International Journal of Technology in Education and Science

www.ijtes.net

The Use of Artificial Intelligence in Early Intervention

Manfred Pretis [1] *, Katerina Todorova [2], Melek Er [3]

[1] Medical School Hamburg, Germany, 0009-0003-6682-0669
[2] Private Pädagogische Hochschule Augustinum, Austria, 0009-0002-1172-7494
[3] Atilim University, Turkiye, 0000-0002-3609-4534
* Corresponding author: Manfred Pretis (Manfred.pretis@medicalschool-hamburg.de)

Article Info

Article History

Received:
1 August 2025

Revised:
21 December 2025

Accepted:
19 January 2026

Published:
13 March 2026

Keywords

Artificial intelligence
Early childhood
intervention

Abstract

The use of Artificial Intelligence (AI) is steadily increasing. This paper explores the extent to which AI is currently utilized in Early Childhood Intervention (ECI) services. Data were collected through an online survey conducted in German-speaking countries (Germany, Austria, Switzerland) and Turkey (n = 123). Results indicate that up to 50% of professionals in ECI services already use AI, predominantly ChatGPT. AI use is associated with younger age and professional background. Home visitors report less frequent use compared to professionals working in kindergarten settings. Non-users primarily cite a lack of information and general skepticism toward AI tools. Among users, AI is applied in methodological research, translation processes, and, to some extent, in planning interventions. Time efficiency is perceived as the main advantage of AI use; however, concerns remain regarding the validity of information and data protection. Overall, there is a clear demand for more training and well-defined guidelines concerning the handling of personal data when using AI in professional practice.

Citation: Pretis, M., Todorova, K., & Er, M. (2026). The use of artificial intelligence in early intervention. *International Journal of Technology in Education and Science (IJTES), 10*(2), 264-274. https://doi.org/10.46328/ijtes.5389

Introduction

The use of artificial intelligence (AI) is currently a widely discussed topic and is expected to play an increasingly significant role in special education in the future (cf. Knaus 2024, EDF 2024). This raises the question of the extent to which AI has already been integrated into early intervention practices in German-speaking countries, or what meaningful applications might emerge.

However, scientific engagement with the use of AI in early childhood intervention appears limited. Most studies emphasize the prospective potential of AI in special education, often with a focus on school settings (Francesc et al. 2019; Alkan 2024). The latter highlights that:

- students are provided with personalized, adaptive learning programs,
- software programs can identify and respond to individual strengths and weaknesses,
- AI tools can adapt to individual learning styles.

Furthermore, dialogue functions between AI and learners as well as data mining (the analysis of large data sets) are emphasized. Reviews on specific applications in (special) educational contexts mention:

1. support for (differential) diagnostic processes,
2. automated processing of information and data,
3. alternative and augmentative communication,
4. management processes, and
5. individualized planning of support processes.

Few studies focus specifically on preschool-aged children, such as Bostelmann (2023), who reflects on the potential use of AI in kindergartens, or Naranjos Velazquez (2023), who examines early support services. The author mentions the use of AI for gathering information (e.g., identifying suitable network partners) and for translation functions (e.g., simplifying documents for parents).

Support for Diagnostic Processes

Most research concerning AI in early diagnosis relates to autism spectrum disorder (ASD). In a meta-analysis, Wei et al. (2023) identified 261 studies focusing on "eye tracking" as a diagnostic indicator for ASD. The general conclusion is that AI can distinguish children with ASD from typically developing peers based on differing gaze patterns. Other studies analyze movement patterns, including stereotypies (Semeon et al. 2021), through video analysis, detecting differences even before clinical symptoms become apparent. Seventeen indicators proved significant for AI-based distinction—such as increased directional changes and faster, shorter movements in children with ASD.

