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EARLY-ASD

SURVEY – TURKIYE REPORT

ERASMUS+ PROGRAMME : UPSKILLING PRESERVICE TEACHERS TO SUPPORT YOUNG CHILDREN WITH AUTISM SPECTRUM DISORDER THROUGH DIGITAL SOCIAL STORIES

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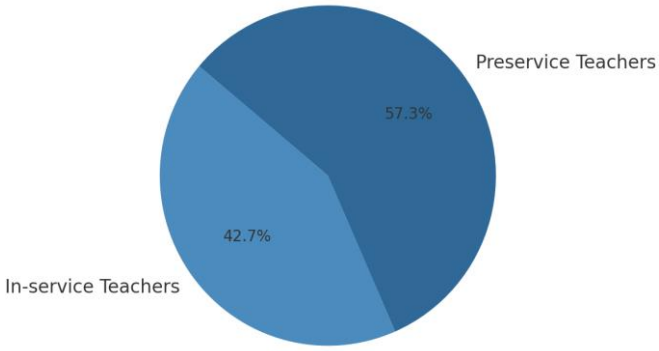
INTRODUCTION

Türkiye recognizes inclusive education as an equal opportunity approach and one of the most important principles of education in supporting the development of all students within the system, participation in daily life and integration into society. National policies and strategies and legal regulations in this field emphasize inclusive practices in schools, the provision of supportive SEN services and the importance of teacher professional development. For the last 10 years in Turkey, there has been an interest in raising awareness about Autism Spectrum Disorder (ASD) among educators in educational settings at various levels such as preschool, primary school, middle school and high school and in increasing the professional skills of educators in this direction.

In this study, we aimed to examine in-service and pre-service teachers' views on the use of assistive technologies in supporting the social-emotional development of children with ASD in Turkey within the framework of the EARLY-ASD Project. In this context, the study focused especially on pre-service teachers working or preparing to work in the fields of Preschool and Special Education (SEN).

A generic questionnaire for teachers and prospective teachers was designed in collaboration with other project partners in order to achieve the objectives related to the purpose set out in this study. The questionnaires were then converted into google form and administered in Turkey in February and March 2025. Random sampling method was preferred to determine the participants to be included in the study. A total of 112 people were reached and data were collected from a total of 75 participants, with 32 valid in-service and 43 valid pre-service responses.

Figure 1. Sample composition



The Turkish sample included 32 in-service teachers participating in the EARLY-ASD project. The analysis of their demographic and professional background offers critical insight into their working conditions, professional roles, and experience with children diagnosed with ASD. The participants' ages ranged from 24 to 50 years. The most frequently represented age was 30, followed by ages 25, 32, and 38. This suggests a relatively young teaching workforce, with many participants being in the early or middle stages of their professional careers. A total of 26 participants (81.3%) identified as female, while only 6 (18.7%) identified as male. This is consistent with gender trends observed in the education sector in Türkiye, particularly in early childhood and SEN contexts. All teachers (100%) reported working with children aged 3 to 7 years. Most reported experience across multiple age groups, particularly 3–7 years and beyond. The diversity in age range suggests a broad scope of experience in early education settings. Participants held a variety of professional titles. The most common was "SEN Teacher" (n = 13), followed by combinations such as "Preschool and SEN Teacher," and roles including child development specialists, psychologists, and ABA therapists. The wide variety of roles reflects a multidisciplinary workforce in early childhood ASD education. Teachers worked in a range of early education environments, including SEN centers, special schools, early intervention centers, and public preschools. The most frequent workplace was a "SEN Center" (n = 14), followed by "SEN Schools" (n = 5). The vast majority (84.4%) taught in specialized or therapeutic classrooms. Only a small minority reported working in general education or inclusive settings. Class size varied widely, from as few as 5 m² to 35 m², and in terms of group size, many taught children with ASD in small groups of 1 to 5 students. For sessions focused specifically on social and emotional skills, group sizes varied again, with many reporting 3–10 children per group. When asked how many children with ASD they had worked with throughout their careers, most teachers reported extensive experience. Seven teachers stated "more than 10," five said "more than 20," and one even indicated "more than 50." Currently, they worked with between 1 to 12 children with ASD, with the most common responses being 2–5 children. Years of general teaching experience ranged from 1 to 25 years. Many reported 2–3 years, while

some had well over a decade. In terms of direct experience with children with ASD, responses ranged from 1 to 22 years, with several teachers indicating more than 8 years of experience in this specific area.

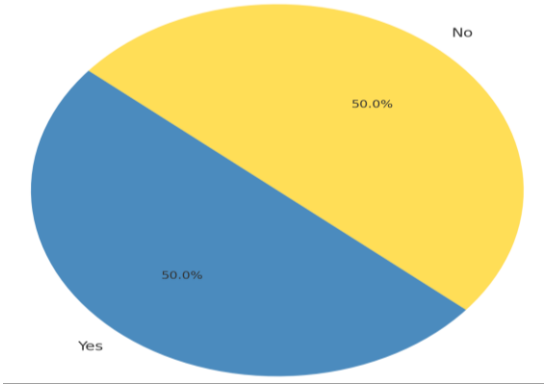
The Turkish preservice teacher sample consisted of 43 undergraduate students enrolled in teacher education programs. The analysis of their demographic background provides valuable insight into the future teaching workforce involved in early intervention and autism education. Among the 43 participants, 26 were female (60.5%) and 17 were male (39.5%). This reflects a relatively balanced gender composition compared to the current in-service teaching force in Türkiye, which is predominantly female. The presence of a substantial proportion of male preservice teachers suggests a possible shift towards more gender diversity in future SEN cohorts. A majority of respondents (n = 31; 72.1%) fell within the 18–22 age group, representing students in the earlier stages of their undergraduate education. Additionally, 7 participants (16.3%) were aged 23–27, and 5 participants (11.6%) were 28 years or older. This age spread indicates that while most preservice teachers are in traditional university age ranges, a notable minority may be pursuing teaching as a second career or later in life. An overwhelming majority of participants (n = 41; 95.3%) reported majoring in SEN, while 2 participants (4.7%) were enrolled in Preschool or Primary Education programs. This concentration within the SEN field demonstrates the sample's relevance and alignment with the project's focus on supporting students with ASD. All respondents (100%) were pursuing a Bachelor's Degree (Lisans Derecesi), indicating a homogenous educational level. The inclusion of only undergraduate students ensures consistency in terms of academic exposure and expected teaching readiness.

TRAINING

In service teachers

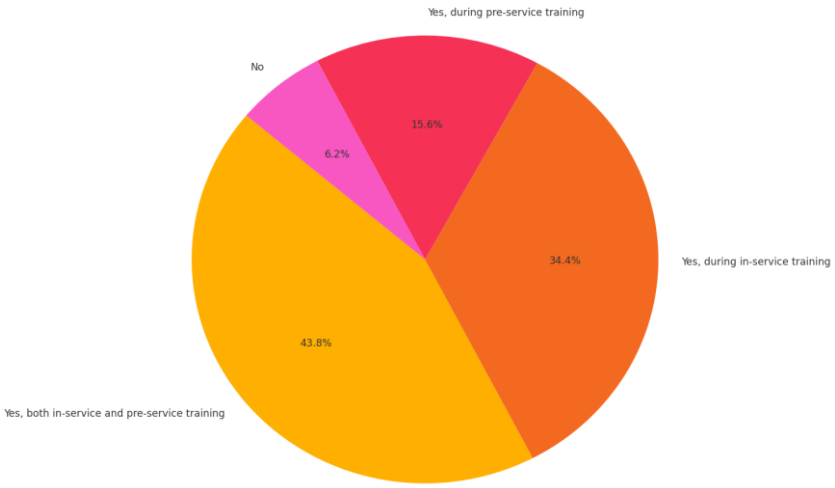
This section assessed whether in-service teachers had received any formal training in the use of assistive technologies (AT) when working with children diagnosed with ASD. The results revealed a perfectly even distribution: 50% of the participants (n = 16) reported having received training, while the remaining 50% (n = 16) had not. This indicates a critical divide within the teaching workforce. While some teachers have acquired competencies in using digital tools and adaptive devices to support learners with ASD, half of the sample lacks such foundational exposure. Given the increasing emphasis on technology-enhanced education and its proven benefits in autism intervention, this gap warrants urgent attention in future teacher training initiatives.

Figure 2. Training in the use of assisstive technologies



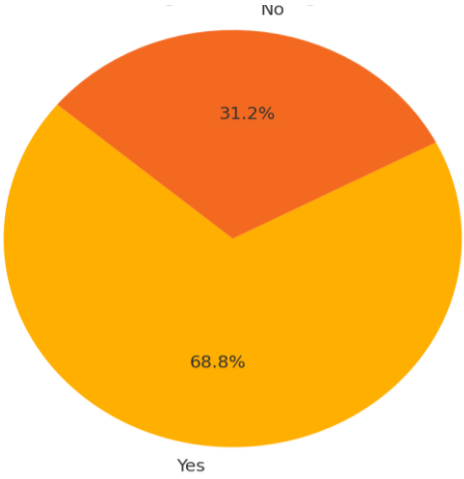
Teachers were also asked about their exposure to training specifically focused on ASD. A majority of the respondents had received some form of ASD training, with 14 teachers (43.8%) having participated in both pre-service and in-service training programs. An additional 11 teachers (34.4%) reported in-service training only, and 5 teachers (15.6%) received training during their university education. However, 2 teachers (6.3%) had never received any formal instruction on ASD. These results highlight the importance of integrating ASD-related content across both pre-service and continuous professional development frameworks. Moreover, the relatively higher number of teachers trained only after entering the profession suggests a need for stronger emphasis on ASD education at the university level.

