IOJPE

ISSN: 1300 – 915X
www.iojpe.org

International Online Journal of Primary Education *2026, volume 15, issue 2*

A SYSTEMATIC REVIEW ON ARTIFICIAL INTELLIGENCE-BASED ACADEMIC AND PSYCHOSOCIAL INTERVENTIONS FOR STUDENTS WITH ATTENTION-DEFICIT/HYPERACTIVITY DISORDER

Ilias TSOLAKIDIS
MSc, Department of Educational and Social Policy, University of Macedonia, Greece
ORCID: https://orcid.org/0009-0002-1889-1289
iliastsolakidis1@gmail.com

Thanos TOULOUPIS
Assistant Professor, Department of Primary Education, University of the Aegean, Greece
ORCID: https://orcid.org/0000-0003-2951-6919
t.touloupis@aegean.gr

Anastasia ALEVRIADOU
Professor, Department of Psychology, Aristotle University of Thessaloniki, Greece
ORCID: https://orcid.org/0000-0001-7022-5537
alevriadou@psy.auth.gr

Stergiani GIAOURI
Associate Professor, Department of Early Childhood Education, University of Western Macedonia, Greece
ORCID: https://orcid.org/0000-0002-2280-9172
sgiaouri@uowm.gr

Dimitrios CHASAPIS
PhDc. Department of Primary Education, University of the Aegean, Greece
ORCID: https://orcid.org/0009-0007-4272-6474
pred23003@rhodes.aegean.gr

Received: April 22, 2026 **Accepted:** June 9, 2026 **Published:** June 30, 2026

Suggested Citation:
Tsolakidis, I., Touloupis, T., Alevriadou, A., Giaouri, S., & Chasapis, D. (2026). A systematic review on artificial intelligence-based academic and psychosocial interventions for students with attention-deficit/hyperactivity disorder. *International Online Journal of Primary Education (IOJPE), 15*(2), 103-121. https://doi.org/10.55020/iojpe.1936264

Abstract

Attention-Deficit/Hyperactivity Disorder (ADHD) presents persistent academic and psychosocial challenges across the lifespan. This systematic literature review examines the emerging role of Artificial Intelligence (AI) as a potential supportive tool in addressing these difficulties. Following PRISMA guidelines, nine empirical studies published between 2020 and 2025 were synthesized to evaluate the effectiveness of AI-based interventions. Results indicate that academic interventions, such as electroencephalogram (EEG)-based game frameworks and socially assistive robots, may enhance concentration, task management, and academic performance across primary, secondary, and higher education. Psychosocially, AI-driven tools like digital journaling and mood trackers show promise in promoting emotional regulation and improving quality of life. The synthesis reveals that AI acts as a dynamic cognitive and emotional scaffold, facilitating real-time personalization and non-judgmental feedback. This systematic literature review concludes that AI-based interventions can function as a valuable support framework in specialized education, providing students with ADHD the personalized and adaptive support necessary to achieve their full academic potential and psychosocial resilience.

Keywords: ADHD, artificial intelligence, academic interventions, psychosocial interventions, special education, educational technology.

INTRODUCTION

Attention-Deficit/Hyperactivity Disorder (ADHD) is a chronic neurodevelopmental condition characterized by persistent patterns of inattention, hyperactivity, and impulsivity that interfere with functioning or development (Tanner & Hsu, 2025). Epidemiological data indicate that the prevalence of ADHD ranges from 3.2% to 10.5% among children and adolescents, and from 1.4% to 4.6% among adults (Martin et al., 2025). Moreover, ADHD often co-occurs with a wide range of other developmental and psychiatric conditions, including learning disorders, autism spectrum disorder, anxiety disorders, and oppositional defiant disorder (Antshel et al., 2016; D'Agati et al., 2019; Liu et al., 2025; Masi, 2015).

A substantial body of literature has documented that students diagnosed with ADHD encounter persistent challenges across academic and psychosocial domains (Antoniou et al., 2021; DuPaul et al., 2021; Ek et al., 2007; Healey & Rucklidge, 2006). Academically, these students tend to exhibit inefficient learning strategies, difficulties in sustaining attention and completing tasks, working memory impairments, and consequently, lower academic achievement (Abrahão & Elias, 2021; Ek et al., 2007; Zoëga et al., 2012). Psychosocially, they often experience deficits in social communication, peer interaction, and emotional regulation, which may compromise the development of stable interpersonal relationships and social bonds (Abrahão & Elias, 2021; Healey & Rucklidge, 2006; Pintos Lobo et al., 2025). Collectively, these findings underscore the critical need for targeted interventions designed to enhance both academic performance and psychosocial functioning among students with ADHD.