Lai et al. (2020) found structural retinal differences (e.g., larger optic disc diameters) in children with ASD using machine learning. These could be detected in high-resolution images via AI. Similarly, Schäfer (2023) identified thinner retinal layers in the macula region among children with ASD, although no functional impairments were

observed. Tariq et al. (2018) developed a mobile app that used machine learning to identify ASD in home video recordings with 87% accuracy. Kojovic et al. (2021) trained AI to distinguish between typical and atypical interaction behavior, achieving 80% accuracy in detecting ASD based on body posture, reduced gestures, eye contact, emotional expression, and communication. Stanley et al. (2025) trained AI tools on sentence patterns from clinical ASD diagnostic reports and were able to identify repetitive or stereotypical expressions associated with ASD.

Krawitz et al. (2025) described AI's ability to detect atypical facial structures in children with possible genetic diagnoses, sometimes referred to medically (and controversially) as "funny-looking face" (FLF). Reich et al. (2021) highlighted AI's potential in detecting neurological problems in preterm infants via fidgety movements. These low-amplitude, moderate-speed, and variable-acceleration movements in awake infants are crucial prognostic markers. Using five-second video clips, AI achieved up to 80% accuracy in identifying such patterns—compared to at least five minutes of observation required by trained professionals.

Automated Information Processing, Management, and Methodological Suggestions

Using traditional internet search engines for support planning (the so-called "Dr. Google" approach) is not revolutionary. While scientific platforms such as Cochrane Library, ResearchGate, or Google Scholar offer more reliable content, information from other sources must be critically evaluated for validity and potential bias. AI significantly enhances data processing and information generation—even though risks such as "hallucinations" (fabricated information) or embedded advertising persist. Tools such as ChatGPT, Gemini, Mistral, or DeepSeek can, with minimal input, provide (usually valid) methodological suggestions tailored to a child's support needs in a school or early childhood setting.

Review articles emphasize professional ethical considerations such as:

- transparency regarding how information is generated,
- validation of the information's accuracy,
- prioritization of interpersonal interaction in support processes,
- and a critical stance toward the use of AI in general.

In addition to information retrieval, AI is capable of generating and summarizing data, especially in the context of ASD support:

- AI can measure a child's engagement during learning processes, response time, or task completion (Kumar et al. 2025), particularly in ABA (Applied Behavior Analysis) programs. AI handles the vast amounts of observational therapy data far more efficiently than humans.
- Cox et al. (2023) demonstrated how 48 ASD-relevant behavioral indicators enabled AI to achieve behavior analyses and predictions with 95–99% accuracy.
- Ghafghazi et al. (2021) described AI-enhanced platforms that individually support planning and evaluation in ABA therapy.
- AI can interpret data from wearable tools (e.g., motion sensors, EEGs) and alert parents to potential

developmental anomalies.

- AI also has potential in educational policy—e.g., for data management in international comparative education studies (Pedro et al. 2019).

AI in Alternative and Augmentative Communication

Technologies such as Bliss symbols, communication devices, and specialized apps have long played a vital role in special education. The emergence of AI represents a technological leap forward (Evengaline & Moorthy 2023). Between 2012 and 2022, 359 scientific articles addressed "speech or communication support tools." Drigas et al. (2012) already noted the use of AI across various diagnoses. Hackbarth (2024) sees countless industrial applications for combining generative AI with tools like text-to-speech, facial recognition, and eye-tracking to facilitate intuitive, personalized communication for individuals with complex learning needs. One notable project is "L2Tor" (http://www.l2tor.eu), which supports second-language acquisition in kindergartens via a "social robot." Due to the wide range of technologies, this article does not offer an in-depth discussion, although the publications clearly reflect a strong link between AI and industrial technology.

AI in Management Processes

Numerous studies address AI in management processes, including risk and information management, workforce deployment, and innovation. A Google Scholar search for “AI and management processes” yielded over 6.3 million results. However, it is difficult to assess the extent of AI integration in management processes in kindergartens or special education schools due to limited literature. A 2023 pilot project in Carinthia (Austria) highlighted that AI allowed more time for direct support of beneficiaries (in this case, adults with disabilities). Vital parameters and support documentation were dictated into a smartphone via an app and automatically transcribed into ICF-oriented administrative documentation.

