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Development of Inclusive Learning of Students with a Social Orientation in the Environment of an Educational Cluster based on a Competence-Based Approach

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ABSTRACT

This study developed and evaluated an inclusive learning model for socially oriented students in an educational cluster using a competence-based approach. A mixed-methods design was applied through literature analysis, pedagogical observation, interviews, questionnaires, expert evaluation, experimental procedures, and statistical analysis. The participants were 397 undergraduate students majoring in pedagogy and psychology, divided into experimental and control groups. The findings showed that game-based learning, targeted exercises, and virtual simulation improved students' readiness for inclusive educational practice. The study also produced an electronic student database, a Pedagogical Skills manual, and a methodological guide for developing inclusive education. These findings support the improvement of teacher education curricula and inclusive competencies.

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1. INTRODUCTION

Inclusive education aims to provide equal learning opportunities for all students, including those with physical, intellectual, social, emotional, linguistic, and other diverse needs. In teacher education, inclusive education is important because future teachers must be prepared to design learning environments that are accessible, supportive, and responsive to student diversity (Glushchenko, 2025; Azizah et al., 2022). The development of inclusive readiness is therefore an essential part of preparing future educators to work in socially diverse classrooms (Egbedeyi and Babalola, 2023).

A competence-based approach offers a useful framework for developing inclusive readiness because it emphasizes knowledge, skills, attitudes, and practical abilities needed in real educational settings. Through this approach, students are expected not only to understand the inclusive education conceptually but also to demonstrate pedagogical, communicative, managerial, and reflective competencies. In the context of an educational cluster, inclusive learning can be strengthened through collaboration among institutions, learning resources, and pedagogical innovations that support student development and social participation (Kazeem et al., 2025; Faddillah et al., 2022).

Previous studies have discussed inclusive education from different perspectives, including inclusive environments, diagnostic competence, psychological and pedagogical support, pedagogical skills, innovation, social adaptation, and interactive teaching. **Table 1** summarizes previous research related to the development of inclusive education and teacher competence. Inclusive education requires more than theoretical understanding. It also requires structured teacher preparation, psychological and pedagogical support, interactive learning strategies, and the ability to apply inclusive principles in practice. However, the practical preparation of future teachers remains a challenge, especially in integrating social, psychological, technological, and pedagogical competencies within a competence-based framework. Recent studies also show the importance of technological pedagogical knowledge and digital readiness in improving teaching practices for modern inclusive education (Jibril and Adedokun-Shittu, 2024; Ibarrientos, 2024).

Table 1. Previous research related to inclusive education and competence development.

RESEARCH SCOPE	REFERENCES
The role of educational work in forming an inclusive environment	Khimmataliyev et al. (2024)
Motivation component in the diagnostic unit of inclusive competence	Svitlana et al. (2020)
Psychological and pedagogical support for inclusive education	Maciver et al. (2018)
Pedagogical skills	Shavkatovna (2021)
Modern science and innovation	Tuychieva (2015)
Social adaptation of younger schoolchildren	Sadovaya and Simonova (2016)
Traditional and interactive teaching models	Boltaeva (2020)

Therefore, this study aims to design and evaluate a model for developing inclusive learning among socially oriented students in an educational cluster using a competence-based approach. The study focuses on how game-based learning, targeted exercises, and virtual simulation can strengthen students' readiness for inclusive educational practice. The findings are expected to contribute to the improvement of teacher education curricula and the development of inclusive competencies among future educators.

2. LITERATURE REVIEW

Inclusive education is based on the principle that all learners should have equal access to meaningful participation in the educational process. This approach emphasizes diversity, equity, and respect for individual learning needs. In teacher education, inclusive education requires future teachers to understand student diversity and to develop the ability to design flexible, supportive, and accessible learning environments (Azizah et al., 2022; Rizqita et al., 2024).

The competence-based approach is relevant to inclusive education because it focuses on the development of knowledge, skills, attitudes, and professional readiness. Future teachers need not only theoretical understanding but also practical competencies in communication, classroom management, instructional adaptation, and reflective decision-making. The development of pedagogical competence is therefore essential for preparing teachers to respond to the needs of learners in inclusive classrooms (Kazeem et al., 2025; Ketrish et al., 2016).