The effectiveness and design of ADHD interventions often vary depending on the developmental stage and educational context. In early childhood education, interventions typically focus on enhancing attention span, behavioral regulation, and task persistence (DuPaul, Kern et al., 2011; Hand & Lonigan, 2025). At the elementary school level, programs often target the acquisition of time management, organizational, and study skills (DuPaul & Weyandt, 2006; Santos & Albuquerque, 2019). In secondary education, interventions tend to prioritize executive functioning, task prioritization, and sustained engagement in learning activities (Chronis et al., 2006; Evans et al., 2020; Giannakopoulos, 2025). Finally, in higher education, students with ADHD benefit from programs aimed at fostering academic self-efficacy, self-regulated learning, and institutional integration (Chacko et al., 2024; Eiraldi et al., 2012; Tresco et al., 2010).

Parallel to academic interventions, psychosocial programs have demonstrated considerable benefits in improving emotional and social competencies among individuals with ADHD. For preschool and school-age students, these interventions emphasize emotion recognition, peer relationship building, and social skill acquisition (LaForett et al., 2008; Tourjman et al., 2022). For adolescents, programs often promote self-management, social problem-solving, and emotion regulation (Evans et al., 2014; Giannakopoulos, 2025). In the college and university context, psychosocial interventions tend to enhance self-esteem, psychological well-being, and overall quality of life (Ali et al., 2024; Wolf, 2001). While these traditional developmental models are well-documented, a significant gap remains in understanding how emerging digital tools can be systematically integrated into these established frameworks to provide scalable and adaptive support.

In recent years, Artificial Intelligence (AI) has emerged as a significant technological development within education, psychology, and special education. AI-based systems integrate ma-chine learning, adaptive algorithms, and data-driven personalization to support individualized learning and mental health interventions. Research suggests that AI-driven academic tools can enhance learning efficiency, personalize instructional content, and increase student motivation and engagement (Hasan & Khan, 2023; Wu & Yu, 2024). Similarly, AI-based psychosocial interventions—ranging from virtual therapeutic agents to emotion-recognition and feedback systems—have shown promising outcomes in reducing clinical symptoms, improving emotional awareness, and enhancing self-regulation among adolescents and adults (Alshammari, 2025; Gual-Montolio et al., 2022; Wang et al., 2022).

Given its capacity for personalization and real-time adaptation, AI represents a promising frontier for psychology and special education, offering opportunities for clinicians and educators to design data-informed, dynamic, and context-sensitive interventions (Liu et al., 2022; Wang & Xue, 2024).

IOJPE

ISSN: 1300 – 915X
www.iojpe.org

International Online Journal of Primary Education *2026, volume 15, issue 2*

This potential becomes particularly salient for students with ADHD, who benefit from structured, feedback-based, and interactive modalities of learning and behavior management. Indeed, technology-enhanced approaches, such as computer-assisted training and virtual reality-based interventions, have already been shown to yield significant improvements in attention, executive functioning, academic engagement, emotional regulation, and behavioral control among children with ADHD (Doulou et al., 2025; Pfiffner et al., 2006; Wong et al., 2023). However, despite the potential of AI to act as a "cognitive scaffold", there is a lack of synthesized evidence on whether these benefits are sustained across different educational levels or if they are primarily limited to early childhood settings.

Despite the increasing integration of AI in educational and clinical contexts, the empirical evidence concerning AI-based interventions specifically for students with ADHD remains limited and fragmented. Existing findings tend to be scattered across age groups (e.g., preschool vs. adolescence) and educational levels (e.g., primary vs. secondary education), offering an incomplete understanding of AI's potential impact on this population. Furthermore, there is a noticeable absence of a structured comparison between academic and psychosocial AI outcomes, leaving a critical void in the literature regarding which AI modalities are most effective for specific ADHD-related deficits. Consequently, the application of AI to psychoeducational interventions for ADHD constitutes a notably under-investigated and under-represented field in the current academic discourse. The present review addresses these gaps by providing a systematic synthesis of the current evidence, highlighting the overlooked developmental areas in existing research.

Building upon this theoretical framework, the present systematic literature review aims to systematically examine the effectiveness of AI-based academic and psychosocial interventions for students diagnosed with ADHD. Specifically, it seeks to explore:

1. The types of AI-based interventions (academic vs. psychosocial).
2. The benefits of AI-based academic interventions, categorized by educational level.
3. The benefits of AI-based psychosocial interventions, categorized by educational level.

