement and learning outcomes as interconnected dimensions of the educational process. Rather than treating engagement as an isolated classroom behavior, the findings suggest that engagement, autonomy, interaction, instructional support, and learning outcomes should be considered as elements of an integrated teacher education environment.

From a practical perspective, teacher education institutions should consider systematically incorporating student-centered practices into courses designed for future primary school teachers. Such practices may include collaborative lesson planning, classroom case analysis, peer teaching, problem-based pedagogical tasks, reflective journals, project-based assignments, formative feedback, and student-led presentations. These approaches can provide future teachers with opportunities to develop professional knowledge while simultaneously experiencing how learner-centered environments operate.

Conclusion. The present study examined the role of student-centered learning in teacher education, with particular attention to its potential to enhance engagement and learning outcomes among pre-service primary school teachers. The findings indicate that student-centered learning can create a more active, participatory, and supportive educational environment in which future

teachers assume greater responsibility for their learning and become more actively involved in academic and collaborative activities.

The study demonstrates that student-centered learning should be understood not as a single instructional technique but as a comprehensive pedagogical approach that reorganizes the roles of both students and instructors. Collaborative learning, problem-based activities, reflective tasks, peer interaction, learner autonomy, and formative feedback can work together to create meaningful learning experiences. At the same time, the instructor remains an important component of the process by providing guidance, scaffolding, feedback, and appropriate academic support.

The findings also highlight the particular relevance of student-centered learning for teacher education. Pre-service primary school teachers need opportunities not only to acquire theoretical knowledge but also to experience effective pedagogical practices from the perspective of learners. Experiencing active and learner-centered instruction during university education can help future teachers understand how participation, collaboration, autonomy, and meaningful interaction can be incorporated into their own future classrooms. This is especially important because teacher education can influence how prospective teachers understand and later implement pedagogical approaches in school settings.

The study contributes to the discussion of contemporary teacher education by emphasizing the relationship between student-centered learning, student engagement, and learning outcomes among future primary school teachers. Nevertheless, the findings should be interpreted in relation to the specific educational context and participant group examined in the study. Future research should involve larger and more diverse samples, longer intervention periods, and comparative designs across teacher education institutions and educational contexts. Further studies may also examine how experiences with student-centered learning during teacher preparation influence pre-service teachers' subsequent classroom practices after entering the teaching profession.

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