

The Role of Assistive Technologies in Forming an Inclusive Culture of Higher Education Institutions in Kazakhstan

Maral Zhanarstanova, Astana IT University, Kazakhstan
Anar Uyzbayeva, Astana IT University, Kazakhstan
Ainur Abdina, Astana IT University, Kazakhstan
Aituar Kospakov, Astana IT University, Kazakhstan

The Paris Conference on Education 2025
Official Conference Proceedings

Abstract

Inclusive policies in higher education are a key element of the UN Sustainable Development Goals, yet universities in Kazakhstan face barriers to full participation of students with special educational needs. This study examines the readiness of faculty and institutional infrastructure to integrate assistive technologies (AT) as part of building an inclusive culture. Based on a thematic analysis of semi-structured interviews with experts from higher education in Kazakhstan conducted between June and July 2024, five main themes emerge: (1) expanding the understanding of inclusion beyond disability; (2) gap between national policies and their implementation; (3) fragmented integration of AT without strategic alignment; (4) insufficient teacher training in adaptive learning; (5) socio-cultural norms that reinforce stigma. Despite the existing efforts of universities in Kazakhstan in the field of inclusive education, the use of AT remains unsystematic and insufficiently effective. For sustainable development of the inclusive model, universities are recommended to include AT in strategic plans, to develop professional development programs, to ensure continuous investment in infrastructure, and to conduct educational campaigns among staff and students. Coordinated interaction between universities, government agencies, and public organizations will allow expansion of successful practices and overcoming institutional and cultural barriers.

Keywords: specialized educational technologies, special education, inclusion, higher education, assistive technologies, inclusive culture

iafor

The International Academic Forum
www.iafor.org

Introduction

High-quality, accessible and inclusive education is a key condition for the implementation of the Sustainable Development Goals. In the context of digital transformation, new opportunities are opening up to ensure inclusion in higher education. One of the central elements of this process is assistive technologies (AT), which include hardware and software solutions designed to support the educational and daily activities of students with special educational needs. AT compensates for or overcomes functional limitations (sensory, motor, cognitive), providing equal access to information, educational materials and communication.

Kazakhstan is taking its first steps in this direction, facing numerous barriers. The development of inclusive education in Kazakhstan began with schools, where barrier-free environments, inclusive classes, and the position of tutors accompanying children with special educational needs were actively created. However, the higher education system began to adapt to global requirements only in recent years. A number of universities in Kazakhstan have taken certain steps to increase inclusiveness and the level of access to higher education, such as campus adaptation (ramps and elevators have been installed, barrier-free classrooms have been equipped), sensory studios have been introduced, and a support service for students with special educational needs has been created. These initiatives, although local, reflect the desire of universities to meet global standards for the development of inclusive education. A study of the level of inclusive culture in the country's universities and the role of auxiliary (assistive) technologies (AT) will help determine strategic directions for its development.

The purpose of this study is to assess the readiness of the teaching staff of universities in Kazakhstan to use assistive technologies as an element of the formation of an inclusive culture to support students with special educational needs (SEN).

The relevance and benefits of assistive technologies for students with SEN include adaptability of methods (Yenduri et al., 2023), equal opportunities (Therasa, 2023), safe and effective learning (Viner et al., 2020), positive psychological impact on students' self-esteem and their competencies (McNicholl et al., n.d.). Effective use of assistive technologies in the educational process requires knowledge on the part of teachers (Maushak et al., 2001; McNicholl, Casey, et al., 2021) and support from the administration in developing inclusive initiatives (Kowalewski & Ariza, 2022).

Methodology

The study was carried out within the framework of the scientific project of grant funding AR 19677013 “Assistive technologies in inclusive education: practice of application in universities of Kazakhstan” of the Scientific Research Ministry of Higher Education of the Republic of Kazakhstan 2023-2025. The implementation of the project included several stages, within which quantitative and qualitative analysis methods were applied. The quantitative study was carried out using the method of sociological survey among the teaching staff and administration of universities from 9 regions of Kazakhstan. The project analyzed the level of proficiency and use of auxiliary IT tools in teaching students with special educational needs. According to the results of the sociological survey, the main barriers identified include a lack of skills in working with technologies (28%), their rare use in teaching (rarely - 26.8%; sometimes - 29.9%), as well as insufficient infrastructural

support. The data obtained emphasize the need to develop training programs for teaching staff and improve the technical base of universities.