METHOD

Literature Search

A comprehensive literature search was conducted across major scientific databases, including Google Scholar, PsycINFO, ERIC, PubMed, Scopus and Web of Science, from August to November 2025. The search strategy involved the systematic combination of keywords and Boolean operators (AND, OR) to maximize the retrieval of relevant studies. The full search string utilized was: ("attention deficit hyperactivity disorder" OR "ADHD") AND ("artificial intelligence" OR "AI" OR "machine learning" OR "robotics") AND ("academic intervention" OR "learning support" OR "psychosocial intervention" OR "emotional regulation"). Search limits were applied to include only peer-reviewed publications and articles available in full text. Additionally, the search was restricted to publications in English and Greek to align with the reviewers' linguistic competencies. The reference lists of the finally included studies were also manually searched to identify any additional relevant records that were not identified through the electronic database search.

Eligibility Criteria

Titles and abstracts of all retrieved studies were screened independently by two reviewers to identify potentially relevant papers for inclusion. To ensure the reliability of the selection process, any discrepancies between the two reviewers were resolved through consensus or by consulting a third senior researcher. When an abstract indicated that a study might meet the inclusion criteria, the full text was subsequently reviewed. Studies were included if they met the following criteria:

1. Published in peer-reviewed scientific journals, books, edited volumes, or conference proceedings.
2. Written in English or Greek.
3. Reported empirical research (i.e., studies with primary data).

4. Involved student populations diagnosed with ADHD, or ADHD comorbid with other disorders.
5. Examined the effectiveness of AI-based academic or psychosocial interventions. To ensure a consistent classification, interventions were defined as AI-based if they utilized autonomous data processing components, such as machine learning for pattern recognition (e.g., in EEG-based systems), natural language processing for social interaction (e.g., in socially assistive robots), or adaptive algorithms for real-time content personalization and automated feedback (e.g., in digital journaling and counseling platforms).

Studies not meeting any of the above criteria were excluded. Initially, 5.596 records were retrieved from the databases. Following title and abstract screening, only 21 articles were deemed suitable for full-text assessment. The full-text review was also conducted independently by two researchers to verify that all inclusion criteria were strictly met. At this stage, we excluded review papers (*n* = 12), studies that did not include participants with ADHD (*n* = 7), and studies that did not employ AI-based interventions (*n* = 5). Consequently, nine (9) studies met all inclusion criteria and were included in the final synthesis. A full list of the excluded studies and the specific reasons for their exclusion is available from the corresponding author upon request. The article selection process is summarized in Figure 1.

