Research in Education and Rehabilitation 2025; 8(1): 252-264 **DOI**: 10.51558/2744-1555.2025.8.1.252

EFFECTIVE STRATEGIES FOR ADDRESSING AUTISTIC BEHAVIOURS AND LEARNING BARRIERS: SYSTEMATIC LITERATURE REVIEW

UČINKOVITE STRATEGIJE ZA RJEŠAVANJE AUTISTIČNOG PONAŠANJA I PREPREKA U UČENJU: SUSTAVNI PREGLED LITERATURE

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Review article

Received: 03/06/2025
Accepted: 18/07/2025

ABSTRACT

The paper aims to identify and analyze effective strategies aimed at managing autistic behavior and learning barriers. A qualitative analysis of the relevant scientific and professional literature published in the last decade was carried out, and after screening, 41 papers were included in thematic analysis. Strategies are divided into six categories: Behavioral interventions and behavior management, Education of children and youth with ASD and the empowerment of educators, Teaching social skills, Sensory integration therapies, Digital and assistive technologies, and Transition support. All included strategies are evidence-based practices (EBPs). The literature review confirms that there is no universal approach in working with children and youth with ASD. Still, successful intervention is based on the application of a combination of strategies adapted to the individual needs of students, the educational environment, and developmental goals. Despite the multitude of strategies at a given setting's disposal effective implementation of EBPs is often thwarted by system, school, and individual factors such as limited resources, training, as well as consistency across environments. By addressing these challenges in a comprehensive manner—through inclusive

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pedagogy, adaptive technology, and collaborative support systems—we can bridge the research-practice gap and provide rich, enabling learning experiences for students with autism spectrum disorders.

Key words: autism, learning strategies, behavior management, learning barriers

SAŽETAK

Cilj rada je identificirati i analizirati učinkovite strategije usmjerene na upravljanje autističnim ponašanjem i preprekama u učenju. Provedena je kvalitativna analiza relevantne znanstvene i stručne literature objavljene u posljednjem desetljeću, a nakon pregleda, 41 rad je uključen u tematsku analizu. Strategije su podijeljene u šest kategorija: Bihevioralne intervencije i upravljanje ponašanjem, Obrazovanje djece i mladih s PSA i osnaživanje edukatora, Poučavanje socijalnih vještina, Terapije senzorne integracije, Digitalne i asistivne tehnologije te Podrška u tranziciji. Sve uključene strategije su prakse utemeljene na dokazima (EBPs). Pregled literature potvrđuje da ne postoji univerzalni pristup u radu s djecom i mladima s PSA. Ipak, uspješna intervencija temelji se na primjeni kombinacije strategija prilagođenih individualnim potrebama učenika, obrazovnom okruženju i razvojnim ciljevima. Unatoč mnoštvu strategija koje su na raspolaganju određenom okruženju, učinkovitu provedbu EBP-ova često ometaju sustavni, školski i individualni čimbenici poput ograničenih resursa, obuke, kao i dosljednosti u različitim okruženjima. Rješavanjem ovih izazova na sveobuhvatan način - kroz inkluzivnu pedagogiju, adaptivnu tehnologiju i sustave suradničke podrške - možemo premostiti jaz između istraživanja i prakse te pružiti bogata i osnažujuća iskustva učenja za učenike s poremećajima iz spektra autizma.

Ključne riječi: autizam, strategije učenja, upravljanje ponašanjem, barijere u učenju

INTRODUCTION

Autism spectrum disorder (ASD) is a neurodevelopmental condition that influences different developmental aspects such as socialization, communication, behavior, and learning. ASD has been the focus of research in recent years for several reasons. First, the prevalence of ASD has increased steadily over the past 20 years, from one in 150 children to 1 in 36 children (Patil & Kaple, 2023). Other reasons for the increased interest in ASD studies are inclusive education and the digital age.

Behaviors present in children and youth with ASD can be a major obstacle to their successful inclusion in the educational environment as well as for the use of digital and assistive technologies. People with ASD have social communication and interaction problems, such as back-and-forth conversation, the use of nonverbal communicative behaviors (e.g., gestures), and developing and maintaining social relationships (Golson et al., 2022). Restricted and repetitive behaviors and interests are one of the diagnostic features of autism and include repetitive bodily movements, strict adherence to rules, and superior knowledge in or immersive preoccupation with specific interests (APA, 2022, as cited in Lung et al., 2024).