Figure 3. Training related to ASD (in-service teachers)



Social and emotional learning (SEL) plays a crucial role in the development of children with ASD, and educators were queried about their training in this domain. A clear majority of in-service teachers (n = 22; 68.8%) indicated that they had received relevant training, whereas 10 teachers (31.2%) had not. This gap raises concerns, as SEL forms the backbone of many evidence-based practices for improving emotional regulation, interpersonal communication, and adaptive behavior in autistic learners. These findings reinforce the need to prioritize emotional and social development in both initial teacher preparation and ongoing training modules, ensuring that teachers are well-equipped to meet the holistic needs of students with ASD.

Figure 4. Training on social and emotional development (in-service teachers)



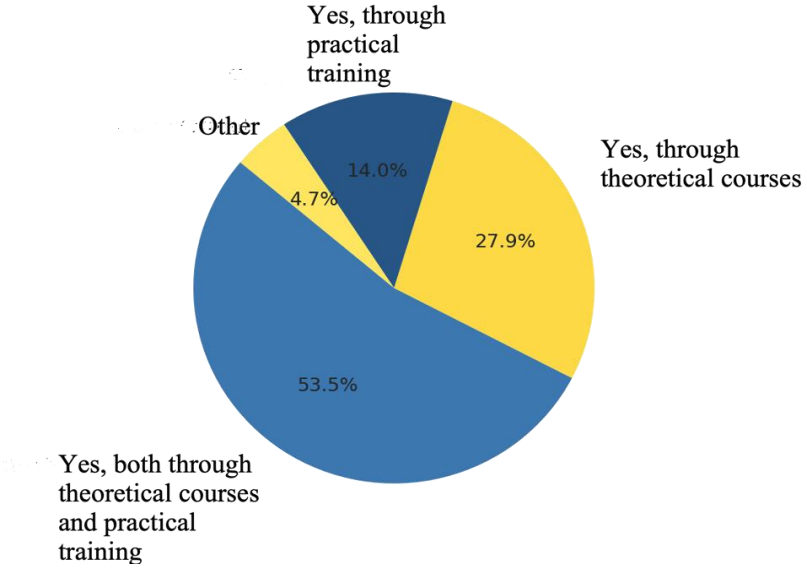
Participants were also asked whether they had received training in recognizing and understanding the diagnostic characteristics of ASD. As with social-emotional training, 22 teachers (68.8%) responded affirmatively, while 10 (31.2%) had not. Training in diagnosis does not aim to equip teachers to perform clinical assessments but rather to enhance their observational and referral skills. Given the growing prevalence of ASD and the importance of early identification, the fact that nearly one-third of the sample lacked such training underscores a significant area for policy and institutional improvement.

The final training-related question explored whether teachers had received instruction in behavioral therapy techniques, including but not limited to Applied Behavior Analysis (ABA). A total of 20 teachers (62.5%) reported having received such training, while 12 (37.5%) had not. Given that behavioral therapy remains one of the most extensively validated intervention methods for children with ASD, the absence of training among over one-third of the participants is noteworthy. This data points to the importance of systematic, evidence-based content on behavioral interventions in both undergraduate coursework and professional learning settings.

Pre-service teachers

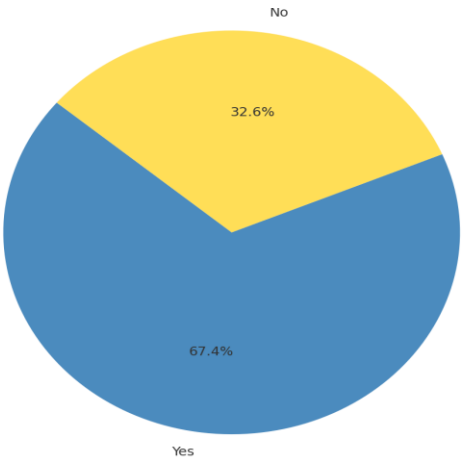
The data showed Figure 5 that a majority of pre-service teachers (approximately 53.5%) reported having received knowledge and experience on working with children with ASD through both theoretical courses and practical training. Meanwhile, 27.9% of the participants stated that they gained this experience through theoretical instruction only, and 14.0% indicated having received practical training only. A small number of respondents selected multiple options together in a single response (e.g., all three forms), indicating possible confusion or overlap in survey interpretation. Only one respondent (2.3%) selected all options simultaneously, which will be excluded from the interpretive percentage analysis due to ambiguity.

Figure 5. Knowledge and experience during studies (pre-service teachers)



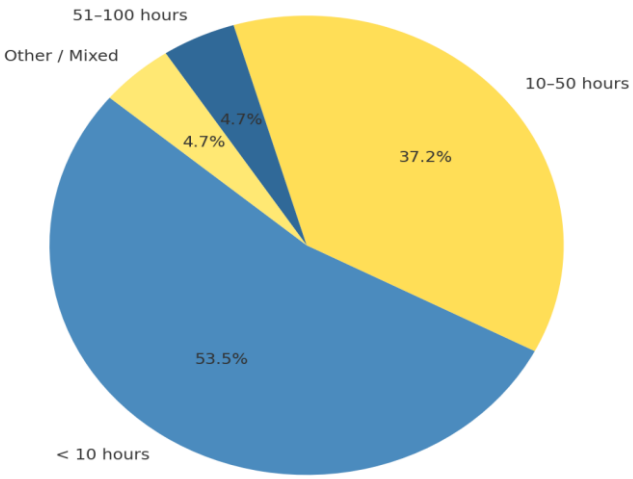
On the subject of assistive technologies, 67.4% of the respondents answered "Yes," stating they had been exposed to assistive technologies designed for use with children with ASD. On the other hand, 32.6% reported not having received such instruction. While the majority shows promising awareness, the fact that nearly one-third of pre-service teachers have not received any training in assistive technology is concerning. Inclusive education frameworks emphasize the necessity of assistive tools—from communication devices to sensory aids—especially for students with autism. Thus, teacher education programs should strive to universalize exposure to assistive technologies, ensuring that all future educators are proficient in their application.

Figure 6. Knowledge of assistive technologies (pre-service teachers)



With respect to practical training hours, 53.5% of respondents indicated having had less than 10 hours of experience, while 37.2% reported between 10 and 50 hours. Only 4.7% received 51 to 100 hours of training. A small percentage (4.7%) selected multiple overlapping ranges, such as “less than 10 hours” and “10–50 hours,” which introduces ambiguity in their exact training exposure. These results reflect a need to extend and clarify practical training components in university curricula. Although most respondents had some degree of field exposure, the duration appears to be insufficient for building confidence and skill in handling the complexities of ASD education. Evidence-based practice suggests that a minimum threshold, such as 100 structured hours, should be set and distributed across areas like behavioral interventions, communication strategies, and sensory support techniques.

Figure 7. Hours of practical training with children with ASD (pre-service teachers)



The data reveal distinct trends in the areas of training:

1. **Working with Children with ASD:** A substantial 72.1% of pre-service teachers reported having no training in this core area. Only 14% received instruction as part of their university studies, while a combined 14% attended either additional courses or both institutional and external programs. This highlights a major gap in pre-service curricula, despite the critical importance of hands-on strategies for classroom inclusion.
2. **Social and Emotional Development of Children with ASD:** This area is even more underrepresented in training. A staggering 81.4% of respondents had no exposure, while only a small fraction (cumulatively 18.6%) received university or additional training. Considering that emotional and social understanding is key to supporting autistic children, this finding suggests an urgent need to integrate socio-emotional content into training programs.
3. **Diagnosing ASD:** This is the most covered area, with 51.2% of participants having received university-level training. However, nearly 35% still report no training, and a further 14% relied on non-university-based education. While educators are not expected to diagnose ASD, awareness of diagnostic criteria is essential for early identification and collaboration with specialists.

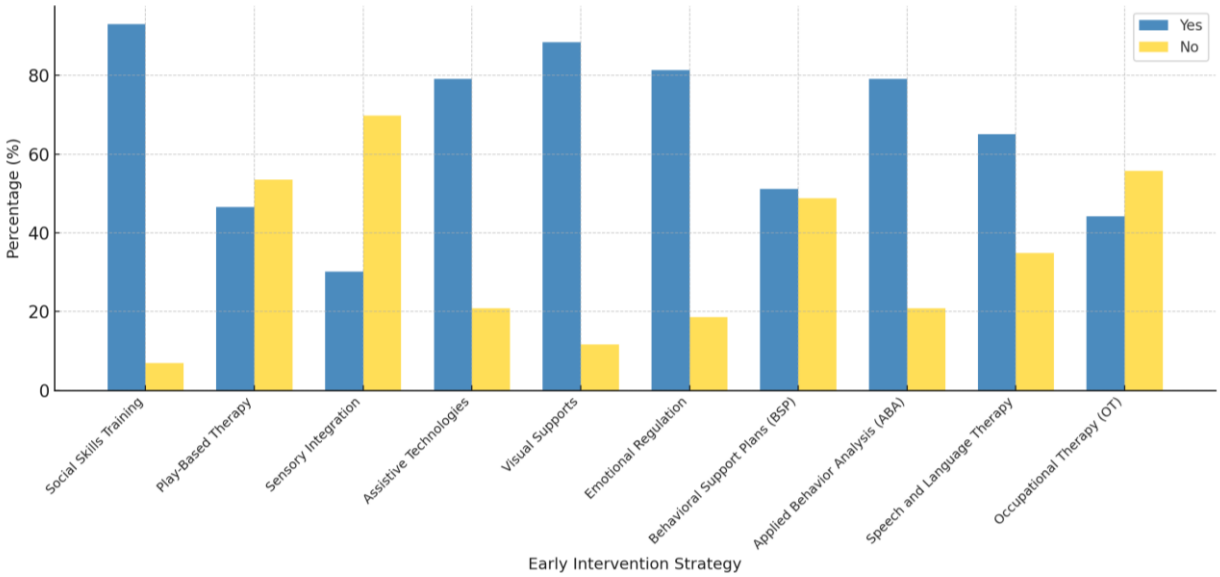
The following Table 1 summarizes the training received by pre-service teachers in Türkiye on specific aspects of ASD. The table includes responses regarding university coursework, external training, or lack thereof.