AI in the Support Process

Devi et al. (2022) reviewed AI’s individualized use for children, particularly in school contexts, and noted:

- tutoring and tracking systems (i.e., learners receive AI-generated feedback and support),
- the potential for global access to education through AI-assisted platforms,
- administrative applications.

The authors also addressed potential negative reactions from learners toward such systems.

Research Question

This examination suggests that the use of AI in early intervention remains largely conceptual (cf. Knaus 2024). Notable exceptions include:

A) Diagnostic processes involving AI, primarily concerning children with ASD, usually within research institutions or clinical settings;

B) Information management, specifically the retrieval and preparation of relevant support information for children and families—although empirical data here are scarce.

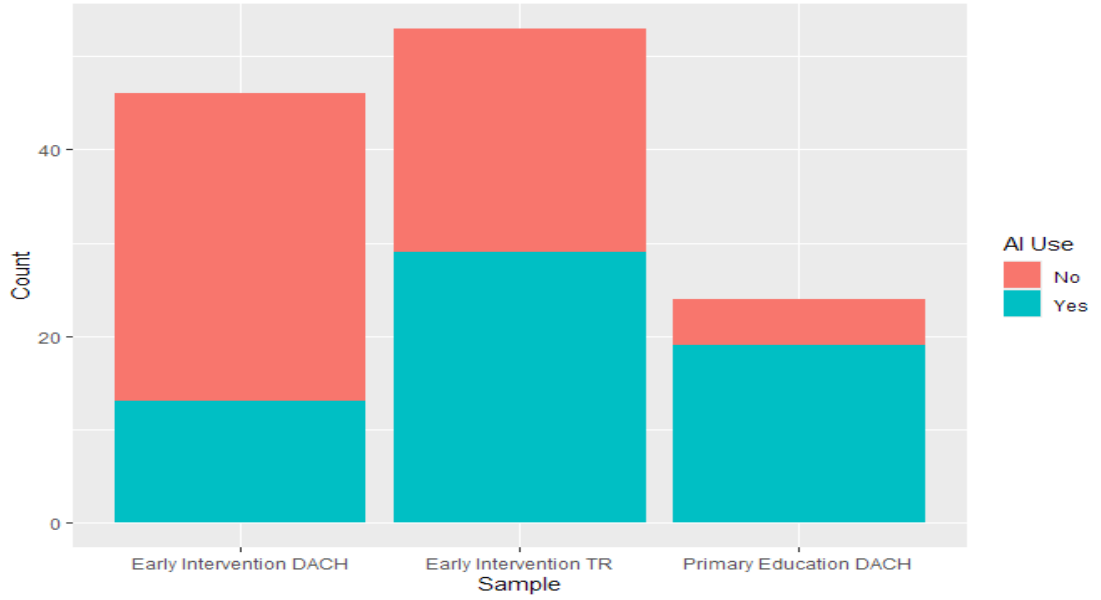
This leads to the central research question:

To what extent has AI "arrived" in early intervention settings, and how do professionals utilize it in this context?

Methodology

Sample

The study was conducted using quantitative research methods and a random sample. It was based on a multicenter online survey conducted in Germany, Austria, Switzerland, and Türkiye between May and June 2025. Early intervention centers in Germany, Austria, Switzerland, and Türkiye were contacted through a random sample and asked to complete a short online survey on the use of artificial intelligence in early intervention. In accordance with the Declaration of Helsinki, no personal data was collected from the participants. A total of 123 experts (aged 20 to 64, M = 38.37, SD = 10.83) participated in the study. Of these, 99 (80%) worked in the field of early intervention, and 24 (20%) worked in the field of inclusive primary education (see Graph 1). Participants were from early intervention (46 or 37%) and primary school (24 or 20%) settings in the DACH region, and from early intervention services in Türkiye (53 or 43%).