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ASD children may experience heightened or reduced sensitivity to sensory input like sounds, lights, textures, or smells, which can lead to discomfort or overstimulation in certain environments (Kirby et al., 2022). Children and youth with ASD also have sensory processing differences, which has a strong impact on school performance (Biter et al., 2020). Emotional dysregulation, although it is not among the diagnostic criteria (Davico et al., 2022), is often present in people with ASD, and manifests as mood instability, irritability, tantrums, and self-harm (Davico et al., 2022). Autistic people are more likely to experience mental health difficulties compared to neurotypical people (Mukherjee & Beresford, 2023) and may exhibit anxiety, irritability, or aggression, especially when faced with changes or unexpected situations.

Children and young people with ASD exhibit a wide range of behaviors that make their inclusion in the regular educational environment significantly more difficult and that pose challenges to teachers in terms of applying strategies that will best suit the individual needs of each student with ASD. There are many strategies available today, but not all of them are evidence-based, and therefore there is a need to highlight those that are. There are available review studies that dealt with the analysis of strategies aimed at autistic behaviors and learning barriers, but they mostly analyzed individual strategies. For example, behavioral intervention and behavior management (Chung, Chung, & Lee, 2024; Vismara & Rogers, 2011), educational and behavior intervention (Sengupta et al., 2017), teaching intervention (Fani-Panagiota, 2015), social skills strategies (Ke, Whalon, & Yun, 2017), digital interventions for enhancing communication and collaboration (Kauts & Rather, 2025), etc. There is a lack of review papers, which focus on a more comprehensive review of strategies. Therefore, this paper aims to identify and analyze effective strategies aimed at managing autistic behavior and learning barriers.

METHODOLOGY

A qualitative analysis of the relevant scientific and professional literature published in the last decade was carried out, with an emphasis on interventions applied in the educational context, as well as on digital and inclusive approaches. Papers that meet the following criteria are included in the analysis: they were published between 2013 and 2024; are available in scientific databases (ERIC, Scopus, PubMed, ResearchGate, Google Scholar); they deal with strategies to mitigate challenging behaviors, learning and inclusion of children and youth with ASD and have an empirical basis (quantitative or qualitative studies, meta-analyses, systematic reviews) or are evidence-based professional guidelines. Exclusion criteria from the review for studies were: do not directly relate to the educational context; do not include the population of children and youth with ASD; are not available in English and are not peer-reviewed or are classified as popular-professional articles. The search was conducted using a combination of keywords such as: "autism AND education strategies" OR "autism AND learning barriers" OR "inclusive practices AND ASD" OR "behavioral interventions AND autism" OR "assistive technology AND autism"**.** The selected papers were analyzed using a qualitative approach based on their content. A thematic analysis was employed to identify recurring key strategies and approaches in the literature.

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RESULTS

The PRISMA diagram (Figure 1) shows the literature search flow. By searching databases (ERIC, PubMed, Google scholar, ResearchGate, Scopus) using keywords, 113,277 references were identified. Using automatic tools available on the searched databases (time range 2013 – 2024; full text; English language) 98.635 references were excluded. Additional title screening removed duplicates (n = 9.631), and the remaining papers (n = 5.011) were examined in relation to titles and abstracts, based on which n = 4.924 papers were excluded. The remaining papers (n = 87) are reviews in their entirety, after which 41 papers remained for analysis.