Table 1. Training in aspects of ASD (pre-service teachers)

Training Area	University Studies Only	University + Courses	Additional Courses Only	No Training
Participation in courses on working with children with ASD	6 (14%)	2 (4.7%)	4 (9.3%)	31 (72.1%)
Attendance at courses on social and emotional development of children with ASD	4 (9.3%)	3 (7.0%)	1 (2.3%)	35 (81.4%)
Attendance at courses on diagnosing ASD	22 (51.2%)	3 (7.0%)	3 (7.0%)	15 (34.9%)

The Figure 8 below illustrates the percentage of Turkish pre-service teachers who reported having learned various early intervention strategies for children with ASD. These strategies were explored either through theoretical instruction or practical training.

Figure 8. Learning early intervention strategies (pre-service teachers)



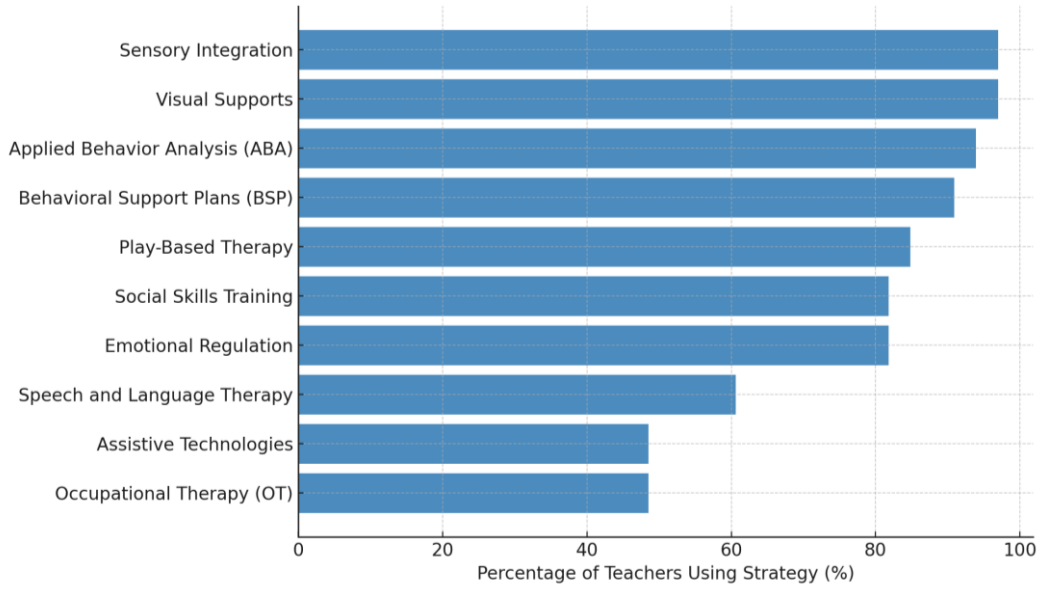
The findings reveal a strong emphasis on social and behavioral strategies: 93% of respondents reported familiarity with Social Skills Training, and 88.4% had learned about Visual Supports. Emotional Regulation Strategies were also well-covered (81.4%). However, exposure to more clinical or therapeutic techniques, such as Sensory Integration (30.2%) and Occupational Therapy (44.2%), was notably limited. This pattern suggests that pre-service programs may be placing greater focus on classroom-based interventions while underrepresenting interdisciplinary strategies often used in specialized or clinical settings.

WORKING WITH ASD / PRACTICE

Use of Early Intervention Strategies (In-Service Teachers – Turkiye)

The Figure 9 below presents the percentages of Turkish in-service teachers who reported using various early intervention strategies to support students with ASD. These strategies reflect classroom practices aimed at promoting inclusion, communication, and behavioral support.

Figure 9. Use of early intervention strategies (in-service teachers)



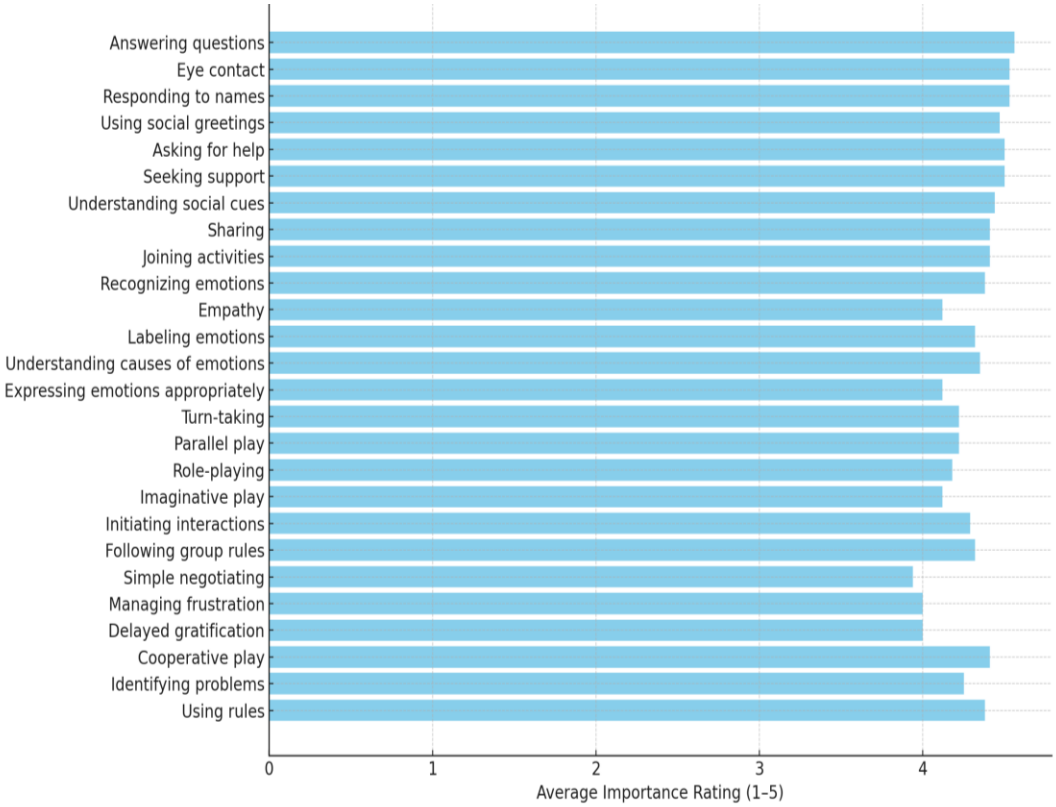
The most frequently used strategies included Visual Supports and Sensory Integration Techniques (both 97%), as well as Applied Behavior Analysis (93.9%) and Behavioral Support Plans (90.9%). Play-Based Therapy (84.8%) and Social Skills Training (81.8%) were also widely adopted. In contrast, Assistive Technologies and Occupational Therapy were employed

by fewer than half of the teachers (48.5%). These patterns indicate a strong emphasis on behavioral and sensory strategies, with some underutilization of technological and interdisciplinary methods. The analysis of institutional support services for in-service teachers in Turkey reveals significant variability in the availability of interventions for children with ASD. The highest reported support was for social skills training programs (84.8%), followed by sensory integration services (78.8%), individual psychological support (72.7%), and behavioral therapy (72.7%). These findings suggest a positive trend in schools' responsiveness to managing behavioral and emotional needs. However, 12ccess to speech therapy (57.6%) and occupational therapy (45.5%) remains limited, despite their essential role in addressing communication challenges and sensory-motor difficulties. Similarly, 69.7% of teachers reported the availability of parent support workshops, indicating a moderately strong but not universal effort toward family engagement. In contrast, only 30.3% of participants had Access to auditory training, marking it as the least available service. These results indicate that while there is notable progress in implementing psychosocial and behavioral interventions, critical therapeutic services such as speech and occupational therapy are still not adequately accessible in many educational settings, highlighting the need for more comprehensive, interdisciplinary support systems.

Strategies for Developing Social and Emotional Skills

The responses indicate a strong preference among Turkish in-service teachers for structured and evidence-informed approaches to support the social and emotional development of children with ASD. The most frequently reported strategies include the use of visual supports, play-based learning, emotion cards, and role-playing scenarios, all of which align with best practices in ASD education. These tools help children recognize, label, and manage emotions while encouraging social interaction through guided, meaningful engagement. A notable number of teachers also mentioned modelling appropriate behavior, using social stories, and group activities, reflecting a multi-modal approach that combines direct instruction with experiential learning. Techniques such as positive reinforcement and storytelling were cited as ways to scaffold emotional regulation and increase prosocial behaviors. The diversity of strategies demonstrates teachers' awareness of individualized needs and their attempts to create inclusive, supportive environments. However, the frequency data also suggests that certain effective practices may not be universally applied. This highlights the need for professional development programs that disseminate and reinforce a broad repertoire of evidence-based interventions across educational settings.