Graph 1. Use of AI Depending on the Professional Field

Instruments

The study used an 18-question questionnaire focused on the research questions. Thirteen questions included AI questions, and five included demographic questions about the participant. The questions in the form were compiled into a question pool by the researchers based on a literature review and finalized after consulting with experts. The online questionnaire included AI-related questions:

a) Knowledge and use of AI,

b) Reported reasons for non-use,

c) Reported type of tool used,

c) Reported area of use,

d) SWOT analysis of use,

e) Future perspectives on use,

f) Useful support for the increased use of AI in Early Childhood Intervention.

Additionally, the anonymized sociodemographic questions included:

g) Age of the respondent

ğ) Function at the Center where the respondent works

h) IT familiarity (multiple choice question)

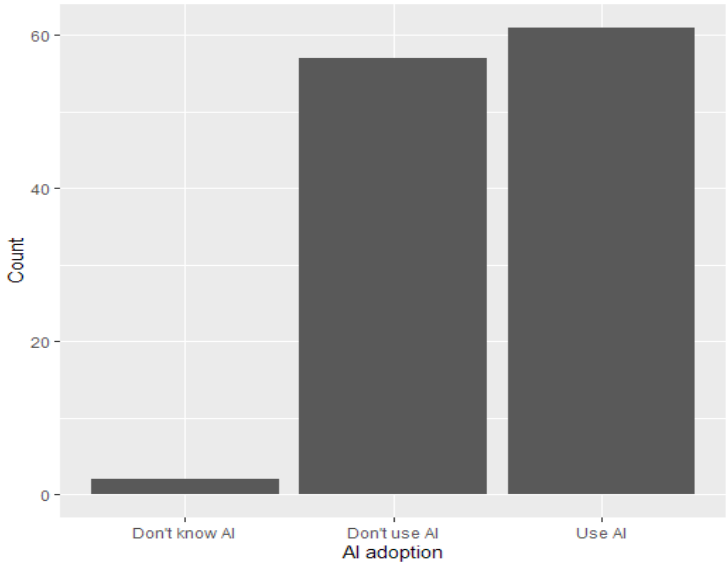
Data Analysis

This study used a quantitative research method to examine the attitudes and behaviors of early intervention professionals toward AI use, based on demographic factors and their familiarity with IT. Demographic variables and AI use behaviors were presented descriptively (frequency, percentage). Then...

Results

Use of AI in Early Childhood Intervention

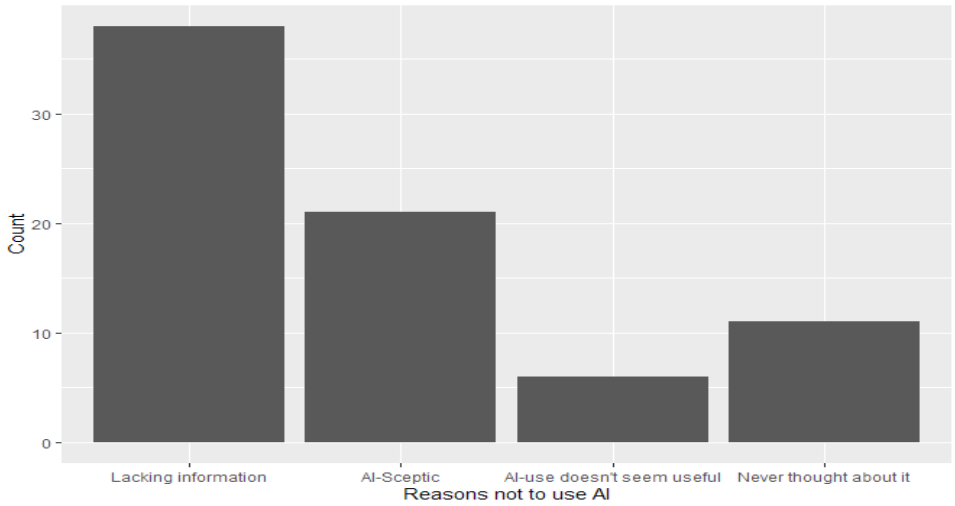
50% (n=61) of the participants reported to use AI, in their professional context of Early Childhood Intervention. 46% (n=57) do not use AI and 4% (n=5) didn't know the term AI (see Graph 2).