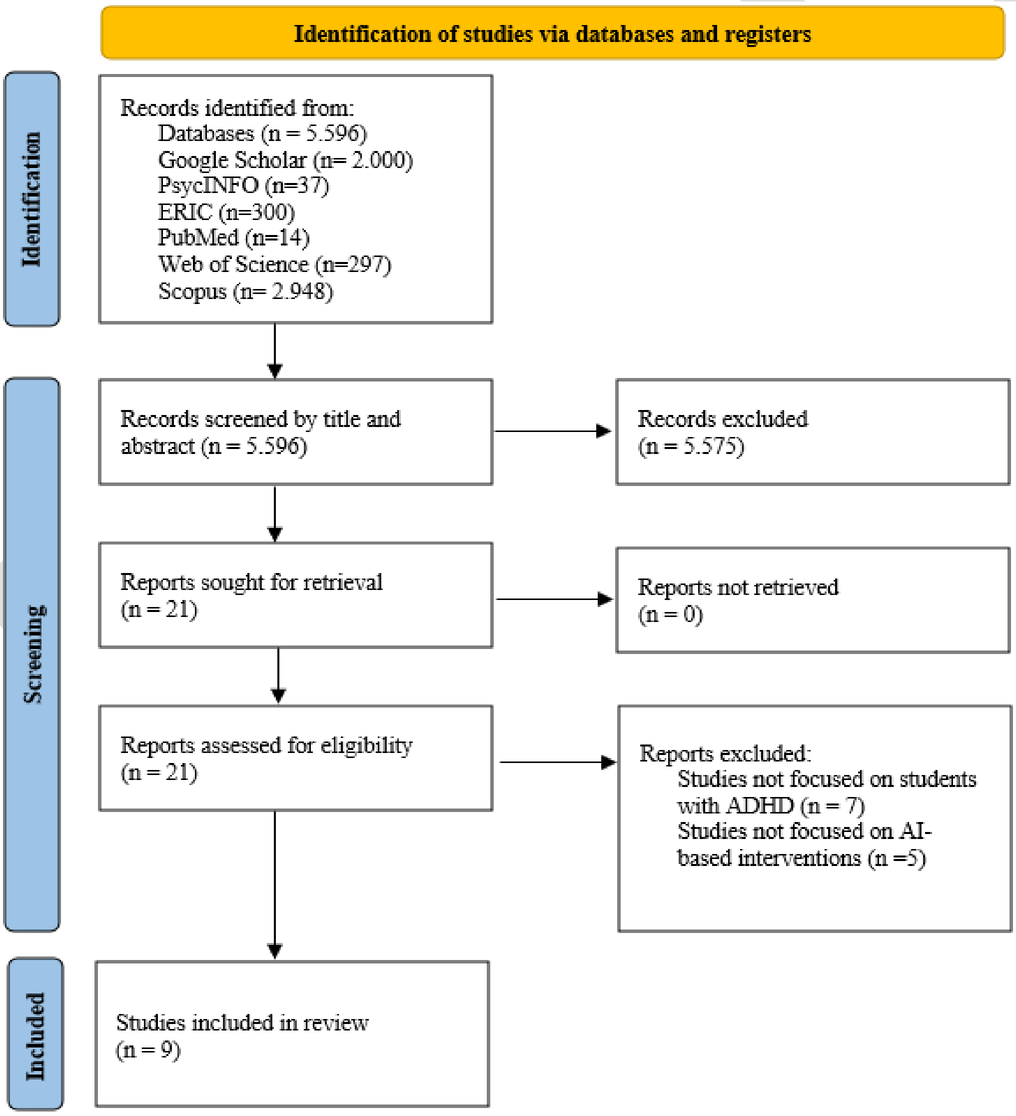

Figure 1. PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) flow diagram of the study selection process.

Data Extraction and Management

To ensure the accuracy and reliability of the synthesized data, a standardized data extraction form was employed. Two independent reviewers screened the titles/abstracts and extracted relevant information from the final nine studies. The extracted data included author details, publication year, geographical context, participant demographics (age, sample size, ADHD diagnosis/comorbidity), AI intervention characteristics, research methodology, and primary outcomes. The primary outcomes of interest were defined as improvements in academic performance (e.g., concentration, writing skills) and psychosocial resilience (e.g., emotional regulation). Any discrepancies between the reviewers regarding the extracted data were resolved through discussion and consensus or by consulting a third senior researcher to ensure objectivity and minimize extraction errors.

Quality Assessment

The methodological quality of the included empirical studies was critically appraised to ensure the robustness of the review's conclusions. Given the heterogeneity of the research designs (ranging from Randomized Controlled Trials to quasi-experimental and quantitative surveys), appropriate appraisal tools, such as the Cochrane Risk of Bias tool for RCTs and the Joanna Briggs Institute (JBI) Critical Appraisal Checklist for quasi-experimental studies, were utilized. Studies were evaluated based on their internal validity, sample representation, and the clarity of their statistical findings. To provide a more systematic overview of the study quality, the results were synthesized by categorizing each study into a specific risk-of-bias level: low, moderate, or high. Two reviewers independently assessed the risk of bias for each study, and a high level of agreement was reached, with any minor differences resolved by a third researcher. This assessment allowed for a nuanced interpretation of the effectiveness of AI interventions while acknowledging the methodological limitations inherent in emerging research areas.

Effect Measures

Given the methodological heterogeneity of the included studies, which employed diverse quantitative and qualitative metrics, no single statistical effect measure (such as Cohen's d or Odds Ratios) was uniformly applied. Instead, the synthesis focused on the reported direction and significance of changes in academic and psychosocial outcomes. The primary indicators of effect included improvements in concentration levels, task completion time, emotional regulation scores, and quality of life dimensions as reported in the original studies.

Synthesis Methods

Studies were grouped for synthesis based on the type of AI intervention (academic or psychosocial) and the educational level of the participants (primary, secondary, or higher education). The diverse technologies were categorized according to their primary AI function: systems using physiological sensors (e.g., EEG) were classified based on their automated state-detection algorithms; robotic platforms were classified based on their use of adaptive engagement and interaction protocols; and software-based tools (e.g., digital journals) were classified by their integration of data-driven feedback loops and predictive analytics. A narrative synthesis approach was adopted, as the diversity of intervention modalities and outcome measures, ranging from EEG data to qualitative surveys, precluded a meta-analysis. To systematically account for heterogeneity, the synthesis evaluated how variations in sample sizes (ranging from small-scale pilots of $n = 12$ to larger surveys of $n = 200$), intervention durations (varying from a single-session interaction to 32-session programs), and measurement tools (e.g., objective biometric data vs. subjective parent-proxy reports) influenced the consistency of the reported benefits. The synthesis involved a thematic analysis of the findings, focusing on identifying patterns in how AI-based academic and psycho-social scaffolds address specific ADHD deficits across different developmental stages.