Figure 10. Socio-emotional skills prioritized by in-service teachers using assisstive technology



The analysis of teachers' responses to the question on socio-emotional skills they prioritize when working with children with ASDusing assistive technologies reveals a strong preference for basic communication and social participation competencies.

Most Highly Rated Skills

- Answering questions (4.56), Eye contact (4.53), and Responding to names (4.53) were rated the highest. These foundational interaction skills are essential for engaging in classroom learning and peer communication.
- Skills like Asking for help (4.50) and Seeking support (4.50) also received top ratings, suggesting teachers emphasize fostering self-advocacy in children with ASD.
- Using social greetings (4.47) and Understanding social cues (4.44) further reflect a priority on functional social interactions.

These ratings show that teachers value skills that enhance functional communication, classroom engagement, and independence—all of which can be effectively supported through digital tools.

Moderately Rated Skills

- Skills such as Labeling emotions (4.32), Following group rules (4.32), Initiating interactions (4.29), and Identifying problems (4.25) demonstrate attention to both emotional awareness and social problem-solving.
- Moderate ratings for Turn-taking (4.22), Parallel play (4.22), and Role-playing (4.18) indicate a developmental focus on peer interactions and perspective-taking.
- Empathy (4.12), Imaginative play (4.12), and Expressing emotions appropriately (4.12) suggest that affective and creative dimensions are acknowledged but possibly seen as more complex to implement.

These findings imply that while teachers prioritize core social-emotional competencies, they also consider a broad set of behaviors that contribute to emotional regulation and relationship building.

Lowest Rated Skills

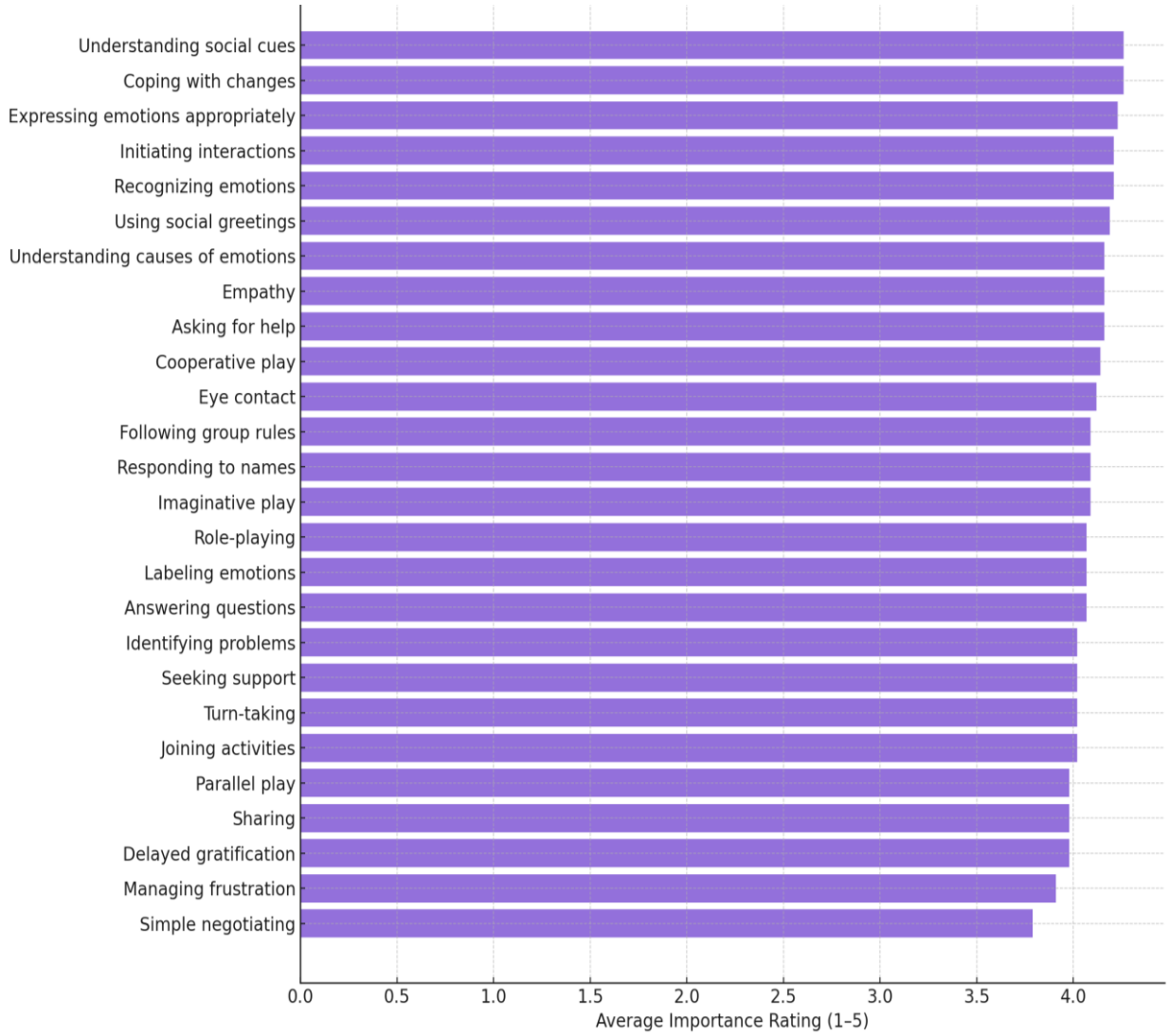
- The lowest average ratings were for Simple negotiating (3.94), Managing frustration (4.00), and Delayed gratification (4.00).

These skills involve executive functioning and emotional self-regulation, which might be seen as advanced or less readily taught using assistive technology. The relatively lower ratings may reflect perceived difficulty or lack of training in supporting these domains effectively. This profile suggests that Turkish in-service teachers using assistive technologies tend to focus on immediate, observable social behaviors and independent communication strategies. There is a strong emphasis on social entry skills, which may be driven by the goal of supporting inclusion and engagement in mainstream settings.

The Figure 11 below above illustrates the average importance ratings of various socio-emotional skills as evaluated by pre-service teachers when working with children with ASDusing assistive technologies. The most highly valued skills include Answering questions (4.56), Responding to names (4.52), Asking for help (4.50), and Eye contact (4.44). These ratings highlight a clear emphasis on foundational communication and self-advocacy behaviors, crucial for classroom engagement and effective interaction. Moderately rated skills such as Empathy (4.00), Managing frustration (4.00), and Expressing emotions appropriately (4.00) indicate recognition of the importance of emotional awareness and regulation. These aspects play an essential role in building inclusive and emotionally supportive learning environments. Skills like Simple negotiating (3.84), Delayed gratification (3.88), and Coping with changes (3.92) were rated the lowest, suggesting that pre-service teachers might find these competencies more difficult to develop or less immediately applicable through assistive technologies. Overall, these findings reflect a focus on basic social engagement and communication skills, aligning

with inclusive education goals that prioritize student participation, interaction, and autonomy in learning environments supported by technology.

Figure 11. Perceptions of socio-emotional skills ımportance (pre-service teachers)



Based on the content analysis of teachers' responses to the question ″Based on your experience, which social and emotional skills should be the highest priority for development in children with ASD?″, four key thematic categories emerged:

- Communication Skills (65.4%): The majority of teachers emphasized fundamental

communication competencies such as eye contact, responding to one's name, initiating interactions, and expressing needs. These were seen as essential for effective learning and classroom engagement.

- Social Interaction and Play (42.3%): A significant number of respondents valued peer interaction and structured play activities (e.g., parallel play, cooperative play), underscoring the role of social participation in inclusive education.
- Emotional Awareness and Regulation (38.5%): Skills such as identifying emotions, expressing them appropriately, and managing sensory and emotional challenges were frequently mentioned, highlighting the importance of emotional intelligence in ASD interventions.
- Language and Cognitive Prerequisites (15.4%): Some teachers noted that the development of language and cognitive readiness is a prerequisite for acquiring higher-order social-emotional skills.

This analysis reveals a consensus among educators about the foundational role of communication and social participation in ASD support, while also pointing to the importance of emotional development and underlying language skills.

PARTICIPANTS PREPAREDNESS

Based on the responses of in-service teachers in Türkiye to the question *"How do you rate your preparation to work with children with ASD?"*, the findings present a relatively positive self-assessment of readiness. The majority of respondents (72.7%) rated themselves as "Good" (4), indicating that while they feel adequately prepared, they also acknowledge areas where further improvement is needed. This dominant response points to a solid foundational understanding, likely stemming from either pre-service education or hands-on experience in the field. A smaller portion of teachers (15.2%) rated their preparedness as "Fair" (3). These individuals feel somewhat prepared but recognize the need for additional guidance and support to feel more confident in their work with children with ASD. This highlights a partial gap in knowledge or practical experience. Encouragingly, only one teacher (3.0%) felt "Very Poor" (1) in terms of preparation, and no teachers selected "Poor" (2). This contrasts with findings from other countries (e.g., Romania), where larger proportions reported significant feelings of unpreparedness. Notably, 9.1% of teachers rated their preparation as "Excellent" (5), indicating a small but confident group who feel highly competent and well-equipped to support ASD learners effectively.

The average rating was 3.85 out of 5, which suggests that, overall, in-service teachers in Türkiye

perceive themselves as better-than-average in terms of readiness. However, the data still reflects a need for continuous professional development, especially in specialized intervention techniques and evidence-based practices. While most teachers do not consider themselves poorly prepared, few rate their readiness at the highest level, underscoring the need for ongoing training opportunities to ensure educators are both confident and competent in inclusive practices for students with ASD.