Graph 2. Use of AI

Significant correlations between age and use of AI (r =- .31, $p < .001$) and IT-Affinity (r = .34, $p < .001$) could

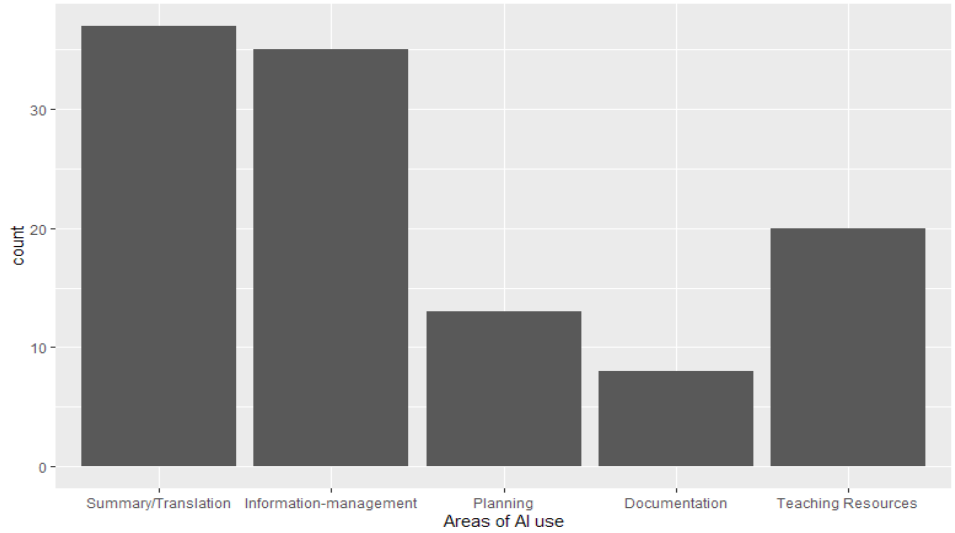
be found. Younger and IT-affin professionals used AI to a higher extent. Also the three sample populations differ significantly from each other regarding AI use (χ^2 (2) = 17.33, $p < .001$), with the primary educators having the highest proportion of AI users (79%), followed by Early Childhood professionals in and professionals in early intervention in the German speaking area. Graph 3 summarizes the reasons for non AI-use: a) lack of information regarding AI (67% or n=38), being generally skeptical about AI use (37% or n=21), belief that AI would not be useful for them (11% or n=6) or never having thought about using AI (19% or n=11).



Graph 3. Reasons for Non AI-use

Used AI tools in Early Childhood Intervention

Respondents mostly use ChatGPT (98% or n=60) and Google Gemini (28% or n=17), with some also using Perplexity, the French Mistral, or others. Professionals report that they use these tools to summarize and translate documents (61%), to manage information (57%), to generate teaching resources (33%), to plan interventions (21%), or use AI within documentation processes (13%) (see Graph 4).



Graph 4. Areas of AI Use

SWOTs- Analysis (Stait 1972)

Professionals reported following strengths of AI use in primary education and early intervention: Speed (44%, n=27), Translation/summary of documents (across languages or into easy language) (15%, n=9) Weaknesses were seen concerning the issue of data protection of AI contents (12 or 20%), validity (10 or 16%) and addressing highly personal aspects (6 or 10%). The respondents perceived opportunities to look for specific methods and teaching resources (22 or 36%) and efficiency (saving time) that could be spent with children and families (17 or 28%). The possible lack of skills (20 or 33 %), fake information and hallucinations (16 or 26%) and the lack of privacy (10 or 16%) were identified as threats.

