



Developing Future Teachers' Information Competence in Inclusive Education: A Comparative Study of Uzbekistan and Indonesia within the WFIEd Framework

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Abstract: *This study investigates the development of future teachers' information competence in inclusive education settings through a comparative analysis of Uzbekistan and Indonesia. Information competence is conceptualized as an integrative construct comprising cognitive, operational-practical, motivational-value, and reflective components. Using theoretical analysis and comparative pedagogy methods, the research highlights significant differences between national teacher education models. The Indonesian experience, particularly the reflective-research-based approach advanced by Professor Ediyanto Ediyanto at Universitas Negeri Malang, demonstrates a systematic integration of information analysis, adaptation, and pedagogical decision-making. The WFIEd framework is positioned as a mechanism for international methodological alignment. Based on the findings, the article proposes evidence-based recommendations for improving methodologies for developing information competence among future teachers in inclusive education contexts.*

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INTRODUCTION

The rapid advancement of digital technologies and the expansion of global information environments have profoundly transformed contemporary education systems. In this context, teachers are no longer perceived merely as transmitters of predefined knowledge; rather, they are increasingly expected to function as critical mediators of information who are capable of searching, evaluating, adapting, and pedagogically redesigning information resources. This transformation is particularly significant in inclusive education settings, where teaching and learning processes must respond to diverse learners' cognitive, physical, emotional, and social needs.

Inclusive education emphasizes equity, accessibility, and participation for all learners, including those with special educational needs and disabilities. Achieving these goals requires teachers to operate within complex pedagogical environments characterized by variability, uncertainty, and the need for continuous adaptation. Consequently, the quality of inclusive education is closely linked to teachers' information competence—that is, their ability to work effectively with information in pedagogically meaningful ways. Information competence in inclusive education goes beyond basic digital literacy and encompasses higher-order skills such as critical evaluation of information sources, ethical and safe information use, adaptation of learning materials, and reflective pedagogical decision-making.

In many national education systems, including Uzbekistan, recent reforms have introduced regulatory frameworks supporting inclusive education and digital transformation. However, teacher education programs often prioritize technical ICT skills rather than holistic information competence grounded in pedagogical reasoning and reflective practice. As a result, future teachers may possess basic technological proficiency while lacking the ability to transform information into inclusive instructional strategies tailored to learners' individual needs.

In contrast, international research highlights the effectiveness of reflective and research-oriented teacher education models in developing advanced professional competencies. The experience of Indonesia—particularly within higher education institutions such as Universitas Negeri Malang—demonstrates a systematic approach to preparing future teachers for inclusive education through the integration of practice-based learning, reflective analysis, and pedagogical research. The scholarly work of Professor Ediyanto Ediyanto plays a central role in this context, emphasizing teachers' capacity to act as adaptive designers of inclusive learning environments rather than passive users of instructional resources.

Furthermore, international professional networks such as the World Federation of Inclusive Education (WFIEd) contribute to the dissemination of evidence-based practices and facilitate methodological alignment across national contexts. Participation in WFIEd enables educators and researchers to situate national teacher education reforms within a broader global discourse on inclusion, equity, and professional competence development.

Several previous studies have examined aspects of teachers' digital and information competence in the context of inclusive education. Méndez et al. (2023) investigated future teachers' perceptions of technology use for inclusion and found that pre-service teachers demonstrated an intermediate level of digital competence, with notable differences according to gender, age, and degree; however, their study focused primarily on a single national context and did not explore the cross-national comparative dimension of information competence

development. Ediyanto and Kawai (2023) conducted an empirical study measuring teachers' attitudes toward inclusive education in East Java, Indonesia, revealing that the majority of teachers held a moderate attitude toward inclusion; nevertheless, their research concentrated on attitudinal measurement rather than on the systemic development of multidimensional information competence within teacher education programs. Furthermore, Booth and Ainscow (2011), through the Index for Inclusion, provided a foundational framework for understanding inclusive school development in terms of cultures, policies, and practices; yet this framework did not specifically address the pedagogical processes through which future teachers acquire and internalize information competence as a professional construct. Taken together, these studies reveal a significant research gap: while individual dimensions of digital competence, teachers' attitudes, and inclusive frameworks have been explored, the systematic development of multidimensional information competence among future teachers through a cross-national comparative lens—particularly within the WFIEd framework—remains insufficiently investigated. This gap constitutes the central focus of the present study.

Against this background, the present study addresses a critical research gap by examining how future teachers' information competence can be systematically developed in inclusive education settings. Through a comparative analysis of Uzbekistan and Indonesia, the study seeks to identify effective methodological approaches and propose directions for enhancing teacher education programs in alignment with international standards.

METHODOLOGY

This study employed a qualitative, theory-driven comparative research design grounded in the principles of comparative pedagogy and educational analysis. The methodological framework was constructed to ensure conceptual rigor, contextual sensitivity, and alignment with international research standards.

Research Design

The research followed a descriptive–analytical and comparative design, enabling an in-depth examination of teacher education practices related to information competence in inclusive education. Rather than focusing on large-scale empirical measurement, the study prioritized conceptual clarity, methodological coherence, and cross-national comparison.