When asked *"How would you assess your preparedness for working with children with ASD?"*, Turkish pre-service teachers provided a telling snapshot of their current confidence levels and training adequacy. The largest group, 54.5% (24 out of 44 respondents), rated their preparedness at a moderate level (3). This indicates that while these future educators have a basic foundation, they are aware that significant improvements—particularly in applied strategies and real-world experience—are needed to support children with ASDeffectively.

A substantial portion of the respondents, 27.3% (12 participants), reported feeling poorly prepared (2). These individuals recognize their limited knowledge and lack of hands-on training. This reflects a pressing need for comprehensive coursework and experiential opportunities that go beyond theoretical understanding. Only one respondent (2.3%) felt completely unprepared (1), which, although a minority, still raises concern. Every pre-service teacher entering the field should feel a minimum level of readiness to work inclusively and ethically with neurodivergent learners. On the more optimistic side, 6 participants (13.6%) rated themselves as "good" (4), showing that a smaller group feels reasonably well-prepared, though even they acknowledge room for improvement. Additionally, only one person (2.3%) felt "excellent" (5) in their preparedness, reflecting high self-efficacy—but also illustrating that such confidence is rare. The average score of 2.86 underscores the general sense of partial readiness, pointing to a gap between what is currently taught in pre-service programs and the practical competencies needed in real educational settings. These results strongly advocate for the integration of structured, practice-based modules, supervised internships, and evidence-based ASD education into teacher training programs to elevate both confidence and competence among future professionals.

Figure 12 shows the degree to which teachers assess their readiness to work with children with ASD in some domains. Turkish in-service teachers generally rated their preparedness across the 12 domains positively, with most average scores falling between 3.34 and 4.12 on a 5-point scale. The highest-rated area was *Assistive Technologies* (4.12), reflecting teachers' confidence in using tools designed to support children with ASD. This is a particularly encouraging finding given the growing importance of technology in inclusive education. The second and third highest ratings were *Understanding Sensory Processing* (4.06) and *Learning Communication Skills* (4.00), indicating that teachers feel relatively confident in handling core sensory and

communicative needs associated with ASD. Additionally, *Collaboration with Families* (3.81) and *Social Skills Training* (3.78) also scored well, showing teachers' acknowledgment of the importance of working with both families and students to foster emotional and social development. On the other hand, *Behavioral Interventions* (3.34) and *Crisis Management* (3.44) received comparatively lower scores, suggesting that teachers may feel underprepared when it comes to managing challenging behaviors and critical incidents in the classroom. The domain of *Use of Digital Tools to Support Social and Emotional Development* scored 3.50, which, although not the lowest, indicates a moderate gap in confidence in using technology for targeted socio-emotional interventions. This mirrors international findings (e.g., Spain) where digital emotional support was also rated as a less developed area. In summary, while Turkish in-service teachers report solid preparedness in many areas, professional development efforts should particularly focus on enhancing competencies in behavioral strategies, crisis response, and digital tools for socio-emotional development. This balanced approach can ensure more holistic, confident, and effective support for children with ASD.

Figure 12. Preparing in-service teachers to work with children with ASD

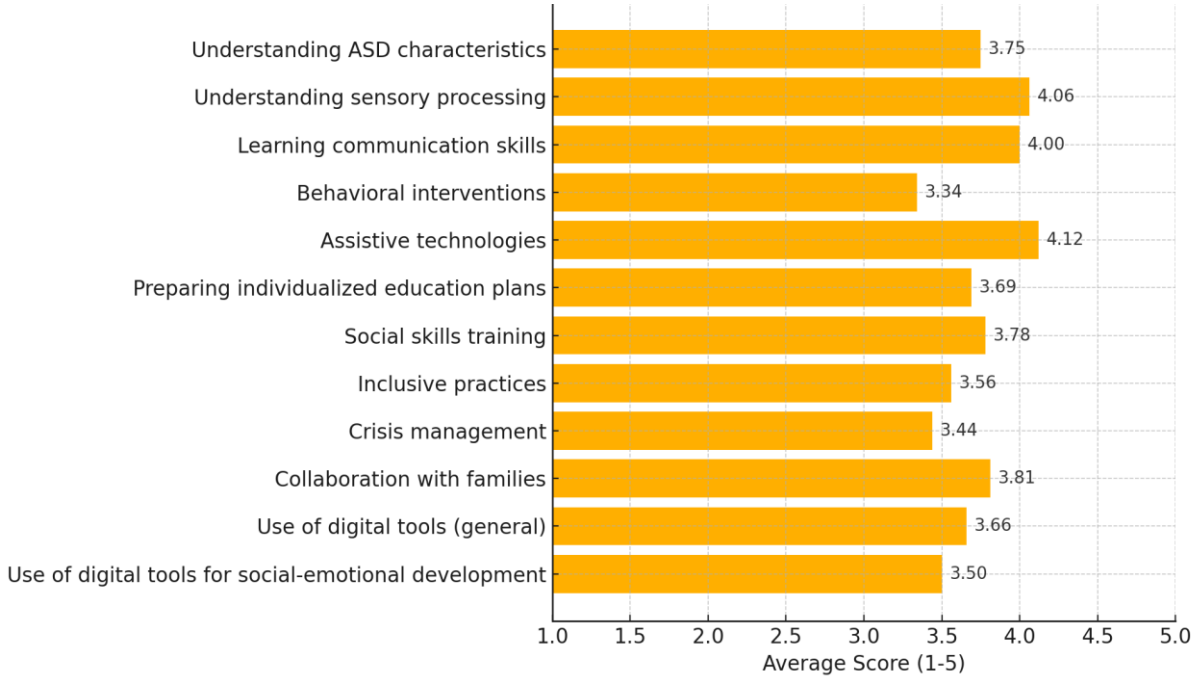
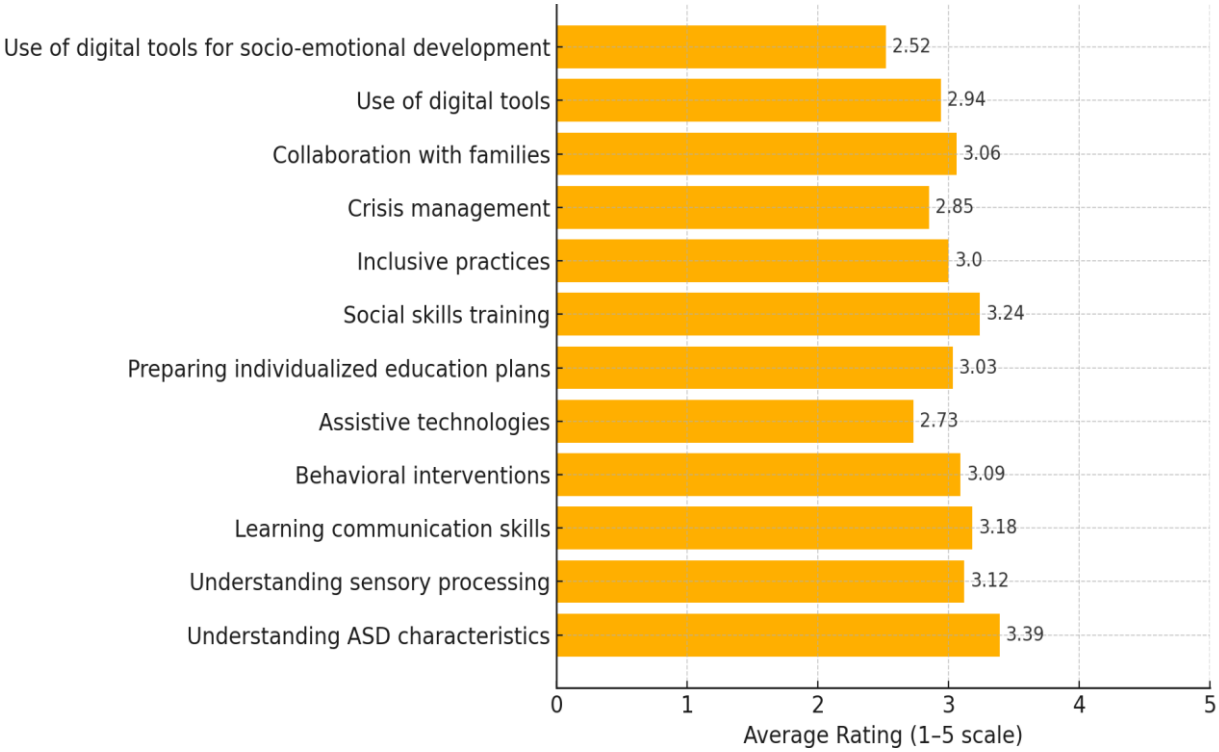


Figure 13 shows the degree to which pre-service teachers assess their readiness to work with children with ASD in some domains. The self-assessment of pre-service teachers regarding

their preparedness to work with children with ASD highlights key areas of relative strength and concern. The highest-rated domain is *Understanding ASD characteristics* with an average score of 3.39, suggesting that theoretical knowledge is the most emphasized aspect in their training. This is followed by *Social skills training* (3.24) and *Learning communication skills* (3.18), indicating moderate confidence in these practical areas. In contrast, the lowest-rated domains include *Use of digital tools to support social and emotional development* (2.52), *Assistive technologies* (2.73), and *Crisis management* (2.85). These findings point to significant gaps in the application of technology and intervention techniques critical for managing complex behaviors and supporting emotional regulation in children with ASD. Overall, the results indicate that while pre-service teachers possess foundational theoretical knowledge, they often lack adequate training in hands-on, technology-integrated strategies. These insights underline the necessity of enhancing teacher education programs with more practice-oriented and digitally informed training modules.