Future AI use in Early Childhood Intervention

62% (or n=38) respondents can imagine an increased use of AI in their work in the future. 15% (n=9) are undecicive,3% reject the future use of AI. Those who might use AI more intensively wish to have training in the different ways to use AI and the request the necessary infrastructure (26% or n=16). Also issues of validity (18% or n=11) and data protection for their clients (7 or 11%) have to be addressed.

Conclusion

The initial research question—whether artificial intelligence (AI) has found its way into early childhood intervention—reveals a heterogeneous picture. Half of the surveyed professionals in German-speaking countries and in Turkey report already using AI in their professional early intervention work. This proportion is slightly higher than what general population statistics suggest (using Austria as an example), where 31% report using AI, with a relatively low usage frequency of 4%. Younger individuals appear more open to AI applications—an age-related trend also reflected in the present study: younger and IT-affine professionals report higher usage rates compared to their older counterparts. This may be attributed to the fact that older professionals do not belong to the generation of digital natives and may display more apprehension towards AI technologies.

Differences were also observed across professional domains (though these may require further investigation to establish significance).AI-generated or AI-assisted processes (e.g., in the context of research, translation, or information management) are primarily characterized by their time efficiency (cf. Ajuwon et al., 2024). This perception is echoed in the current study. AI tools thus hold considerable theoretical efficiency potential—especially in terms of human resource allocation—particularly for processes often regarded as administratively "burdensome," such as completing forms.

On the other hand, the professional quality (i.e., validity) of AI-generated documents and concerns related to data protection are commonly perceived as limitations or even risks. For instance, AI could potentially identify a child based on pattern recognition using variables such as age, place of birth, diagnosis, nationality, first language, or temporal and spatial information—posing a threat to fundamental data protection principles. When applying AI in personalized planning processes, strict attention must therefore be paid to data privacy regulations. Close

collaboration with data protection experts will be essential to prevent both identification and stigmatization. It must also be considered a basic requirement that professionals using AI possess the necessary competencies to communicate its use transparently, assess the validity of outputs, and derive evidence-based and meaningful interventions accordingly. Some participants in this study expressed concerns that the use of AI might eventually lead to the "rationalization" of professionals themselves or a loss of expertise. At the same time, nearly all scientific literature agrees that AI must not and cannot replace the interpersonal interaction between professionals and clients.

What remains to be critically examined, however, are the potential effects of perceived (administrative) efficiency gains on the deployment of professionals. Whereas professionals in early childhood intervention have reported, based on anecdotal evidence, that tasks such as research or document preparation previously took about 1.5 hours, the use of AI could reduce this workload to an estimated 15 to 30 minutes—including preparation and validity checks. Initial pilot results (see Land Kärnten, 2023) suggest that professionals perceive the availability of more time resources—enabled through AI—as relieving, as it allows more time to be spent on primary beneficiaries (i.e., children, clients, patients, etc.).

Recommendations

To date, the use of AI in early childhood intervention appears limited and has received little academic attention. Anecdotal evidence from students in training and continuing education suggests they are positively surprised by the capabilities of these tools. Yet it is likely inevitable that AI will increasingly be used—initially perhaps in the preparation of professionals, for translating texts, or for generating methodological intervention proposals (Pretis & Todorova, 2025).Whether AI will also be adopted in intervention planning or evaluation will largely depend on data protection clarifications and training opportunities. While the risk of professionals being “rationalized away” by AI in early childhood intervention is considered relatively low, a certain degree of unease remains regarding future developments. This may relate to the use of social robots (Thiessen et al., 2023), the rise of online counseling (via chatbots), or the growing influence of social media. It also remains an open question how AI will impact professionals’ workloads. However, the assumption that AI will have no effect on the future of early childhood intervention can be strongly challenged.

