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Integrating Artificial Intelligence into Support Education Rooms

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Abstract: In the digital era, educational systems are undergoing a structural transformation driven by technological innovation, reshaping every stage of learning—from instruction to assessment. A key component of this transformation is the integration of artificial intelligence (AI) systems into educational environments. AI functions as an assistant for teachers and a learning companion for students, enhancing flexibility, personalization, and interactivity in the learning process. This study investigates the potential impacts of AI assistants on diverse student profiles within Support Education Rooms. Using a scenario-based analytical framework, the research explores how AI tools can be effectively implemented for five student groups: those with dyslexia, autism spectrum disorder (ASD), attention deficit hyperactivity disorder (ADHD), visual impairments, and giftedness. The methodological approach follows a practice-oriented recommendation model developed through a comprehensive literature review. The analysis suggests that AI-based tools may offer varying levels of benefit depending on the student profile. For instance, speech recognition and text-to-speech technologies can improve reading fluency among students with dyslexia, while social interaction simulators may enhance communication skills for students with ASD. Accessibility applications foster independent learning for visually impaired students, and task management assistants can extend attention span in learners with ADHD. Moreover, adaptive AI tutoring systems provide enriched, self-paced learning experiences for gifted students.

Keywords: Digitalization, Support education room, Artificial intelligence, Teaching assistant, AI tools

Introduction

Rapid advancements in information and communication technologies have brought about a profound transformation in educational systems. Digitalization is reshaping not only instructional tools but also learning environments, teacher–student dynamics, and assessment processes. As the emphasis on personalized learning continues to grow, Artificial Intelligence (AI)-based systems have emerged as powerful instruments that enhance teaching and learning processes. Within learning environments, AI can function as a cognitive support assistant for teachers and a peer-like facilitator for students, fostering interaction and enabling personalized, adaptive learning experiences (Cosar, 2024). This is particularly valuable for students with special educational needs and gifted learners who receive instruction in Support Education Rooms (SERs), where AI tools provide the flexibility and individualization required for inclusive learning.

AI-assisted systems can reduce teachers' routine workload while generating learning materials tailored to individual differences among students. This allows educators to closely monitor student performance, provide real-time feedback, and implement data-driven classroom management strategies (Coşar, 2025). The adaptability of AI to diverse student profiles—including those with dyslexia, autism spectrum disorder (ASD), attention deficit hyperactivity disorder (ADHD), visual impairments, and giftedness—presents new opportunities for inclusive and equitable education in the era of digital transformation.

The primary purpose of this study is to examine how AI-based tools can be integrated into the educational process under teacher guidance. Specifically, it investigates the potential contributions of AI-supported applications—such as speech recognition systems, social simulation tools, task planners, and accessibility

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solutions—for students with dyslexia, ASD, ADHD, visual impairments, and giftedness within SER contexts. In this regard, the integration of AI into instructional processes not only enriches individualized learning experiences but also enhances teacher effectiveness in managing diverse classrooms. Ultimately, this study aims to identify the potential benefits and limitations of AI use across different student groups, offering insights into how digital assistants can promote more inclusive, personalized, and data-informed education.

Literature Review

The digital transformation of education has introduced new instructional paradigms aligned with 21st-century skills. Reports by UNESCO (2023) and the OECD (2022) emphasize that digital literacy, data awareness, and AI competencies have become essential professional skills for modern educators. Within this framework, AI is not merely a technological innovation but a transformative force reshaping instructional philosophy, pedagogy, and the organization of learning environments. Holmes, Bialik, and Fadel (2021) categorize the use of AI in education into three dimensions:

- AI in Education, referring to intelligent instructional systems that guide or adapt learning content.
- AI Education, which focuses on teaching students about AI technologies; and
- AI for Teachers, encompassing AI-based assistants that support educators in decision-making, assessment, and instructional planning.

Among these, AI in Education has received the most scholarly attention. Holmes et al. (2021) argue that AI-powered systems enhance student motivation and engagement by offering personalized and adaptive content. Similarly, Luckin (2018) and Luckin et al. (2016) conceptualize AI as a cognitive partner that alleviates teachers' cognitive load and enriches pedagogical decision-making. This human-centered approach positions AI as an augmentation tool that enhances teacher capacity rather than replacing it.