The current study is based on a qualitative analysis of interviews with experts in a mixed format (offline and online) between June and July 2024. The interviews involved six experts from different sectors (higher education institutions, non-governmental organizations, and government agencies) from three cities in Kazakhstan. Audio recording of interviews was carried out only with the written consent of the interview participants.

To analyse the interviews, we used thematic analysis (Braun & Clarke, 2006) to identify patterns and views in the content of the interview data. All interviews were transcribed verbatim and anonymised using pseudonyms (e.g., 'Expert 1', 'Expert 2'). Two researchers independently conducted open coding to capture key ideas related to inclusive education and the implementation of assistive technology. The resulting codes were then combined into potential themes, which were refined and revised. Finally, the identified themes were interpreted in the context of existing literature on inclusive education, providing empirical and theoretical support for our findings.

Discussion

Based on the described methodological procedures, our analysis revealed several key themes characterizing the current state of inclusive education in higher education institutions in Kazakhstan. The following section presents the results, detailing the evolution of ideas about inclusion, the gap between policy and practice, the integration of assistive technologies, teacher training, and the influence of cultural and social factors. These results are discussed in light of the existing literature, allowing for a balanced view of achievements and challenges in this area.

Evolution of Ideas About Inclusive Education

The analysis of interviews revealed a marked evolution in how involved parties in Kazakhstan conceptualise inclusive education. Traditionally, inclusion was identified solely with serving students with disabilities. However, a broader understanding is now emerging that encompasses a variety of individual differences, including temporary difficulties such as mental health issues. For example, one expert noted: "Inclusive education is not a separate category of students; it is a new norm in which every person, regardless of their challenges, deserves equal access to learning and quality education" (Expert 5).

Similarly, another participant emphasized that inclusion must go beyond just physical accessibility: "I now understand inclusive education as providing all the necessary resources to ensure accessibility – not only physical, but also economic, methodological and even psychological support" (Expert 1).

These views are consistent with international frameworks that support the concept of universal design for learning (Oliver, 2009; UNESCO, 2020). Despite the positive shift in understanding of inclusion, translating these ideals into concrete policies and practices presents a distinct set of challenges.

Policy and Its Implementation: Advantages and Disadvantages

Several experts noted that despite Kazakhstan's strong legislative framework, there is a significant gap between formal policy and its practical implementation. One participant noted that while the National Education Concept for 2023–2029 requires universities to create conditions for all students, many institutions face challenges in implementing these measures due to limited resources and outdated methodologies (Expert 3).

Another expert highlighted the gap in the pedagogical field: “Despite a strong legal framework, teachers and administrators are still hesitant to fully support students with special educational needs, as the dominant thinking is still rooted in the medical model rather than the social model of inclusion” (Expert 5).

Such observations suggest that while formal policies exist, their effectiveness is significantly limited by insufficient funding, inadequate training, and persistent cultural stereotypes (Ministry of Education and Science of the Republic of Kazakhstan, 2020; Shakespeare, 2014). Rollan and Somerton (2019) showed that it is non-governmental organizations that take on key functions in implementing inclusive norms from the bottom up, with NGOs actively filling the gaps in state support by providing teacher training, engaging local communities, and raising awareness of inclusion. The authors highlight three areas of their activity as the formation of inclusive cultures, facilitating the development and implementation of regulations, and translating policies into specific educational practices, which is especially important for the uniform dissemination of AT outside large cities.

In this context, it is important to explore the role of assistive technologies in ensuring the implementation of legislative goals in practice, as well as their impact on the academic inclusion of students with special educational needs in the higher education system of Kazakhstan.

The Role and Integration of Assistive Technologies

Assistive technology (AT) is seen as a key tool to remove barriers in higher education. Several experts reported that institutions are already implementing basic solutions such as text-to-speech programs, screen magnifiers, and adapted versions of websites to support students with sensory impairments. One expert noted, “Our university has begun to integrate assistive software and hardware such as screen readers and tactile materials, but these measures are often implemented on a random basis rather than as part of a coordinated strategy” (Expert 2).

Another participant expressed concern that AT sometimes becomes a “formal” requirement: “We see expensive devices being purchased solely to meet regulatory requirements, but without accompanying training and guidance, these technologies often remain expensive artefacts rather than tools that actually improve the learning process” (Expert 5).