References

Ajuwon, O.A., Animashaun, E.S., Chiekezie, N. R. (2024). Integrating AI and technology in educational administration: Improving efficiency and educational quality, *Open Access Research Journal of Science and Technology, 11*(02), 116–127. https://doi.org/10.53022/oarjst.2024.11.2.0102

Alkan, A. (2024). The role of artificial intelligence in the education of students with special needs. *International Journal of Technology in Education and Science, 8*(4), 542-557. https://doi.org/10.46328/ijtes.569

Berliner Senatsvewaltung für Bildung, Jugend und Familie. (2024). *Berliner Teilhabe und Förderplan für die Kindertagesbetreuung. Erhebungs-, Maßnahmen und Empfehlungsbögen.* Berlin: Senatsverwaltung

Bostelmann, A. (2023) *Künstliche Intelligenz und die Bildung. Das Kita-Handbuch*. Verfügbar unter

https://www.kindergartenpaedagogik.de/ [25.4.2025].

Cox, D.J., D'Ambrosio, D., Pagliaro, J. (2023). *An Artificial Intelligence Driven System to Predict ASD Outcomes in ABA*. https://doi.org/10.31219/osf.io/3t9zc

Devi, J. S., Sreedhar, B., P Arulprakash, P., Radhakrishnan,K. R. (2022). A path towards child-centric Artificial Intelligence based Education. *International Journal of Early Childhood, 14*(3), 9915-9922

Drigas, A., Ioannidou, R.E. (2012). Artificial intelligence in special education A decade review. *International Journal of Engineering Education, 28*(6), 1366-1372.

EDF (European Disability Forum (2024). *The EU's artificial intelligence policies. European Disability Forum*. Verfügbar unter https://www.edf-feph.org/the-eus-artificial-intelligence-policies/ [25.4.2025].

Evangeline, B., Moorthy, A.D. (2023). A Comprehensive Review on Augmentative and Alternative Communication Tools for Speech-Impaired Individuals. In: Hewage, C., Nawaf, L., Kesswani, N. (eds) *AI Applications in Cyber Security and Communication Networks*. ICCS 2023. Lecture Notes in Networks and Systems, vol 1032. Springer, Singapore. https://doi.org/10.1007/978-981-97-3973-8_20

Ghafghazi, S., Carnett, A., Neely, L., Das, A., Rad, R. (2021). AI-augmented behavior analysis for children with developmental disabilities: building toward precision treatment. *IEEE Systems, Man, and Cybernetics Magazine*, *7*(4), 4-12.

Hackbarth, K.R. (2024). Voices from Industry Revolutionizing Augmentative and Alternative Communication with Generative Artificial Intelligence. *ATIA Assistive Technology Industry Association*, *18*, 100-123. https://doi.org/10.1145/3568294.3580161

Kojovic, N., Natraj, S., Mohanty, S. P., Maillart, T., Schaer, M. (2021). Using 2D video-based pose estimation for automated prediction of autism spectrum disorders in young children. *Scientific Reports, 11*, 15069.

Knaus, T. (2024). Künstliche Intelligenz und Pädagogik – ein Plädoyer für eine Perspektiverweiterung. *Ludwigsburger Beiträge zur Medienpädagogik*, *24*, 1-34- https://doi.org/10.21240/lbzm/24/11

Krawitz, P.M., Ruder, A., Nihues, T. (2025). Schneller zur genetischen Diagnose bei Kindern mit auffälliger Fazies durch künstliche Intelligenz. Einsatz in der Kinderarztpraxis. *Monatsschrift Kinderheilkunde, 173,* 305-309.