Despite technological progress, pedagogical integration has evolved slowly. Zawacki-Richter et al. (2019) found that most studies focus on algorithmic and technical modeling, while pedagogical aspects such as teacher roles, ethical considerations, and student self-regulation remain underexplored. This highlights the need for a multidimensional restructuring of AI integration encompassing pedagogical, ethical, and social dimensions. Recent scholarships have sought to bridge these gaps. Rakap (2024) emphasizes that although AI can support lesson planning, differentiation, and teacher professional growth, it may also pose risks such as de-professionalization, weakened teacher–student relationships, and data privacy concerns. He advocates for a balanced model that positions AI as a complement to, rather than a substitute for, human expertise—particularly in special education contexts.

In the field of special education, AI offers substantial opportunities for accessibility and personalization. Speech recognition tools can assist students with dyslexia; emotion recognition systems can support learners on the autism spectrum; task planners can aid students with ADHD; and screen readers can improve accessibility for visually impaired learners. Adaptive learning platforms further benefit gifted students by adjusting content complexity based on cognitive levels. However, as Cosar (2024) notes, much of the existing research focuses on coverage planning, material adaptation, or automated feedback, with limited exploration of the unique pedagogical dynamics within SERs.

Yim and Su (2023) highlight the crucial role of teacher guidance in ensuring the effective use of AI tools in K–12 settings, reinforcing the importance of human–AI collaboration. Similarly, Yurtsever and Yurtsever (2024) argue that successful AI integration depends on teacher readiness, continuous professional development, and the preservation of interpersonal interaction. Their findings also underline the lack of teacher-centered research in AI-supported learning environments.

Hocaoğlu (2024) contributes by examining the AI awareness of special education teachers. Although participants demonstrated moderate theoretical and practical knowledge, their awareness of classroom-level AI integration remained limited. The study identified significant variations across gender and age, highlighting the need for targeted training and institutional support mechanisms.

From a technological perspective, Hopcan et al. (2022) report an increasing emphasis on software-based AI applications in special education, especially in skill development and autism-related interventions. However, the predominance of technical models—such as Artificial Neural Networks and Support Vector Machines — suggests the necessity of more pedagogically grounded approaches. Ayeni et al. (2024) further argue that

adaptive AI systems can advance educational equity by tailoring instruction to individual learning needs, reinforcing the principles of inclusive education.

Ethical considerations have also become central to this discourse. Özer (2024) underscores the importance of AI literacy among teachers and warns of the potential ethical and social risks of uncritical AI adoption. Likewise, Walls (2025) proposes a professional development framework to equip teachers with the competencies necessary for ethical and effective AI use, positioning AI as a teacher-centered instrument for educational innovation.

Finally, Güven and Saygın (2024) findings reveal a sharp rise in research interest since 2019, yet most studies remain focused on technical development rather than classroom implementation. They identify ethical issues, teacher training, and infrastructural limitations as the primary barriers to effective AI adoption, calling for more doctoral-level, pedagogically oriented research. Building on these insights, the present study addresses the identified research gaps by examining how AI-supported educational assistants can enhance teacher–student interaction and cognitive efficiency within the SER context. By modelling a cognitive efficiency–time balance, this study underscores that digital transformation in education requires not only technological innovation but also pedagogical and ethical restructuring to achieve sustainable, inclusive progress.

Method

This study adopted a qualitative and practice-oriented research design to examine the potential contributions of AI-supported instructional tools for teachers and students within SER settings. The primary objective was to explore how AI-based solutions can be adapted to diverse learner profiles and to develop strategic recommendations for their integration into both classroom and individualized learning processes.