These opinions are consistent with international literature (WHO, 2011) and supported by studies such as Allan and Omarova (2021), who highlight that the impact of assistive technologies is significantly increased when integrated into a wider, supported educational system.

Teacher Training and Pedagogical Adaptation

The ability of teachers to adapt teaching methods to the diverse needs of students is a critical factor. Although many universities have initiated professional development programs, experts noted that such programs are often too general. One participant explained, “Although we conduct workshops and trainings on inclusive teaching, many of these sessions only provide theoretical knowledge rather than practical strategies for adapting classes to specific disciplines such as STEM” (Expert 4).

Another expert stressed the need to move from a traditional, achievement-oriented approach to a pedagogy that values empathy and individual support: “Higher education teachers must move beyond traditional methods and embrace a pedagogy that recognizes and develops the potential of each student” (Expert 5). These observations point to the need for more targeted, discipline-specific training to translate inclusive ideals into effective practice (Dweck, 2006; Passeka & Somerton, 2022).

Cultural and Social Aspects of Inclusion

Cultural attitudes and social norms are identified as significant barriers to the effective implementation of inclusive education. Participants repeatedly noted that the influence of the “medical model” often leads to the stigmatization and marginalization of students with special educational needs. One expert noted: “When we label a student as ‘special’ or ‘different,’ we unwittingly create division that undermines the idea of equal opportunity” (Expert 5).

In addition, family attitudes play a significant role. One participant noted, “The family context is important: parents who are overprotective can reinforce the perception of the child’s disability, which leads to a cycle of dependency” (Expert 6). These observations are in line with the studies of Kudaibergenova et al. (2024) and Tazhina et al. (2023), who emphasize that socio-cultural factors are critical for the successful implementation of inclusive practices in the educational context. In addition to infrastructural and cultural barriers, Abdina et al. (2023) identify rigid administrative structures and a lack of methodological support as key socio-institutional factors that contribute to the alienation of students with special educational needs and the reinforcement of stigma.

Based on a detailed analysis of key topics from the evolution of understanding “the inclusion” to the practical aspects of integrating assistive technologies and teacher training, it can be concluded that the results achieved by higher education institutions in Kazakhstan lay the foundation for further development. At the same time, the identified barriers and fragmentation of current initiatives indicate the need for systemic coordination and a more unified approach.

Conclusion

The results of the study demonstrate that higher education institutions in Kazakhstan are taking initial steps towards the formation of an inclusive culture, such as adapting campus infrastructure, creating specialized support services, and implementing projects using assistive technologies (master classes, advanced training courses, collaborations with other organizations). However, the current approach remains fragmented and is not always

supported by comprehensive strategies and systemic support, which confirms the need for further transformations.

For sustainable development of inclusive higher education, it is recommended to include AT in the strategic plans of universities as mandatory components, to develop programs for advanced training of faculty and administrative staff on inclusive education, to ensure regular updating of the technical base, to support for projects through grants and partnership initiatives, and to conduct information and educational campaigns among students and staff of higher education institutions. At the same time, it is necessary to actively involve non-governmental organizations at all stages of AT implementation from piloting and methodological support to coordination of funding and user involvement, which will overcome fragmentation and ensure systemic dissemination of technologies (Rollan, 2023). Joint efforts of universities, government agencies and public organizations will create a basis for expansion of successful practices and overcoming socio-cultural and institutional barriers, which will further allow the formation of a sustainable model of inclusion in the higher education system of Kazakhstan.