Kumar, N. (2025). Real-Time User Behaviour Tracking for AI-Driven In-Session Product Recommendations and Insights. *International Journal of Computer Engineering and Technology, 16*(2), 137-146.

Land Kärnten (6.11.2023). *Digitalisierung in Pflegeheimen: KI-gesteuerte Dokumentation entlastet Pflegekräfte*. Verfügbar unter https://www.ktn.gv.at/Service/News?nid=36517 [25.4.2025].

Lai M., Lee J., Chiu S., Charm J., So, WY., Yuen, FP, Kwok C., Tsoi J., Lin, Y., Zee, B.(2020). A machine learning approach for retinal images analysis as an objective screening method for children with autism spectrum disorder. *EClinicalMedicine*, *5*(28). https://doi.org/10.1016/j.eclinm.2020.100588.

Naranjos Velazquez, N. (2023). *Nutzung von ChatGPT in Netzwerken Frühe Hilfen Impulspapier*. Verfügbar unter:
https://rosdok.uni-rostock.de/file/rosdok_document_0000021649/rosdok_derivate_0000206592/Velazquez_Nutzung_2023.pdf [25.4.2025].

Pedro, F., Subosa, M., Rivas, A., Valverde, P. (2019). *Artificial intelligence in education: Challenges and opportunities for sustainable development.* Verfügbar unter:

https://unesdoc.unesco.org/ark:/48223/pf0000366994 [15.7.2025].

Pretis, M. (2022). *Teilhabeziele planen, formulieren und überprüfen*. München: Reinhardt.

Pretis, M., Todorova, K. (2025). KI unterstützte ICF Förderplanung. Erste Erfahrungen. *Paper im Rahmen der ICF Anwenderkonfererenz Klagenfurt*, 30.9.2025 [in press].

Reich, S., Zhang, D., Kulvicius, T., Bölte, S., Nielsen-Saines, K., Pokorny .B., Peharz, R., Poustka, L., Wörgötter F., Einspieler, Ch., Marschik, P.B. (2021). Novel AI driven approach to classify infant motor functions. *Scientific Reports, 11*, 9888.

Stanley, J., Rabot, E., Reddy S., Belilovsky E., Mottron, L., Bzdok, D. (2025). Large language models deconstruct the clinical intuition behind diagnosing autism. *Cell*, *188*(8), 2235-2248.

Stait, N.H. (1972). Management training and the smaller company: SWOT analysis. *Industrial and Commercial Training*, *4*(7), 325–330. doi:10.1108/eb003232

Statistik Austria (2025). Rund ein Viertel der Bevölkerung schätzt ihr Wissen über KI als gut ein Jüngere und Hochgebildete stehen KI-Anwendungen positiver gegenüber. *Pressemitteilung, 13*, 605-098/25 Verfügbar unter: https://www.statistik.at/fileadmin/announcement/2025/05/20250515KI_Analyse.pdf [25.4.2025].

Tariq, Q., Daniels, J., Schwartz, J.N., Washington, P., Kalantarian, H., Wall, D.P. (2018). Mobile detection of autism through machine learning on home video: A development and prospective validation study. *PLoS Med*, *15*(11): e1002705. https://doi.org/10.1371/journal.pmed.1002705

Thiessen, R., Dabiri, M., Geiskkovitch, D.Y, Ripat, J.,Young, J.E. (2023). *Social Robots to Encourage Play for Children with Disabilities: Learning Perceived Requirements and Barriers from Family Units*. https://doi.org/10.1145/3568294.3580161

Wei,Q., Cao, H., Shi,Y., Xu, X., Li, T. (2023). Machine learning based on eye-tracking data to identify Autism Spectrum Disorder: A systematic review and meta-analysis. *Journal of Biomedical Informatics*, *137*. https://doi.org/10.1016/j.jbi.2022.104254

World Medical Association (1991). Declaration of Helsinki. *Law Med Health Care*, *19*(3-4), 264-5.