To achieve this, a scenario-based analysis approach was implemented. The analysis involved special education teachers working in SERs and students with varying levels of special educational needs. Five distinct learner profiles—dyslexia, ASD, ADHD, visual impairment, and giftedness—were represented in the scenarios. Each scenario was designed to explore how AI tools could enhance teacher–student interaction, facilitate targeted learning outcomes, and reveal potential implementation challenges. The study relied on three complementary data sources and analytical bases:

- Literature Review: A comprehensive review of current research on AI applications in education provided the theoretical foundation, with particular emphasis on special education contexts.
- Experiential Insights: Informal, conversation-based exchanges with SER practitioners offered grounded perspectives on the realities of AI integration in educational practice.
- Functional Evaluation of AI Tools: A structured review of existing AI-based educational applications—such as Speechify, Replika AI, ChatGPT, BeMyEyes, and Khanmigo—was conducted. These tools were evaluated using criteria including accessibility, language support, pedagogical adaptability, personalization capacity, and emotional engagement potential.

By combining these data sources, the study established a multidimensional framework for analyzing the pedagogical, technological, and ethical implications of AI-supported learning in inclusive educational environments. The methodological approach thus emphasizes applied reflection over empirical measurement, offering conceptual and practice-based insights for effective AI integration in SERs.

Results and Discussion

This study investigated the potential contributions of AI-supported educational tools to diverse learner profiles within SER environments. The reflections presented here are grounded in literature review, instructional design principles, and scenario-based insights rather than empirical data. The purpose was to explore how AI technologies can enhance learning outcomes, strengthen teacher roles, and address specific instructional challenges across different student groups.

Students Diagnosed with Dyslexia

AI tools such as Speechify and Read&Write were found to effectively support students with dyslexia by improving word–sound association and reducing reading anxiety. These applications foster reading fluency and comprehension through multimodal feedback.

- *Advantages*: AI-based speech and text tools enhance phonological decoding and increase reading speed and comprehension.
- *Expected Gains*: Students receive auditory support during reading, reducing word recognition errors and anxiety.
- *Potential Limitations*: Limited Turkish natural language processing may cause pronunciation errors; overreliance on audio support may hinder silent reading development.

Such tools also enable teachers to monitor student progress through auditory feedback, reinforcing comprehension and individualized support.

Students on the Autism Spectrum

Emotion recognition and social scenario simulations—such as Replika AI and Curipod—provide structured environments for practicing social interaction. These tools help students identify facial expressions and respond appropriately to social cues.

- *Advantages*: They create a safe social learning environment and improve the recognition of facial expressions and emotional signals.
- *Expected Gains*: Students enhance their ability to initiate communication and respond appropriately in social contexts.
- *Potential Limitations*: Simulated dialogues may limit natural communication skills if overused, as real-life interactions are difficult to replicate.

These applications enable teachers to systematically observe socio-emotional development and design personalized support plans.

Students with ADHD

Task-oriented AI assistants such as FocusMate and AI Planner were observed to improve attention regulation and task completion among students with ADHD.

- *Advantages*: These tools support time management, task prioritization, and self-regulation, with real-time feedback enhancing focus.
- *Expected Gains*: Students complete tasks more efficiently and maintain attention longer; teachers can digitally track progress.
- *Potential Limitations*: Excessive digital feedback may cause cognitive overload; gamification elements may increase dependence on external motivation.

AI-based reminders and adaptive scheduling systems can reduce teachers' individual monitoring workload while promoting self-regulated learning.

Students with Visual or Hearing Impairments

Applications like BeMyEyes and Seeing AI for visually impaired students, and Otter.ai for hearing-impaired learners, significantly enhance accessibility to educational materials.

- *Advantages*: These tools enhance accessibility by converting content into audio or text formats.
- *Expected Gains*: Students gain greater independence in learning; teachers can share instructional materials through multimodal channels.
- *Potential Limitations*: Limited offline functionality and language model inconsistencies (e.g., accents or dialects) may restrict usability.

Integrating such tools within SER environments strengthens inclusive practices and expands opportunities for independent learning.

Gifted Students

Adaptive learning platforms such as Khanmigo and ChatGPT Custom Tutor offer cognitively stimulating content tailored to each student's pace.