Inclusive learning also requires psychological and pedagogical support. A supportive educational environment helps students feel accepted, valued, and able to participate in learning activities. Universal Design for Learning provides a useful framework because it encourages flexible presentation of materials, varied forms of student response, and multiple ways to engage learners (Hartmann, 2015). Psychological safety, empathy, and positive interpersonal relationships are also important for building an inclusive classroom culture (Al Shaban Radi and Hanafi, 2024; Maciver et al., 2018).

Technology and interactive learning strategies can strengthen inclusive education practices. Game-based learning, virtual simulation, and digital learning tools allow prospective teachers to experience classroom scenarios, solve pedagogical problems, and develop inclusive decision-making skills. These strategies support active learning and help students connect theory with practice (Albion et al., 2021; Hanna et al., 2021; Jibril and Adedokun-Shittu, 2024; Ibarrientos, 2024).

Based on the literature, inclusive teacher preparation should integrate competence-based learning, psychological-pedagogical support, interactive methods, and technology-enhanced instruction. However, practical training models that combine these elements within an educational cluster remain limited. Therefore, this study develops and evaluates an inclusive learning model for socially oriented students using a competence-based approach.

3. METHOD

This study used a mixed-methods quasi-experimental design to evaluate the effectiveness of an inclusive learning model based on a competence-based approach. The quantitative component compared students' inclusive education competencies before and after the intervention, while the qualitative component explored the learning process through observation, interviews, questionnaires, expert evaluation, and student reflections.

The participants were 397 undergraduate students enrolled in teacher education programs, particularly in pedagogy, psychology, primary education, and sports pedagogy. The participants were divided into an experimental group and a control group. The experimental group received an intervention using game-based learning, structured exercises, and virtual simulation, while the control group followed conventional learning activities.

The intervention was designed to develop students' pedagogical, communicative, managerial, and reflective competencies for inclusive education. Learning activities included problem-based scenarios, role-playing, simulation videos, discussion, practical exercises, and reflective tasks. These activities were intended to improve students' understanding of inclusive education and their readiness to work with learners with diverse needs.

Data were collected through pre-tests, post-tests, classroom observation, questionnaires, interviews, and expert assessment. The main indicators included students' knowledge of inclusive education, attitudes toward inclusion, ability to solve pedagogical problems, and readiness to apply inclusive teaching strategies. Quantitative data were analyzed using descriptive statistics, Pearson's chi-square test, and Student's t-test, while qualitative data were analyzed descriptively to identify patterns in student participation, reflection, and pedagogical readiness.

4. RESULTS AND DISCUSSION

The inclusive learning model was implemented through role-playing, game-based learning, structured exercises, and virtual simulation. These activities were designed to create problem-based learning situations, encourage discussion, support reflective thinking, and strengthen students' readiness to work in inclusive classrooms. The intervention also provided students with opportunities to practice decision-making in simulated educational situations that reflected the realities of inclusive teaching.

4.1. Development of Inclusive Education Competencies

The results of the pedagogical experiment showed that students in the experimental group experienced greater improvement than those in the control group. **Table 2** presents the development levels of inclusive education competencies before and after the intervention. The proportion of students at the high level in the experimental group increased from 20.8 to 33.7%, while the proportion at the low level decreased from 28.2 to 6.0%. This indicates that the intervention helped more students move from low and medium levels toward stronger inclusive education competence. In contrast, the control group showed only slight improvement, with the high level increasing from 20.0 to 23.2% and the low level decreasing from 30.2 to 26.8%. These findings suggest that conventional learning was less effective than the structured competence-based intervention.

Table 2. Results of the pedagogical experiment.

LEVELS OF DEVELOPMENT OF INCLUSIVE EDUCATION	EXPERIMENTAL GROUP INITIAL, N = 202	EXPERIMENTAL GROUP FINAL, N = 199	CONTROL GROUP INITIAL, N = 205	CONTROL GROUP FINAL, N = 199
High	42 (20.8%)	67 (33.7%)	41 (20.0%)	46 (23.2%)
Medium	103 (51.0%)	120 (60.3%)	102 (49.8%)	99 (50.0%)
Low	57 (28.2%)	12 (6.0%)	62 (30.2%)	53 (26.8%)

The improvement in the experimental group can be linked to the use of interactive and experience-based learning strategies. Game-based learning, targeted exercises, and virtual simulations allowed students to engage with inclusive education not only as theory but also as practice. This is important because future teachers need opportunities to apply inclusive concepts in situations that require communication, adaptation, empathy, and pedagogical

decision-making. Previous studies also emphasize that teacher preparation for inclusive education should develop both knowledge and practical readiness (Kamens et al., 2003; Winter, 2006; Forlin and Chambers, 2011).