Figure 13. Preparing pre-service teachers to work with children with ASD



ASSISTIVE TECHNOLOGIES - EXPERIENCE, PRACTICE AND TRAINING

In response to the question *"Have you used assistive technologies in early education for children with ASD?"*, 75% of teachers (24 out of 32) reported having used such technologies, while 25% (8 out of 32) indicated they had not. This result demonstrates a relatively high level of exposure to or engagement with assistive technologies among in-service teachers in early childhood education. The fact that three-quarters of respondents have some experience using these tools reflects positively on the growing awareness and adoption of inclusive practices. However, the remaining quarter without any experience still represents a significant portion that could benefit from targeted training, resource allocation, and institutional encouragement to incorporate assistive technologies into their practice—particularly to support the social and emotional development of children with ASD.

Based on the responses of 24 teachers who indicated using assistive technologies in early education for children with ASD, the majority (58.3%) reported using them "Sometimes". Both "Rarely" and "Often" were selected by 20.8% of respondents each. The absence of responses in the "Never" or "Always" categories suggests that while assistive technologies are somewhat embedded in practice, their use is neither fully absent nor consistently integrated into daily routines. The dominant response of "Sometimes" implies sporadic or situational use, likely influenced by contextual factors such as training, confidence, availability of tools, and institutional support. This distribution underscores the need to move beyond occasional use toward more systematic and frequent integration of assistive technologies—especially for fostering social-emotional skills in children with ASD. Providing educators with structured guidelines, professional development opportunities, and access to resources may help shift usage patterns toward more consistent and intentional application. Based on the responses to the open-ended question *"Please, specify which tools you have used"*, a content analysis reveals four main categories of assistive technologies utilized by teachers:

Mobile Devices (n = 7): This was the most frequently mentioned category, including tablets and mobile apps. The prevalence of such tools suggests that portability and ease of use are key considerations for teachers.

Video-Based Content (n = 5): Tools like short YouTube films were often cited. This highlights the importance of audiovisual materials in maintaining engagement and illustrating social-emotional scenarios for children with ASD.

Interactive Digital Tools (n = 3): Some teachers reported using tools such as interactive stories and video resources. These promote two-way engagement and can be especially beneficial for enhancing attention and comprehension.

Fixed Digital Hardware (n = 2): Devices such as digital screens were also noted, indicating that

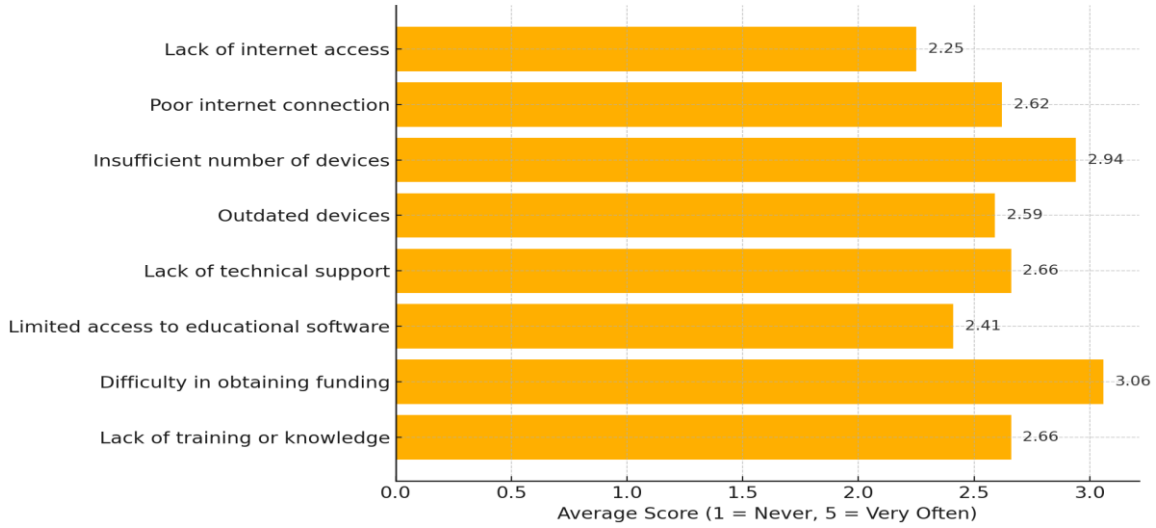
some classrooms may be equipped with stationary digital tools to support instruction.

Overall, the data indicate a varied use of assistive technologies, with a dominance of mobile and visual tools. While the range of tools used is relatively narrow, the existing practices point to a foundation that can be expanded through further training and access to diverse, evidence-based digital resources tailored for children with ASD.

The majority of participants (53.13%) expressed a positive attitude toward using digital technologies, identifying themselves as either *comfortable* or *very comfortable*. This suggests a growing familiarity and confidence among teachers in incorporating digital tools into their educational practice, which is particularly promising for the use of assistive technologies in supporting children with ASD. However, a substantial portion of the group (43.75%) identified as *neutral*, indicating neither confidence nor discomfort. This may reflect uncertainty, limited exposure, or a lack of training in using digital tools effectively. These respondents represent a critical target group for professional development efforts. Only one respondent (3.13%) reported feeling *uncomfortable*, which is a relatively small but still notable indicator that some teachers may face barriers such as lack of digital literacy or access to adequate resources. While a majority of teachers report positive or neutral levels of comfort with digital technologies, the data highlight an important opportunity to further support and train educators—especially those who feel ambivalent or underprepared. Increasing confidence in this area can directly contribute to more effective integration of digital solutions in inclusive and SEN settings.

The analysis of in service teachers' responses regarding the frequency of challenges they face in accessing and using technology in the workplace is also noteworthy. Each category was rated on a scale from 1 (Never) to 5 (Very Often):

Figure 14. Technology access challenges faced by in-service teachers



- Difficulty in obtaining funding for new technology received the highest average score of 3.06, indicating this is the most common challenge. Teachers frequently face financial barriers when trying to procure technological resources.
- Insufficient number of devices scored 2.94, reflecting a notable gap in hardware availability, such as tablets or projectors, in classrooms.
- Lack of training to use technology and Lack of technical support both had relatively high scores of 2.66, suggesting that even when devices are available, educators may not have the adequate support or knowledge to use them effectively.
- Poor internet connection was also a prevalent issue with an average score of 2.62, while Outdated devices followed closely at 2.59.
- Limited access to educational software (2.41) and Lack of internet access (2.25) were rated slightly lower, though they still represent barriers that hinder the effective use of digital tools.

These findings highlight multiple systemic issues that limit the integration of technology in early education for children with ASD. Addressing funding gaps, improving infrastructure, and investing in professional development are essential steps toward more inclusive and technologically-supported education environments.

Among the 43 pre-service teachers surveyed, a total of 29 individuals (67.4%) reported that they had received knowledge about assistive technologies in the context of working with children with ASDduring their studies. In contrast, 14 participants (32.6%) indicated that they had not been exposed to such knowledge. This distribution shows a positive trend, suggesting that the majority of teacher education programs are beginning to incorporate content on assistive technologies for ASD. However, the fact that nearly one-third of the respondents lacked such exposure points to a significant gap in training. To better prepare future educators, universities and teacher training institutions should consider embedding assistive technology training more systematically into their curricula. This would help ensure equitable professional preparation and support the inclusion and development of children with ASD across educational settings.

Among 43 pre-service teachers surveyed, the majority — 29 participants (67.4%) — indicated that they had not attended any courses or workshops related to the use of assistive technologies for children with ASD. Only a minority reported relevant training: 7 participants (16.3%) attended such courses as part of their university studies, 3 participants (7.0%) gained this training through additional courses/workshops, 4 participants (9.3%) received exposure both systems, studies and courses. These findings reveal a significant training gap in the area of assistive technology for ASD within pre-service teacher education. While some teacher

candidates have benefited from structured learning opportunities, the fact that over two-thirds of them have not been exposed to this critical content underlines the need for more systematic and comprehensive inclusion of assistive technology training in teacher education programs. Addressing this gap would better equip future educators to support the complex needs of children with ASD through the effective integration of digital and assistive tools.

The responses of 43 pre-service teachers indicate a clear trend toward moderate levels of self-assessed knowledge regarding assistive technologies for children with ASD: 69.8% (n = 30) reported having moderate knowledge, suggesting that while they are familiar with the concept and some tools, their understanding may lack depth or practical application. Only 2 participants (4.7%) stated having no knowledge, and 5 participants (11.6%) rated their knowledge as poor, highlighting a subgroup that is significantly underprepared in this area. On the more positive end, 2 individuals (4.7%) considered their knowledge good, and only 1 respondent (2.3%) felt their knowledge was very good. These findings underscore a notable gap in advanced or applied understanding of assistive technologies among future educators. While most are not entirely uninformed, their responses reveal a strong need for targeted coursework, hands-on training, and practical exposure to digital tools specifically designed to support the social, emotional, and academic development of children with ASD. To ensure future teachers are well-equipped, teacher education programs should consider integrating specialized modules on assistive technologies, with an emphasis on practical implementation, case-based learning, and reflection on real-world classroom applications.