The selection of a descriptive–analytical and comparative research design was guided by several methodological considerations. First, the study's primary objective is to examine and compare the conceptual and institutional structures of teacher education programs across two distinct national contexts, which inherently requires a comparative analytical framework rather than an experimental or interventionist approach (Creswell & Poth, 2018). Second, the research seeks to understand the qualitative nature of information competence as a multidimensional professional construct, an objective best served by in-depth conceptual and documentary analysis rather than large-scale quantitative measurement. Third, the Universal Design for Learning (UDL) framework, as articulated by Meyer, Rose, and Gordon (2014), informed the analytical orientation of the study by emphasizing the need to examine how teacher education systems accommodate diverse learner needs through flexible, principles-based approaches—an aim that aligns closely with descriptive-analytical methodology. This design therefore enables the study to produce rigorous, contextually sensitive, and

internationally comparable insights into the development of future teachers' information competence.

Data Sources

Multiple data sources were used to ensure triangulation and analytical depth:

1. International policy documents and reports (UNESCO, OECD, wfied);
2. Peer-reviewed journal articles on inclusive education, information literacy, and teacher competence;
3. National regulatory documents related to inclusive and digital education in Uzbekistan;
4. Scholarly publications and methodological frameworks developed within Indonesian teacher education, particularly those associated with Ediyanto Ediyanto's research school at Universitas Negeri Malang.

Methods of Analysis

The following analytical methods were applied:

1. Theoretical and content analysis: to identify key concepts, definitions, and structural components of information competence in inclusive education.
2. Comparative pedagogical analysis: to compare teacher education models in Uzbekistan and Indonesia across predefined criteria (regulatory framework, pedagogical approach, role of reflection, methodological support, and international integration).
3. Conceptual modeling: to construct a structural model of information competence that integrates cognitive, operational-practical, motivational-value, and reflective components.
4. Analytical synthesis: to derive methodological recommendations informed by WFIEd guidelines and international best practices.

Analytical Criteria

The comparison was guided by a set of analytical criteria reflecting contemporary demands of inclusive education:

1. alignment with inclusive education principles;
2. depth of information competence conceptualization;
3. integration of reflective practice and research activities;
4. availability of adapted methodological resources;
5. degree of international collaboration and methodological transfer.

RESULT AND DISCUSSION

Results

1. Comparative Analysis of Teacher Preparation Models

The comparative findings are summarized in Table 1, which presents key differences between Uzbekistan and Indonesia in developing future teachers' information competence in inclusive education.

Table 1.
Comparative Analysis of Developing Future Teachers' Information Competence in Inclusive Education (Uzbekistan And Indonesia)

Criterion	Uzbekistan	Indonesia
Regulatory framework	Inclusive education policies under development	Inclusive education integrated into higher education standards
Teacher education model	ICT-oriented and competency-based	Reflective–research-based and practice-oriented
Concept of information competence	Digital literacy and technical ICT skills	Critical analysis, adaptation, and pedagogical redesign
Methodological support	Fragmented and general resources	Systematic and adapted resource banks
Reflective practice	Optional and irregular	Mandatory and structured
Scientific leadership	Predominantly national initiatives	Ediyanto's inclusive education research school
International integration	Limited	Active (WFIEd, UNESCO)
Expected outcome	Digitally literate teacher	Reflective inclusive education specialist

2. Interpretation of Results

The results indicate that Indonesian teacher education demonstrates a higher level of methodological coherence in developing information competence. Reflective practice and research-based learning are systematically embedded in the curriculum, enabling future teachers to transform information into inclusive pedagogical solutions. In Uzbekistan, the predominance of ICT-focused approaches highlights the need for deeper integration of reflective and analytical components.

Discussion

The findings of this study provide substantial evidence that the development of future teachers' information competence in inclusive education settings cannot be adequately addressed through a narrow focus on technical ICT skills. Instead, information competence must be understood as a multidimensional professional construct that integrates knowledge, skills, values, and reflective judgment. The comparative results summarized in Table 1 reveal a clear divergence between Uzbekistan and Indonesia in how teacher education systems conceptualize and operationalize information competence. In Uzbekistan, current practices predominantly emphasize digital literacy and technology use, reflecting broader national priorities related to digital transformation. While these efforts are essential, they remain insufficient for addressing the pedagogical complexity inherent in inclusive education. Inclusive classrooms require teachers to make nuanced decisions about how information is selected, adapted, and applied to support learners with diverse educational needs.

In contrast, Indonesian teacher education—particularly within the academic environment of Universitas Negeri Malang—demonstrates a more coherent and theoretically grounded approach. The reflective–research-oriented model advocated by Professor Ediyanto positions information competence as a dynamic process of continuous inquiry, adaptation, and redesign. Such an approach enables future teachers to develop professional autonomy and methodological flexibility, which are critical for effective inclusive practice.

From a theoretical perspective, the findings support constructivist and reflective learning theories, which emphasize active knowledge construction and continuous professional learning. The integration of reflective practice as a mandatory component of teacher education enhances teachers' capacity to critically assess their instructional decisions and to align information use with inclusive pedagogical goals. This aligns with international research emphasizing the role of reflection and inquiry in developing complex professional competencies.