4.2. Statistical Verification of the Intervention

To verify the effectiveness of the intervention, statistical analysis was conducted using quantitative indicators. **Table 3** presents the quantitative criteria used to evaluate the statistical significance of the pedagogical experiment. The analysis focused on the Student's t-test result, which showed that the calculated value was 7.4 and exceeded the critical value of 1.84. This result indicates that the difference between the experimental and control groups was statistically significant. Therefore, the null hypothesis was rejected, and the alternative hypothesis was accepted. These findings support the conclusion that the competence-based inclusive learning model had a positive effect on students' readiness for inclusive education.

Table 3. Quantitative criteria and indicators.

NO.	INDICATOR	EXPERIMENTAL GROUP, N = 199	CONTROL GROUP, N = 198
1	Statistical coefficient	65%	76%
2	Standard deviation	0.32	0.50
3	Student's t-test value	7.4 (7.4 > 1.84)	—
4	Statistical conclusion	H_0 rejected, H_1 accepted	—

The decrease in low-level competence and the increase in high-level competence in the experimental group show that the intervention helped students develop more advanced inclusive education skills. The findings also indicate that simulation-based and interactive methods can strengthen students' professional preparation because they provide opportunities to solve pedagogical problems in realistic but controlled learning environments. This is consistent with studies showing that game-based activities and digital learning tools can improve engagement, problem-solving, and learning motivation (Albion et al., 2021; Hanna et al., 2021).

4.3. Contribution of Interactive and Technology-based Learning

The findings demonstrate that interactive and technology-based learning strategies played an important role in improving students' inclusive competencies. Role-playing and simulation helped students understand classroom diversity, identify learner needs, and practice appropriate pedagogical responses. Virtual simulation also supported students in developing digital and pedagogical readiness, which is increasingly important in modern teacher education.

Technology integration in inclusive teacher preparation is relevant because inclusive classrooms require flexible teaching strategies and adaptive learning tools. The use of virtual simulation, digital resources, and structured pedagogical technologies can help future teachers connect theoretical knowledge with practical classroom situations. This aligns with studies emphasizing the importance of technological pedagogical competence and digital readiness in teacher education (Jibril and Adedokun-Shittu, 2024; Ibarrientos, 2024).

The results also support the need to reform teacher education curricula by integrating inclusive education modules, competence-based learning, and practical training activities. Inclusive competence cannot be developed only through lectures. It requires repeated

practice, guided reflection, problem-solving, and exposure to diverse learning situations. Therefore, higher education institutions need to provide systematic opportunities for students to develop pedagogical, communicative, managerial, and reflective competencies for inclusive practice.

4.4. Implications for Teacher Education

The study produced practical outputs that supported the development of inclusive learning, including an electronic student database, a *Pedagogical Skills* manual, and a methodological guide for developing inclusive education for socially oriented students. These outputs show that the model was not limited to classroom intervention but also contributed to instructional management and curriculum support.

The findings imply that inclusive teacher education should be interdisciplinary and practice-oriented. Future teachers need to understand inclusive values, learner diversity, psychological support, pedagogical adaptation, and the use of technology in instruction. The competence-based approach provides a useful framework because it connects knowledge, skills, attitudes, and practical application. Therefore, the development of inclusive competencies should become an integral part of teacher education programs rather than a separate or supplementary topic.

Overall, the results show that the competence-based inclusive learning model improved students' readiness for inclusive educational practice. The model was effective because it combined theory, practice, interaction, and technology. These findings confirm that structured interdisciplinary training can strengthen inclusive values and professional competencies among future educators.

5. CONCLUSION

This study shows that a competence-based inclusive learning model can improve the readiness of socially oriented students for inclusive educational practice. The experimental group demonstrated greater improvement than the control group, particularly in high-level inclusive competence and the reduction of low-level competence. The use of game-based learning, structured exercises, role-playing, and virtual simulation helped students connect inclusive education theory with practical classroom situations. These strategies supported the development of pedagogical, communicative, managerial, and reflective competencies. Therefore, inclusive education should be integrated systematically into teacher education curricula through interdisciplinary, interactive, and technology-supported learning models.

6. AUTHORS' NOTE

The authors declare that there is no conflict of interest regarding the publication of this article. The authors confirmed that the paper was free of plagiarism.

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