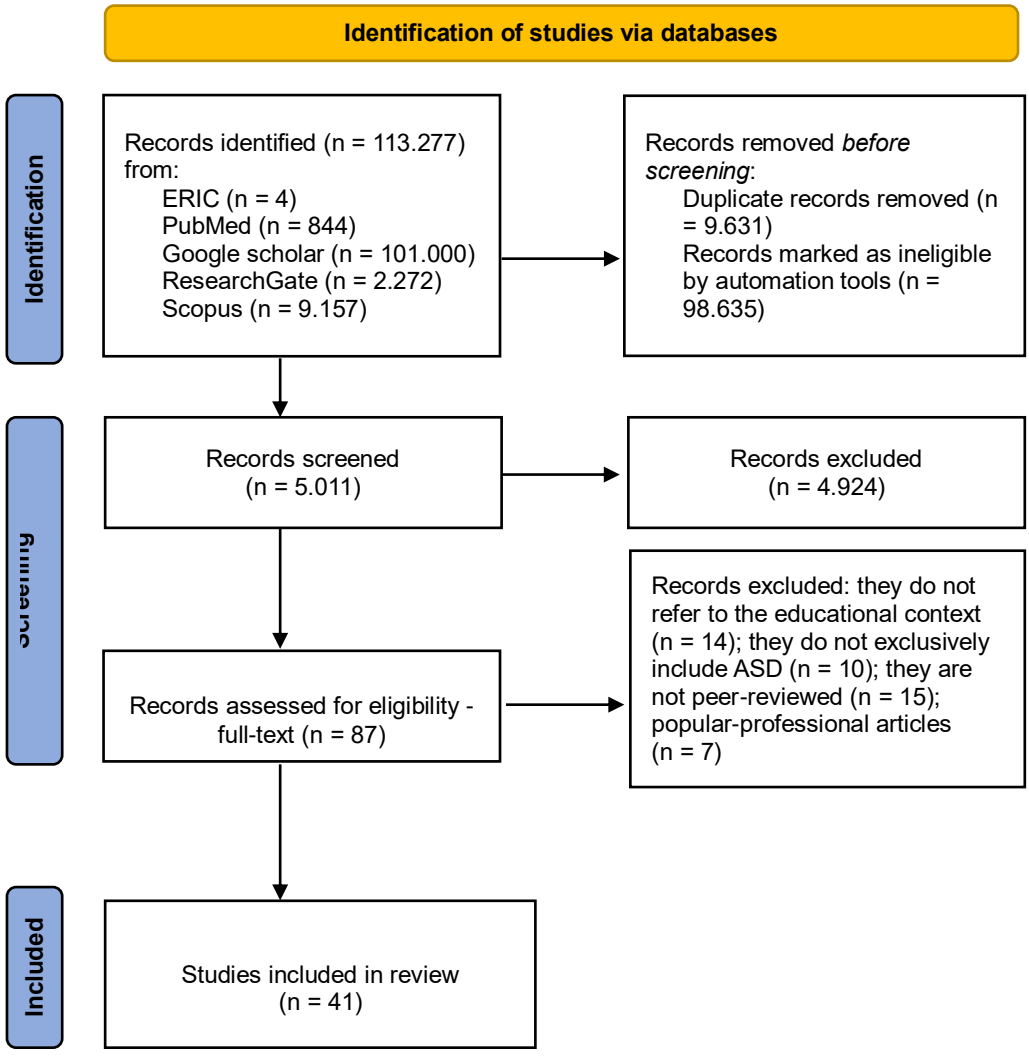

Figure 1. PRISMA diagram of searches

The thematic analysis of the included works identified key strategies aimed at solving autistic behavior and learning obstacles, which were classified into six thematic categories. Table 1 shows the categories, their description, as well as the corresponding references.

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Table 1. Thematic categories with description and associated references

Categories	Description	References
Behavioral interventions and behavior management	Interventions based on applied behavior analysis (ABA), cognitive-behavioral strategies, self-regulation strategies, prevention and modification of challenging behaviors.	Wood et al., (2018), Drahota et al., (2011), Singh et al., (2011), Radley et al., (2020), Morin & AFIRM (2018), Sam & AFIRM (2015a), Blackwell & Stockall (2021), Plavnick & Hume (2014), Lei & Ventola (2017), Tomaszewski & AFIRM (2017), Sam & AFIRM (2016), Sam & AFIRM (2015b), Sam & AFIRM (2015c), Sam & AFIRM (2015d), Barry et al., (2020), Sandbank et al., (2020), Odom et al., (2021), Steinbrenner et al., (2020), Anderson et al., (2024),
Education of children and youth with ASD and the empowerment of educators	Education of children and youth with ASD, implementation of strategies in school organization and teacher empowerment.	Ediyanto (2023), Kossyvaki & Papoudi (2016), Honorato et al., (2024), Gunn & Delafield-Butt (2016), Sengupta et al. (2017), Steinbrenner et al., (2020), Fani-Panagiota (2015), Anderson & Carr (2021), Cook & Ogden (2022), Davey (2020), Fleury et al. (2014)
Teaching social skills	Strategies to encourage the development of social skills such as Common group-based trainings, Cognitive-behavioral therapy, Technology-based tools, etc.	Do et al., (2024), Divya & Maniraj (2024), Fan et al., (2023),
Sensory integration therapies	Interventions involving sensory integration.	Camino-Alarcón et al., (2024)
Digital and assistive technologies	Use of digital technologies, assistive technology, applications and software tools to promote skills development and education	Atherton & Cross (2021), Esnaashari et al., (2022), Parsons et al., (2017), Mayer et al., (2024), Klavina et al., (2024), Wang & Jeon (2024) Grynszpan et al., (2014),
Transition support	Strategies that support the transition of children with autism from one educational or living environment to another, including the transition from preschool to the school system.	Nuske et al., (2019)

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DISCUSSION

The literature review confirms that there is no universal approach in working with children and youth with ASD, but successful intervention is based on the application of a combination of strategies adapted to the individual needs of students, the educational environment and developmental goals. Strategies can be classified into several key categories: Behavioral interventions and behavior management, Education of children and youth with ASD and the empowerment of educators, Teaching social skills, Sensory integration therapies, Digital and assistive technologies and Transition support.