Included Studies

The final research sample comprised nine empirical studies published in English-language peer-reviewed journals and conference proceedings between 2020 and 2025. Given that research on

AI-based academic and psychosocial interventions for ADHD remains limited (Singh, 2025), no date restriction was applied during article selection.

Of the studies included, nine (9) addressed the first research goal, five (5) were related to the second research goal, and four (4) pertained to the third research goal. Table 1 presents an overview of the key characteristics of the selected studies, including authors, publication year, country, research aim, sample, methodology, and main findings.

Table 1. Summary of key characteristics and main findings of the included empirical studies on AI-based interventions for students with ADHD.

Authors	Country	Research Aim	Sample	Methodology	Main Findings
Faria et al. (2020)	Brazil	The introduction of adaptive AI-based game for boosting and maintaining concentration levels for children with disabilities.	30 children, 6-10 years old, (24 males, 6 females) with various neurodevelopmental disorders (ID, ASD, ADHD, ODD & Hydrocephaly), without specifying the proportion of students with ADHD. Comorbidity is not specified by the authors.	The experimental design contained one group measured in three states: concentration state, relaxed state and neutral state. The measurement of concentration was based on EEG and observations of the researchers. Moderate risk of bias.	The classification of the concentration by the framework achieved 96% accuracy. The participants gave positive feedback on the game and the intervention.
Lalwani et al. (2025)	USA	Use of Socially Assistive Robot (SAR) for conversation, task prioritization and scheduling, engagement detection, and emotion recognition.	15 undergraduate students, 18-24 years old (8 females, 7 males) with ADHD	Experimental design contained one group from which all participants had a session with the SAR. Participants completed pre and post experiment questionnaires that included the evaluation of the SAR, the assistance in prioritization/rescheduling and refocus during the session. High risk of bias.	The participants were more organized after the use of SAR and 80% expressed interest in using it again. They scored above 2.5 in ESQ-R.
Aldakhil (2024)	Saudi Arabia	Examination of the impact of AI-based play activities on the quality of life of 61 Saudi children with ADHD diagnosis.	61 boys, 8-12 years old with ADHD (M_{age} = 10.0, SD = 1.4)	Randomized controlled design contained two groups. The experimental group engaged with AI-based play activities 3 times a week for four weeks. The control group didn’t receive any intervention. The children and their parents completed the PedsQL pre-test, post-test and follow up after seven weeks. Low risk of bias.	Significant improvements in the PedsQL for the experimental group compared to the control group. Specifically, improvements in physical, social, school and emotional dimensions were observed in the experimental group for both child self-reports and parent-proxy reports.

Table 1 (Continued). Summary of key characteristics and main findings of the included empirical studies on AI-based interventions for students with ADHD.

Authors	Country	Research Aim	Sample	Methodology	Main Findings
Mahmoudi-Dehaki & Nasr-Esfahani (2025)	Iran	Examination of the efficacy and acceptability of human and AI hybrid tutoring in improving the writing skills of bilingual students with motor dysgraphia and ADHD.	12 twice exceptional bilingual students, 13-18 years old, with comorbidity motor dysgraphia and ADHD.	The study utilized a quasi-experimental design. The experimental group with six participants received human-AI hybrid tutoring in writing skills. The control group, with six participants, received traditional instructions in writing skills. The intervention consisted of 32 sessions 90 minutes each. Pre-test and post-test performance in writing assessed with DASH-2. Moderate risk of bias.	The experimental group showed significantly enhanced handwriting fluency and composition skills. These improvements were observed in within-group and between-group comparisons.
Berrezueta-Guzman et al. (2021)	Spain	Assessment of a robotic assistant aimed at providing therapeutic support in the performance of homework (distraction from the task and time for task competition) in children with ADHD.	12 children, 6-12 years old (8 girls and 4 boys), including children with suspected ADHD and children without ADHD.	Experimental design: The sample formed 3 groups, one of which was assigned with specific tasks (math, language and English). For the first 2 weeks all the groups carried out the tasks without the robotic assistant and for last 2 weeks with the robotic assistant. The sessions were not exceeding 70 minutes each. Moderate risk of bias.	The robotic assistant allows remote homework monitoring with therapeutic contribution and improves the routines of children with or without suspected ADHD. Specifically, the degree of distraction from the task decreased after the third week and the time for task completion also decreased.
Aslam et al. (2025)	N/A	Investigation of the effectiveness of AI-based tools in children's emotional learning and emotional regulation.	200 students, 7-12 years old, with dyslexia and ADHD or ASD (authors don't specify the existence of comorbidity).	Quantitative methodology: Various interventions were applied for anxiety, self-control or motivation. The data were collected through survey (more information regarding the execution of interventions, the existence of experimental and control group or the survey were not available). High risk of bias.	Positive and significant connection between AI-based emotional learning tools and emotional control were observed. Also, AI-tools help in improving emotional regulation. Moreover, the use of AI-tools is a predictor for improved emotional regulation.