- *Advantages*: These platforms offer dynamically adjusted challenges based on cognitive level, fostering creativity and higher-order thinking.
- *Expected Gains*: Students progress at their own pace, explore advanced topics, and receive personalized feedback; teachers can provide differentiated guidance.
- *Potential Limitations*: Excessive personalization may reduce peer interaction and increase competitive stress.

These adaptive systems not only benefit gifted learners but also empower teachers to implement more refined instructional differentiation.

Cross-Cutting Observations

Across all student groups, AI tools demonstrated the potential to improve accessibility, personalize learning experiences, and redefine the teacher's role—from information provider to learning designer. Real-time performance tracking supports data-driven assessment, while ethical considerations such as data privacy, transparency, and fairness remain critical.

Table 1. Key dimensions and potential impacts of AI integration in SERs

Dimension	Potential Impact
Accessibility	Easier access to learning materials across all student groups.
Personalization	AI dynamically adapts learning pace and content to individual needs.
Teacher's Role	Teachers evolve from content deliverers to learning designers.
Data-Driven Monitoring	Real-time tracking enhances timely interventions and objective assessment.
Ethics & Data Security	Protecting student data and avoiding algorithmic bias are essential priorities.

As summarized in Table 1, AI-supported tools provide multidimensional benefits across key educational dimensions. In terms of accessibility, they promote equitable learning opportunities for students with sensory or cognitive challenges. Personalization allows adaptive pacing and content modification that foster engagement and differentiated instruction. The teacher's role shifts toward instructional design and facilitation, optimizing pedagogical strategies. Moreover, data-driven monitoring enables evidence-based decisions, ensuring continuous improvement. Finally, all implementations must adhere to rigorous ethical and data protection standards to prevent misuse and ensure fairness. Collectively, these reflections underscore the transformative potential of AI in creating inclusive, adaptive, and ethically grounded learning ecosystems.

Conclusion

This study explored the pedagogical potential of AI-supported instructional tools within SER environments, focusing on their applicability across diverse learner profiles. The reflections indicate that AI can serve as a complementary assistant to teachers, enhancing accessibility, personalization, and instructional efficiency. Rather than replacing educators, AI systems contribute to the creation of responsive learning environments that accommodate individual differences and advance the principles of inclusive education.

AI-based tools demonstrated notable advantages across five learner categories. For students with dyslexia, text-to-speech applications reduced reading anxiety and improved fluency. For those with ADHD, task planners enhanced attention regulation and task completion. Learners on the autism spectrum benefited from emotion recognition tools that strengthened their ability to interpret social cues. Students with visual or hearing impairments achieved greater independence through accessibility-oriented platforms, while gifted learners were supported by adaptive systems that fostered advanced cognitive engagement. Nonetheless, certain limitations were observed, including over-personalization, digital dependency, and linguistic constraints in Turkish natural language processing.

From a pedagogical standpoint, the integration of AI should follow a hybrid instructional model wherein teachers retain leadership in pedagogical decision-making while AI systems provide targeted, data-informed support. To maximize educational impact, inclusive content design, real-time feedback mechanisms, and differentiated instructional strategies are essential. Technologically, AI models should be adapted to local linguistic and cultural contexts, offer offline functionality, and allow for teacher-controlled customization. Ethically, data privacy, algorithmic transparency, and informed consent—particularly for students with special educational needs—must be regarded as non-negotiable priorities. As an exploratory and conceptual study, this research does not include experimental data. Future investigations should incorporate quantitative and qualitative analyses of AI-supported learning models across disability groups, explore emotional and social learning dimensions using biometric and behavioral data, and develop professional development frameworks to enhance teachers' AI literacy and pedagogical readiness.In conclusion, AI-supported educational systems represent a paradigm shift toward data-informed, learner-centered, and ethically grounded instruction. Their mindful integration within SER contexts can cultivate equitable, accessible, and personalized learning experiences. When used responsibly, AI should not be viewed as a replacement for teachers but as a "smart learning partner" that empowers both educators and students to achieve deeper, more inclusive learning outcomes.

Scientific Ethics Declaration

* The author declares that the scientific ethical and legal responsibility of this article published in EPESS journal belongs to the author.

Conflict of Interest

* The author declares that there is no conflict of interest

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