References

- Abdina, A., Uyzbayeva, A., & Zhanarstanova, M. (2023). Analysis of inclusive education in the Republic of Kazakhstan in the context of the philosophy of independent living. *Journal of Philosophy Culture and Political Science*, 86(4).
<https://doi.org/10.26577/jpcp.2023.v.86.i4.03>
- Allan, J., & Omarova, T. (2021). Disability and inclusion in Kazakhstan. *Disability & Society*, 37(7), 1067–1084. <https://doi.org/10.1080/09687599.2020.1867073>
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101.
- Cameron, D. (2001). *Working with spoken discourse*. SAGE.
- Coates, J. (2007). Talk in a play frame: More on laughter and intimacy. *Journal of Pragmatics*, 39, 29–49.
- Drew, P., & Heritage, J. (1992). Analysing talk at work: An introduction. In P. Drew, & J. Heritage (Eds.), *Talk at work* (pp. 3–65). Cambridge University Press.
- Dweck, C. S. (2006). *Mindset: The new psychology of success*. Ballantine Books.
- Kowalewski, S. J., & Ariza, H. H. (2022). How assistive technology impacts college students and faculty. *The Business and Management Review*, 13(01).
<https://doi.org/10.24052/BMR/V13NU01/ART-04>
- Kudaibergenova, A., Kurmanbek, A., & Meirbekova, A. A. (2024). Socio-pedagogical support of students with special educational needs based on the organization of an inclusive university environment. *Journal of Educational Sciences*, 79(2), 132–142.
<https://doi.org/10.26577/JES20247902011>
- Maushak, N., Kelley, P., & Blodgett, T. (2001). Preparing Teachers for the Inclusive Classroom: A Preliminary Study of Attitudes and Knowledge of Assistive Technology. *Journal of Technology and Teacher Education*, 9(3), 419–431.
- McNicholl, A., Casey, H., Desmond, D., & Gallagher, P. (2019). The impact of assistive technology use for students with disabilities in higher education: a systematic review. *Disability and Rehabilitation: Assistive Technology*, 16(2), 130–143.
<https://doi.org/10.1080/17483107.2019.1642395>
- McNicholl, A., Desmond, D., & Gallagher, P. (n.d.). Assistive Technologies, Educational Engagement and Psychosocial Outcomes among Students with Disabilities in Higher Education. *Disability and Rehabilitation: Assistive Technology*, 18(1), 50–58.
<https://doi.org/10.1080/17483107.2020.1854874>
- Ministry of Education and Science of the Republic of Kazakhstan. (2020). *Roadmap for the Development of Inclusive Education*. Nur-Sultan.

- Oliver, M. (2009). *Understanding disability: From theory to practice* (2nd ed.). Palgrave Macmillan.
- Passeka, Y., & Somerton, M. (2022). Bridging the gap: Special educators' perceptions of their professional roles in supporting inclusive education in Kazakhstan. *Disability & Society, 39*(6), 1380–1401. <https://doi.org/10.1080/09687599.2022.2160925>
- Rollan, K. (2023). Engines, Paramedics, and Urban Madmen: Grounded theory study of engagement of NGOs in inclusive education reform in Central Asia [Apollo - University of Cambridge Repository]. <https://doi.org/10.17863/CAM.104761>
- Rollan, K., & Somerton, M. (2019). Inclusive education reform in Kazakhstan: civil society activism from the bottom-up. *International Journal of Inclusive Education, 25*(10), 1109–1124. <https://doi.org/10.1080/13603116.2019.1599451>
- Shakespeare, T. (2014). *Disability rights and wrongs revisited* (2nd ed.). Routledge.
- Tazhina, G., Syrgakbayeva, A., Tairova, K., & Zhubakova, S. (2023). Factor analysis of inclusiveness variables in higher education. *Journal of Educational Sciences, 76*(3), 65–80. <https://doi.org/10.26577/JES.2023.v76.i3.06>
- Therasa, M. M. (2023). Adapting Assistive Technology to Diverse Learning Needs in Inclusive Education. *Shanlax International Journal of Arts, Science and Humanities, 11*(S1), 63–66. <https://doi.org/10.34293/sijash>
- UNESCO. (2020). *Embracing diversity: Toolkit for creating inclusive, learning-friendly environments*. UNESCO.
- Viner, M., Singh, A., & Shaughnessy, M. F. (2020). Assistive Technology to Help Students With Disabilities. In A. Singh, M. Viner, & C. Yeh (Eds.), *Special Education Design and Development Tools for School Rehabilitation Professionals* (pp. 240-267). IGI Global Scientific Publishing. <https://doi.org/10.4018/978-1-7998-1431-3.ch012>
- World Health Organization [WHO]. (2011). *World report on disability*. WHO Press.
- Yenduri, G., Kaluri, R., Rajput, D. S., Lakshmana, K., Gadekallu, T. R., Mahmud, M., & Brown, D. J. (2023). From Assistive Technologies to Metaverse: Technologies in Inclusive Higher Education for Students with Specific Learning Difficulties. <http://arxiv.org/abs/2305.11057>

Contact email: maral.zhanarstanova@astanait.edu.kz