Table 1 (Continued). Summary of key characteristics and main findings of the included empirical studies on AI-based interventions for students with ADHD.

Authors	Country	Research Aim	Sample	Methodology	Main Findings
Su et al. (2024)	Taiwan	Investigation of the effectiveness of AI-based digital journaling platform in enhancing counseling efficiency.	22 students, 10-12 years old with emotional disorders, ADHD, or ASD	Experiment design: All participants completed 468 journal entries. The data collected via teacher assessments and digital platform data. Self-Awareness, Self-Management, Social Awareness, Relationship Skills and Responsible Decision Making were measured during pre-test and post test phase. Moderate risk of bias.	The results revealed significant improvement in all five variables for the students who were using the digital journal platform.
Katsarou et al. (2025)	Greece	Investigation of the use of AI in assessing and supporting grammar performance among children with learning disabilities.	100 children, 8-12 years old with various neurodevelopmental disorders (e.g. dyslexia, ADHD, language disorders, and other related disorders), without specifying the proportion of students with ADHD. Comorbidity is not specified by the authors. Experimental group: M_{age} = 10.2, *SD* = 1.4 Control Group: M_{age} = 10.1, *SD* = 1.5	Experimental design: Experimental group consisted of 50 students who received AI-facilitated grammar assessments and personalized feedback. Control group consisted of 50 students who completed conventional paper-based grammar tests without personalized feedback. Low risk of bias.	There was an improvement for the experimental group in grammar accuracy, task completion, engagement levels and grammar strategies.
Xu et al. (2025)	China	The main goal was the evaluation of AI-assisted drawing therapy for children with ADHD in core symptoms and functional impairments.	41 children, 7-10 years old with ADHD. Experimental group: n = 19 Control group: n = 22	Randomized controlled trial: The guardians of the participants completed the SNAP-IV and WFIRS scales to set the baseline values before the intervention. The same scales were completed after the intervention. The experimental group included AI-assisted and traditional drawing intervention. The control group included only traditional drawing intervention. Low risk of bias.	Both AI and traditional interventions reduced significantly core ADHD symptoms. Within groups: AI group had improvements in attention and oppositional defiant behavior, traditional therapy group had broader symptom reductions across all domains. Between-groups: AI group had grater improvement in inattention and the traditional group improved more on oppositional defiant behavior.

Note: ASD = Autism Spectrum Disorder, DASH-2 = Detailed Assessment of Speed of Handwriting 2nd Edition, EEG = electroencephalogram, ESQ-R = Executive Skills Questionnaire-Revised, ID = Intellectual Disability, NARS = Negative

Attitude Towards Robot Scale, ODD = Oppositional Defiant Disorder, PedsQL = Pediatric Quality of Life Inventory, SAR = Socially Assistive Robot, SNAP IV = Swanson, Nolan and Pelham-IV rating scale, SUS = System Usability Scale, WFIRS = Weiss Functional Impairment Rating Scales-Parent.

Figure 2 illustrates that five of the selected studies focused on AI-based academic interventions, whereas four studies addressed AI-based psychosocial interventions.

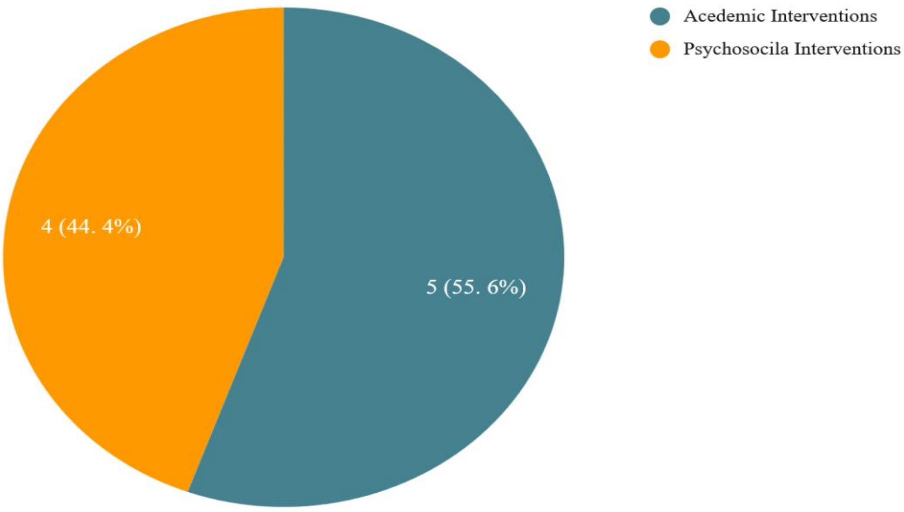

Figure 2. Distribution of AI-based interventions based on their academic and psychosocial content.