Behavioral interventions and behavior management are among the most commonly used and empirically validated approaches for addressing challenging behaviors in children with autism spectrum disorder (Wood et al., 2018; Barry et al., 2020). These include a range of evidence-based practices (EBPs):

- Antecedent-Based Interventions (ABIs) modify the environment to prevent problem behavior and promote positive responses. Effective strategies include presession attention, high-probability request sequences (HPRS), and functional communication training (FCT) (Wood et al., 2018). Before selecting an intervention, a teacher should conduct a functional behavior assessment (FBA) and a preference assessment (Wood et al., 2018).
- Cognitive Behavioral Intervention (CBI) improves behavior through cognitive restructuring. It is often used with ASD children who exhibit challenging behaviors, such as anger and anxiety (Drahota et al., 2011; Singh et al., 2011) older than six years but can also be adapted for younger children (Anderson et al., 2024).
- Discrete Trial Teaching (DTT) is a structured one-on-one method effective for teaching specific skills using task analysis, prompting, and reinforcement (Radley et al., 2020).
- Extinction (EXT) reduces problematic behavior by removing reinforcing consequences. It is most effective when combined with differential reinforcement and FBA (Morin & AFIRM Team, 2018).
- Modeling (MD) involves demonstrating target behaviors for imitation. It is validated across age groups and often combined with prompting and reinforcement (Sam & AFIRM Team, 2015a).
- Incidental Teaching uses natural learning opportunities based on the child's interests, and supports development of social communication (Blackwell & Stockall, 2021; Plavnick & Hume, 2014).
- Pivotal Response Treatment (PRT) focuses on motivation, self-management, and social engagement. It is highly effective in promoting language and social skills (Lei & Ventola, 2017).
- Response Interruption and Redirection (RIR) redirects attention from repetitive or self-injurious behaviors after functional assessment (Tomaszewski & AFIRM Team, 2017).

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- Self-Management (SM) teaches children to monitor and regulate their own behaviors, often using visual supports or video modeling (Sam & AFIRM Team, 2016; Redley et al., 2020).
- Task Analysis (TA) breaks down complex tasks into steps. It is effective for teaching communication, social, and academic skills (Sam & AFIRM Team, 2015b).
- Time Delay (TD) is a practice that systematically fades the use of prompts during instructional activities by using a brief delay between the initial instruction and any additional instructions or prompts and has proven effective across multiple developmental domains (Sam & AFIRM Team, 2015c).
- Prompting Procedures (PP) provide verbal, gestural, or physical cues to support skill acquisition in diverse settings (Sam & AFIRM Team, 2015d).

Use of EBPs has been linked to improved educational and behavioral outcomes in children with ASD (Sandbank et al., 2020; Odom et al., 2021). However, implementation can be affected by barriers at multiple levels—macro (e.g., funding, cultural factors), school (e.g., resources, staff training), and individual (e.g., teacher resistance, student variability). Facilitators include staff support, positive outcomes, and alignment with teaching goals (Barry et al., 2020).

The second group of strategies focuses on *educational support for children and youth with ASD and the empowerment of educators*. Effective instructional methods include Discrete Trial Training, Pivotal Response Training, Script Training, and Augmentative and Alternative Communication (AAC) (Ediyanto, 2023). Despite often being overlooked in formal education, play-based learning can significantly support progress in ASD students (Kossyvaki & Papoudi, 2016). Game-based approaches, especially 2D computer games in naturalistic settings, have shown promise, though mostly studied qualitatively (Honorato et al., 2024).

Engaging students' restricted interests in classroom activities can enhance learning, social interaction, and behavior (Gunn & Delafield-Butt, 2016). Common strategies include behavioral, developmental, AAC, visual strategies, and individual/group formats (Sengupta et al., 2017). Behavioral models like ABA and FBA aim to teach appropriate behaviors, while developmental models (e.g., Floortime, RDI) foster relationship-building.