The role of international collaboration and professional networks is another significant dimension highlighted by the study. Engagement with organizations such as the World Federation of Inclusive Education (WFIEd) facilitates the transfer of evidence-based practices and contributes to methodological legitimation at the national level. The Indonesian experience illustrates how international integration can strengthen local teacher education models by embedding global inclusive education standards into institutional practices. For Uzbekistan, increased participation in such networks may serve as a catalyst for advancing teacher education reform beyond technical digitalization.

Furthermore, the study underscores the importance of developing adapted information resources and methodological support systems. Without access to systematically designed and inclusive-oriented resources, teachers may struggle to translate information competence into effective classroom practice. This finding has direct implications for curriculum design, institutional support, and policy development within teacher education systems.

The present findings offer a meaningful contribution to the existing body of research on teachers' information competence in inclusive education. When situated alongside the work of Méndez et al. (2023), who demonstrated that future teachers' digital competence remains at an intermediate level and that perceptions of inclusion as a challenge are widespread, the current study extends this understanding by moving beyond single-country assessments to reveal how structural differences in teacher education systems—particularly in the integration of reflective and research-based pedagogical practices—account for divergent trajectories in information competence development. Whereas Méndez et al. (2023) identified the importance of teacher training in both digital competence and inclusion as an educational principle, the comparative analysis conducted in this study demonstrates concretely how such integration can be operationalized differently across national contexts, thereby offering actionable insights for teacher education reform. This cross-national comparative dimension constitutes a unique contribution of the study, as it moves beyond documenting competence levels or attitudinal profiles to illuminate the systemic and institutional factors that shape the development of information competence among future teachers within the framework of inclusive education.

CONCLUSION

This study concludes that future teachers' information competence in inclusive education is a complex and integrative construct that extends far beyond basic ICT proficiency. Its effective development depends on the synergistic interaction of cognitive knowledge, operational–practical skills, motivational–value orientations, and reflective judgment. These components collectively enable teachers to engage in informed pedagogical decision-making and to design inclusive learning environments responsive to diverse learners' needs.

The comparative analysis demonstrates that Indonesian teacher education practices—particularly those implemented at Universitas Negeri Malang and informed by Ediyanto's scholarly framework—provide a robust methodological model for developing information competence through reflective and research-based learning. This model emphasizes teachers' capacity to adapt and redesign information resources rather than merely apply pre-existing instructional materials. Such an approach is particularly well suited to the demands of inclusive education, where pedagogical flexibility and contextual sensitivity are essential.

In the context of Uzbekistan, the findings indicate a need to move beyond an ICT-centered understanding of information competence toward a more pedagogically grounded and reflective model. Key directions for methodological improvement include the systematic integration of reflective practice into teacher education curricula, the development of adapted information resource banks for inclusive classrooms, and the incorporation of research-based pedagogical decision-making processes. Strengthening international collaboration through platforms such as WFIEd can further support the alignment of national teacher education practices with global inclusive education standards.

Overall, the study contributes to the theoretical and methodological discourse on inclusive teacher education by offering a comprehensive framework for understanding and developing information competence. While the research is primarily conceptual and comparative in nature, it lays the groundwork for future empirical studies aimed at testing and refining the proposed models in diverse educational contexts. By advancing a holistic and internationally informed perspective, this article provides valuable insights for researchers, policymakers, and teacher educators seeking to enhance the quality and sustainability of inclusive education.

It is important to acknowledge certain limitations of the present study. The research is primarily conceptual and documentary in nature, relying on published policy documents, scholarly literature, and institutional frameworks rather than on direct empirical data collection such as interviews, surveys, or classroom observations. Consequently, the findings reflect the state of teacher education as documented in available sources and may not fully capture the lived experiences of future teachers or the on-the-ground realities of inclusive education implementation. Furthermore, the comparative scope is restricted to two national contexts—Uzbekistan and Indonesia—which, while offering complementary perspectives, do not represent the full diversity of teacher education systems operating within the WFIEd network or globally. Additionally, differences in the availability, accessibility, and comprehensiveness of documentary sources across the two countries may have influenced the depth and balance of the comparative analysis.

Based on these limitations, several directions for future research are recommended. First, empirical studies employing mixed-methods designs—incorporating qualitative interviews with teacher educators, quantitative surveys of pre-service teachers' information

competence, and ethnographic observation of classroom practices—are needed to validate and extend the conceptual framework proposed in this study. Second, longitudinal research tracking the development of information competence among cohorts of future teachers over the course of their education programs would provide valuable insights into the dynamics of professional growth and the effectiveness of specific pedagogical interventions. Third, expanding the comparative scope to include additional countries within the WFIEd network—particularly those representing diverse socioeconomic, cultural, and institutional contexts—would strengthen the generalizability of the findings and deepen understanding of the factors that mediate information competence development in inclusive education. Finally, collaborative international research projects, facilitated through platforms such as WFIEd, are encouraged to promote methodological consistency and cross-cultural validity in future investigations.

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