Moreover, as depicted in Figure 3, five studies examined AI-based academic interventions implemented across various educational levels (from primary to higher education), excluding preschool settings. Specifically, three studies investigated interventions applied to primary education student samples, one study conducted in secondary education, one study conducted in higher education and none of the studies included a mixed education level sample (Figure 3). In contrast, the rest four AI-based psychosocial interventions were identified exclusively within primary education settings.

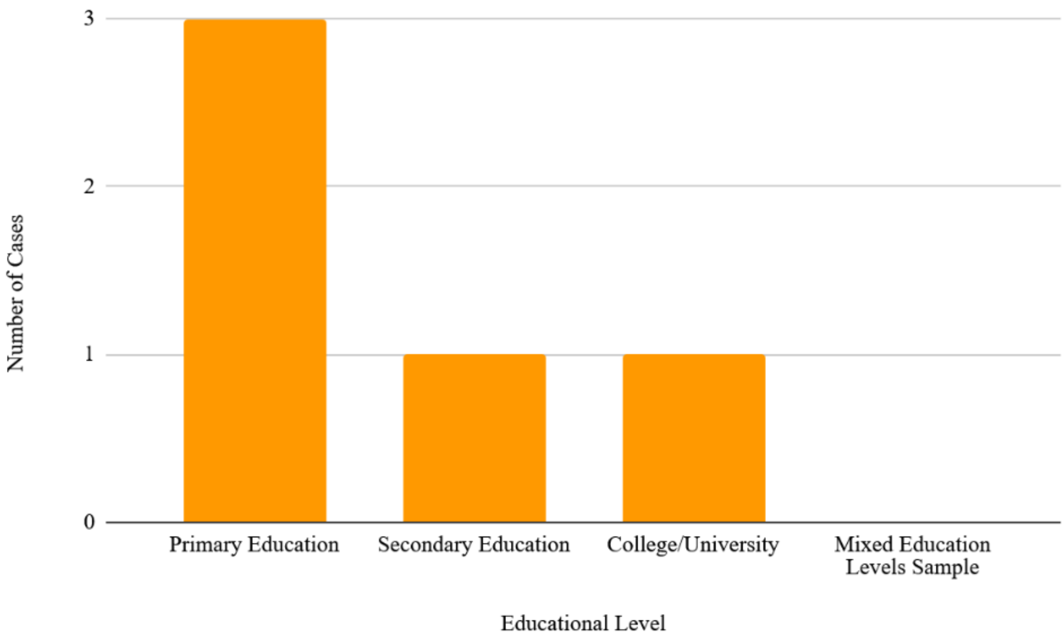

Figure 3. Distribution of AI-based academic interventions by educational level.

RESULTS

Types of AI-based Interventions (Academic vs. Psychosocial)

Regarding the first research objective and the types of AI-based interventions for students with ADHD, nine (9) studies were identified. These studies were categorized into academic and psychosocial interventions. Moreover, according to Figure 2, it appears that most of these studies target the academic deficits of students with ADHD, while fewer address psychosocial deficits.

Specifically, the studies by Berrezueta et al. (2021), Faria et al. (2020), Katsarou et al. (2025), Lalwani et al. (2025), as well as Mahmoudi-Dehaki and Nasr-Esfahani (2025), implemented AI-based interventions with an academic focus. Their objectives ranged from improving task concentration and task/time management to enhancing reading and writing performance. On the other hand, the studies by Aldakhil (2024), Aslam et al. (2025), Su et al. (2024), and Xu et al. (2025) focused on AI-based psychosocial interventions targeting areas such as quality of life, emotional learning and regulation, and effective counseling.

Benefits of AI-based Academic Interventions Categorized by Educational Level

Regarding the second research objective, which concerns the benefits of AI-based academic interventions across educational levels, five (5) studies were identified. Of these, three (3) examined benefits in primary school students, one (1) in secondary school students, and one (1) in college/university students.