Among the 43 pre-service teachers surveyed, only 11 individuals (25.6%) reported having had the opportunity to observe the use of assistive technologies in practice with children diagnosed with ASD. The overwhelming majority — 32 respondents (74.4%) — indicated that they had not had such observational experiences. This finding is significant and reveals a critical experiential gap in the training of future educators. While theoretical knowledge may be addressed in some teacher education programs, practical exposure to assistive technologies and their classroom applications remains limited. Without direct observation, pre-service teachers may struggle to understand how digital tools are implemented, adapted, and integrated to meet the diverse needs of children with ASD. To bridge this gap, it is essential that teacher preparation programs incorporate more practicum experiences, internships, or school-based observations that include exposure to technology-supported inclusive practices. Embedding these experiences into the curriculum can enhance not only the technical proficiency of future teachers but also their confidence and creativity in using assistive technologies to support the socio-emotional and educational development of learners with ASD.

Out of 43 pre-service teachers who responded to the question, only 13 individuals (30.2%) indicated that they are familiar with assistive technologies that can be used when working with

children with ASD. A significantly larger proportion — 30 respondents (69.8%) — reported that they do not know which assistive technologies are applicable in this context. This result reveals a notable knowledge gap regarding technological tools among future educators. Familiarity with assistive technologies is a critical component of inclusive education, especially for supporting students with ASD in developing communication, social interaction, and self-regulation skills. The fact that nearly 70% of respondents lack this basic knowledge suggests that teacher education programs may not be systematically integrating content on assistive technologies into their curricula.

Among 43 pre-service teachers surveyed, only 8 respondents (18.6%) reported having experience using assistive technologies with children diagnosed with ASD. A substantial majority — 35 individuals (81.4%) — stated that they have never used such technologies. These findings emphasize a critical experiential gap in teacher preparation programs. Despite the growing importance of digital tools and assistive technologies in inclusive and SEN, most pre-service teachers lack direct experience with these resources. This lack of exposure can hinder their confidence and ability to support the diverse needs of children with ASD in real classroom settings.

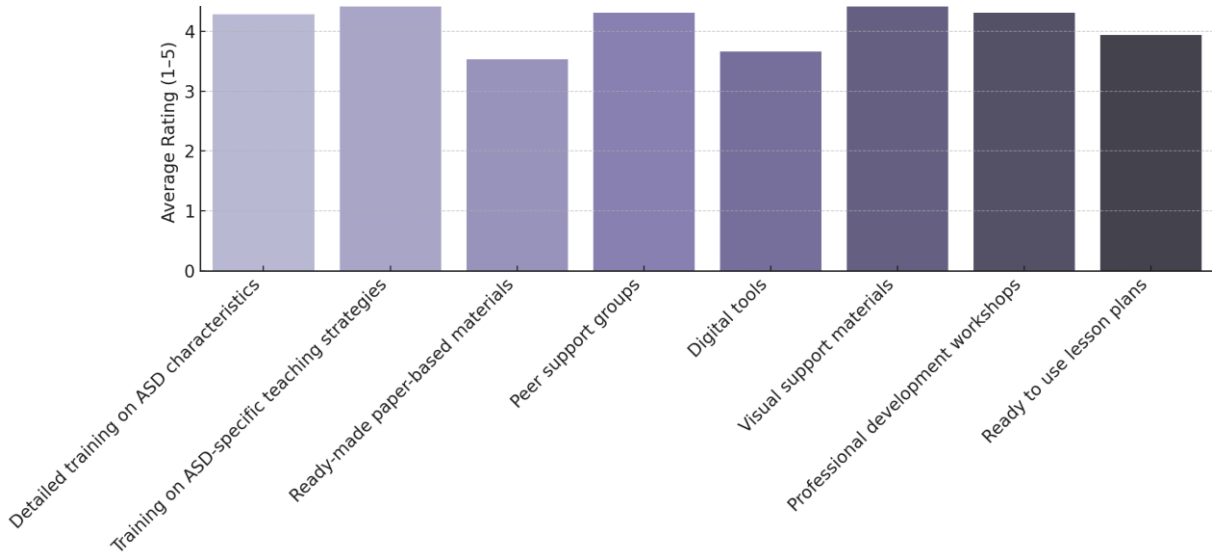
The answers of the pre-service teachers to the question "If yes, how easy is it for you to use and implement digital technologies in your work?" are as follows: 3 participants (37.5%) found it easy to use and implement digital technologies, 4 participants (50%) held a neutral view, suggesting uncertainty or limited experience, and 1 participant (12.5%) found it difficult. These findings reflect a mixed level of confidence even among those with some practical exposure. While over a third feel comfortable, half remain ambivalent, and a minority experience challenges.

NEEDS

Here are the analyzed results for the teacher responses to the question: "How important do you think it is to have access to the following resources or support for your work with children with ASD?" (Figure 15). Teachers rated training on ASD-specific teaching strategies and visual support materials as the most essential resources (both averaging 4.41), highlighting their need for specialized and practical strategies in classroom implementation. Peer support and ongoing professional development also received high importance, each with an average of 4.31, showing the perceived value of collaboration and continuous learning. Detailed knowledge about ASD characteristics was similarly prioritized (4.28), which indicates teachers' awareness of the importance of understanding foundational traits of autism. In contrast, resources like ready-made materials and digital tools were rated moderately (3.53 and 3.66 respectively), perhaps

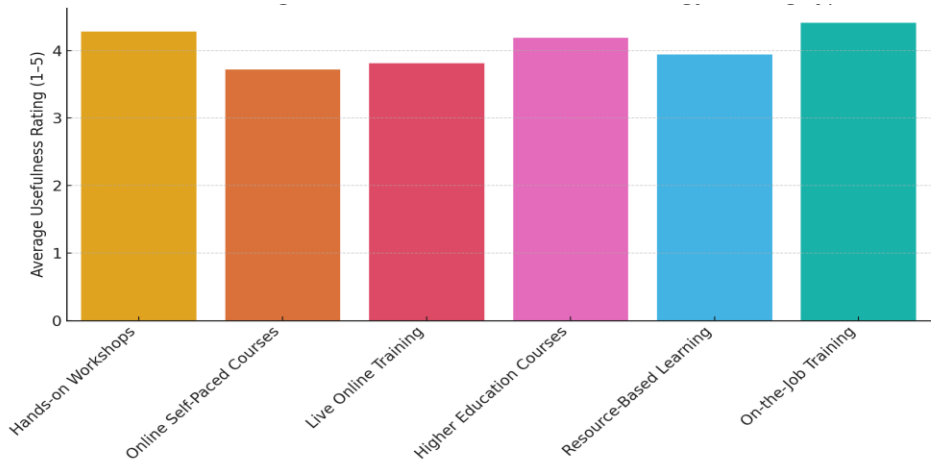
suggesting either limited exposure or perceived lower efficacy. Still, ready-to-use lesson plans were seen as relatively important (3.94), reflecting a need for structured, immediately applicable content. These findings emphasize that while foundational theoretical training is valued, practical, collaborative, and visually supported resources are equally crucial for teachers in ASD education.

Figure 15. Average ımportance ratings of resources/supports for working with children with ASD (in-service teachers)



The Figure 16 below presents the average ratings given by teachers regarding the perceived usefulness of various types of training on assistive technologies (1 = Not Useful at All, 5 = Extremely Useful): On-the-Job Training: 4.41, Hands-on Workshops: 4.28, Higher Education Courses: 4.19, Resource-Based Learning (guides, manuals): 3.94, Live Online Training: 3.81, Online Self-Paced Courses: 3.72. According to these findings, teachers identified “on-the-job training” and “hands-on workshops” as the most useful forms of professional development. This suggests that they perceive approaches involving direct application and experiential learning as more effective for their growth and preparedness. Conversely, “online self-paced courses” received the lowest average rating, indicating a preference for guided or collaborative learning environments over independent, non-interactive methods

Figure 16. In-service teachers ratings of usefulness assistive tecnology training types

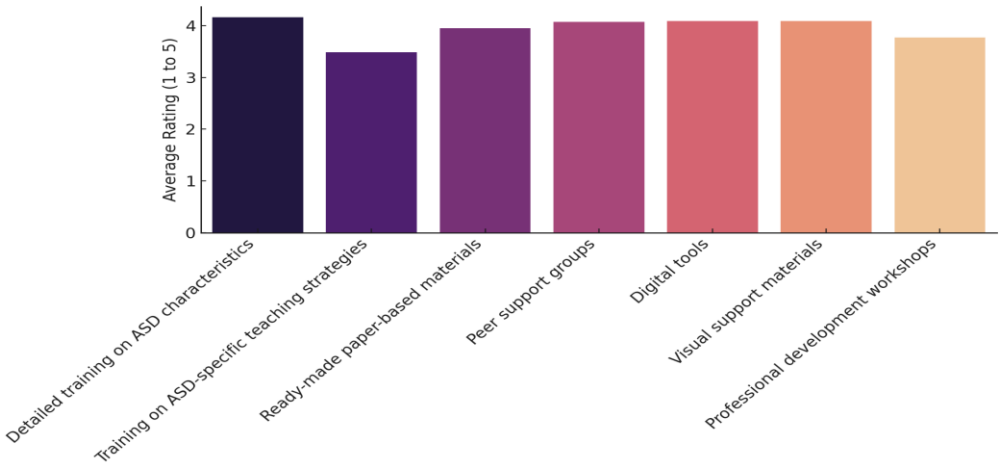


Here is the analysis of teachers' reported needs for different types of assistive technologies. The table displays the frequency and percentage of teachers who answered "Yes" or "No" to each type of technology. Key findings include: The most frequently needed tool is *Adapted keyboards or input devices*, with 56.25% of respondents indicating this as a need. Other technologies with relatively high interest include *Sensory tools* (46.88%), *Smartboards or interactive whiteboards* (40.62%), *Video modeling tools* (40.62%), and *Virtual reality tools for social learning* (40.62%). On the other hand, no responses were recorded for *Communication devices (e.g., AAC)* and *Social-emotional learning software*, which may suggest either a lack of familiarity or a perceived lack of relevance. Technologies like *Interactive learning apps* and *Timers or time management tools* were less frequently selected, each receiving interest from just over a third of the respondents. This data highlights specific areas where additional support or resources may be beneficial to better equip teachers working with children with ASD.