Comprehensive Treatment Models (CTMs), such as ABA, ESDM, LEAP, TEACCH, and SCERTS, integrate multiple approaches with structured protocols and high intensity (Steinbrenner et al., 2020). In contrast, Focused Interventions (FIs) target specific skills for shorter periods (e.g., PECS, Social Stories). While CTMs show positive outcomes in language, cognitive, and adaptive skills, ABA demonstrates the strongest evidence, though methodological debates remain (Fani-Panagiota, 2015; Anderson & Carr, 2021).

Teachers face challenges supporting ASD students in inclusive settings. Strategies include boosting teacher self-confidence and personalized support (Cook & Ogden, 2022), using special interests to improve engagement (Davey, 2020), and addressing academic needs in adolescence—particularly in social skills, communication, and executive functioning (Fleury et al., 2014).

Teaching social skills is a key focus in interventions for adolescents with ASD, who often face challenges in everyday interactions. Group-based programs as SSGRIN and PEERS

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teach social rules and communication strategies (Do, Thi, & Nguyen, 2024). Other approaches include cognitive-behavioral therapy, peer- and parent-mediated interventions, and technology-based tools such as virtual reality and video modeling, offering safe environments for practice. Martial arts and community-based settings also support social development and self-regulation. Machine learning can further personalize interventions by analyzing individual behavior patterns and learning needs, enhancing the effectiveness of support strategies (Divya & Maniraj, 2024). Structured programs for social interaction show strong potential to improve communication skills and reduce social learning barriers (Do et al., 2024). Additionally, nature-based interventions (NBIs), which extend therapy into natural environments, have shown benefits for both cognitive and behavioral development, offering a less overstimulating alternative to traditional settings (Fan et al., 2023).

In terms of sensory processing difficulties, Camino-Alarcón et al. (2024) highlight the importance of *sensory integration therapies*, which allow children with ASD to process sensory information more effectively. These therapies can reduce sensory sensitivities that have a tendency to disrupt learning and the regulation of behavior, offering a critical mechanism for dismantling barriers to learning.

Digital and assistive technologies have shown promise in supporting individuals with ASD. A meta-analysis by Grynszpan et al. (2014) confirmed the overall effectiveness of technology-based interventions. Both analog and digital games help improve social, academic, and physical skills through interactive and structured learning (Atherton & Cross, 2021). Esnaashari et al. (2022) highlight digital tools' impact on enhancing receptive and expressive language skills in ASD learners. Parsons et al. (2017) emphasize the importance of interdisciplinary and personalized approaches in designing effective ASD technologies. Mayer et al. (2024) propose digital citizenship guidelines to promote balanced screen use for behavior management. Klavina et al. (2024) report improved independence with digital tools, while Wang and Jeon (2024) show that assistive tech (e.g., mobile apps, VR) can enhance daily functioning and reduce academic and social barriers in adults with ASD.

Transitioning to a new school can be challenging for children with ASD, as well as their parents and teachers. Nuske et al. (2019) found that students often experienced anxiety and social stress, while parents faced complex decisions and concerns for their child's well-being. Teachers struggled to provide adequate support, often lacking resources. Effective strategies included preparing students for the new environment, individualizing transition plans, clarifying processes for parents, and improving communication between schools and families.

CONCLUSION

Effective education for children and adolescents with ASD relies on the application of evidence-based practices (EBPs) that are systematic, individualized, and responsive to each learner's needs. Interventions such as antecedent-based strategies, cognitive behavioral interventions, discrete trial teaching, modeling, and self-management have demonstrated success in improving social, communicative, behavioral, and academic outcomes. While comprehensive treatment models like ABA, TEACCH, and ESDM provide broad developmental support, targeted interventions allow for focused skill-building.

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Maximizing effectiveness often involves integrating developmental approaches with augmentative and alternative communication, visual supports, and emerging tools such as technology-based programs, peer-mediated approaches, and nature-based interventions. Despite their proven value, systemic, institutional, and individual barriers— including limited training, resources, and consistency, frequently challenge the implementation of these strategies. Overcoming these challenges requires strong interdisciplinary collaboration, teacher preparation, contextual sensitivity, and the use of learner-driven approaches. By aligning interventions with students' strengths and interests and embracing innovative formats, educators can bridge the gap between research and practice and create inclusive, supportive, and engaging learning environments for students with ASD.

ACKNOWLEDGEMENTS

The results are part of research conducted under ERASMUS + project (Project No. 2024-1-DE02-KA220-ADU-000246090) titled Designing Educational Materials and Teaching Digital Literacy to Individuals with Autism.

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