The Figure 17 below presents the average importance ratings assigned by pre-service teachers to different forms of support they believe are essential for gaining competencies to work with children with ASD. Among the support types, “Training on ASD-specific teaching strategies” and “Detailed training on ASD characteristics” received the highest average ratings, indicating a strong perceived need for specialized and comprehensive knowledge in ASD-related education. “Visual support materials” and “Professional development workshops” were also rated highly, highlighting the importance of practical tools and ongoing professional learning. In contrast, “Peer support groups” and “Ready-made paper-based materials” received relatively lower average scores, suggesting these forms of support may be perceived as supplementary rather than essential. Overall, the findings emphasize the pre-service teachers' demand for

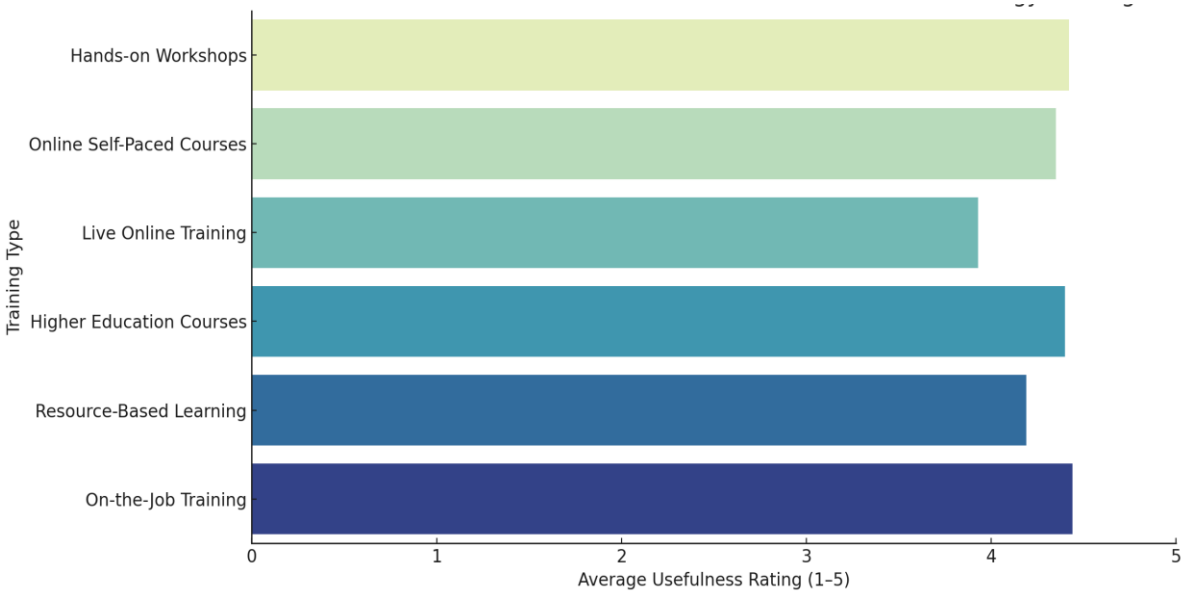
structured, content-rich, and practically applicable training resources to effectively support children with ASD.

Figure 17. Average importance ratings of resources/supports for working with children with ASD (pre-service teachers)



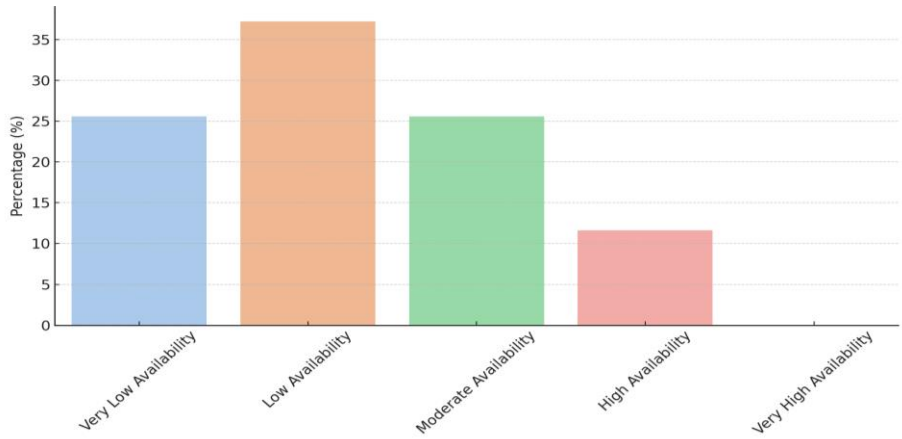
Based on the evaluation results of pre-service teachers regarding the usefulness of various training formats in assistive technologies for working with children with ASD, Hands-on Workshops emerged as the most favored format, with an average rating of 4.35 on a 5-point scale (Figure 18). This indicates a strong preference for practical, experience-based learning approaches among teacher candidates. On-the-Job Training followed closely with an average of 4.29, further highlighting the value placed on real-world exposure and application in professional settings. Higher Education Courses also received a relatively high score of 4.10, suggesting that structured academic instruction remains a significant source of perceived competence. Meanwhile, Live Online Training (3.88) and Resource-Based Learning (3.85) were seen as moderately useful, indicating that while accessible, they may lack the immersive or interactive elements preferred by pre-service teachers. Online Self-Paced Courses, despite their flexibility, received the lowest average rating of 3.73, which could reflect concerns about limited engagement or insufficient support. Overall, the data reveals a clear trend: pre-service teachers tend to value training formats that combine interaction, application, and mentorship, while less guided, asynchronous methods are viewed as less impactful for building the competencies required to support children with ASD effectively.

Figure 18. Pre-service teachers' perceived usefulness assistive tecnology training types



According to the data showed Figure 19, 37.21% of pre-service teachers rated the availability of assistive technologies in their internship institutions as low. This was followed by 25.58% who rated the availability as very low and another 25.58% as moderate. Only 11.63% of the respondents reported high availability of such technologies, while none indicated very high availability. These findings suggest that most pre-service teachers experience limited access to assistive technologies, which may negatively impact their hands-on learning and professional readiness. This highlights the need to strengthen the assistive technology infrastructure in field placement settings within teacher education programs.

Figure 19. Availability of assistive technologies in internship institutions



CONCLUSION

The findings of this report provide valuable insights into the experiences, perceptions, and needs of pre-service and in-service teachers in Türkiye regarding the use of assistive technologies (AT) for supporting children with ASD. The data, gathered through multiple items addressing training, practice, access, and perceived preparedness, highlight both strengths and critical gaps in current educational practices and support systems.

Teachers and teacher candidates emphasized the importance of comprehensive training on ASD characteristics and ASD-specific teaching strategies. In both groups, these areas received the highest importance ratings, indicating that foundational understanding remains a priority. However, the availability of such training appears to be inconsistent, especially among pre-service teachers. While a majority of participants reported some exposure to ASD and assistive technologies during their studies, a substantial proportion had not attended dedicated workshops or observed these technologies in use. This reflects a need for more structured and accessible training opportunities that bridge theoretical knowledge with practical application.

Teachers reported moderate levels of preparedness to work with children with ASD, with many identifying specific areas where further support is needed—particularly in behavioral interventions, social skills training, and the use of digital tools for emotional development. Notably, assistive technologies were among the least utilized and least familiar tools, especially for fostering social-emotional competencies. Even when exposure had occurred, the frequency of actual classroom implementation remained low, underscoring the gap between awareness and confident application.

The self-assessments revealed that both teachers and pre-service teachers predominantly rated their preparedness as moderate, reflecting a cautious confidence that is tempered by a recognition of ongoing learning needs. A significant portion rated their preparedness as low, pointing to a critical need for reinforcement through continuous professional development.

Importantly, the availability of assistive technologies in internship or workplace settings was also perceived to be limited, which may contribute to low levels of confidence and skill acquisition.

Regarding training formats, participants across both groups consistently rated on-the-job training and hands-on workshops as the most useful and effective methods for acquiring competencies in assistive technology use. In contrast, self-paced online learning received lower ratings, suggesting that interactive and experiential approaches are preferred. The tools most commonly used or desired by teachers include visual aids, social-emotional learning software, and communication devices, reflecting an emphasis on tools that support both understanding and emotional regulation.

Participants expressed a strong need for increased access to digital tools, ready-to-use lesson plans, visual materials, and peer support networks. Additionally, challenges such as insufficient internet connectivity, outdated devices, and limited technical assistance were reported as frequent barriers to effective implementation. These infrastructural constraints must be addressed to ensure equitable access to AT across educational settings.

Overall, the results clearly indicate that teachers and teacher candidates in Türkiye value the potential of assistive technologies but require greater support to use them effectively. The need for structured training, institutional resources, and professional learning communities is evident. Future efforts should focus on embedding AT training within teacher education curricula, providing schools with adequate technological infrastructure, and fostering collaborative learning environments where teachers can share strategies and gain practical experience. This multi-dimensional approach will be essential for building inclusive educational systems capable of meeting the diverse needs of children with ASD.