Regarding primary education, Faria et al. (2020) detected and categorized electro-encephalogram (EEG) data from children with various disorders, including ADHD, into three states: concentration, relaxation, and neutral. The findings indicated high levels of engagement among participating students. Teachers reported that even the most challenging students remained fully focused during interactions with the games. Students also stated that the games were easy to use, enjoyable, and that they would be willing to play them again (Faria et al., 2020). Similarly, Berrezueta-Guzman et al. (2021) found that the use of a robotic assistant enabled remote homework monitoring with therapeutic benefits. Notably, after the third week of intervention, a reduction in ADHD-related symptoms was observed. These included decreases in the frequency of distractions, pauses between tasks, requests for assistance, impulsivity, and sound emissions. Additionally, improvements were reported in concentration, time management, and organization. The robot also reduced the need for breaks and impulsive behaviors, facilitated task completion, and minimized anxiety and distractions (Berrezueta-Guzman et al., 2021). The study by Katsarou et al. (2025) demonstrated improvements in grammar accuracy, time management, and student engagement. Specifically, the experimental group that utilized AI showed statistically significant improvement compared to the control group. Furthermore, the experimental group reduced test completion time by 5.3 minutes. Higher engagement levels were also observed, with 76% of students demonstrating strong commitment compared to those in the control group. An additional benefit was the provision of real-time personalized feedback, with AI dynamically adjusting the level of difficulty to meet individual student needs (Katsarou et al., 2025).

Regarding secondary education, Mahmoudi-Dehaki and Nasr-Esfahani (2025) re-ported that the AI-based intervention significantly improved all domains of the De-tailed Assessment of Speed of Handwriting-2 (DASH-2), including handwriting fluency, orthographic coding, fine motor control, and composition skills. Participants in the experimental group demonstrated clear improvements in post-test measurements compared to both baseline and control group results. Moreover, as AI assumed responsibility for managing aspects of the educational process, teachers were able to focus more on providing emotional encouragement and support, thereby making the learning experience more enjoyable and less stressful (Mahmoudi-Dehaki & Nasr-Esfahani, 2025).

At the university/college level, Lalwani et al. (2025) showed that a social assistive robot (SAR) helped undergraduate students with ADHD to prioritize and schedule their tasks more effectively and efficiently. Students reported feeling more organized, as the SAR assisted in prioritizing tasks and creating realistic schedules. Furthermore, the robot's ability to break tasks into smaller, manageable steps reduced stress and alleviated feelings of being overwhelmed by academic obligations (Lalwani et al., 2025).

Benefits of AI-based Psychosocial Interventions Categorized by Educational Level

Regarding the third research objective, which examines the benefits of AI-based psychosocial interventions across educational levels, four (4) studies were identified. All of these studies targeted students in primary education.

Specifically, the study by Aldakhil (2024) demonstrated improvements in total scores on the Pediatric Quality of Life Inventory (PedsQL). Enhancements were also observed across all PedsQL dimensions, including physical, social, emotional, and school functioning. Notably, these improvements were maintained at the seven-week follow-up for both child self-reports and parent-proxy reports, with no statistically significant differences compared to post-test scores, indicating the durability of the intervention effects (Aldakhil, 2024).

Similarly, Su et al. (2024) found that the experimental group receiving the AI-based intervention combined with counseling demonstrated significant improvements across all five Social and Emotional Learning (SEL) indicators. In contrast, the control group, which received counseling alone, showed improvement only in self-awareness (Su et al., 2024). The integration of AI enabled students to express their thoughts and emotions through creative processes. For example, the use of a Mood Tracker allowed counselors to identify students experiencing negative emotions and prioritize targeted interventions. Additionally, engaging students in comic book creation enhanced their motivation for self-directed learning and transformed journaling into a more enjoyable activity (Su et al., 2024).

In their study, Aslam et al. (2025) reported that AI-based emotional learning tools can significantly benefit students with ADHD. Correlational analyses revealed a statistically significant positive relationship between the use of AI-based emotional learning tools and emotional regulation. Furthermore, one-way *t*-tests indicated that students who used these tools achieved higher emotional regulation scores compared to those who did not. The AI tools functioned as supportive frameworks, helping students recognize, label, and regulate their emotions through immediate, personalized feedback. As a result, students developed greater self-awareness, which contributed to increased classroom attentiveness and improved relationships with peers and family members (Aslam et al., 2025).

Finally, Xu et al. (2025) reported mixed findings regarding the three core symptoms of ADHD. The AI-assisted drawing group demonstrated improvements in concentration, whereas the traditional drawing group showed greater reductions in impulsivity. No significant improvements were observed in hyperactivity in either group. However, the AI intervention group exhibited enhanced overall functioning, with notable gains in both family and school domains of the Weiss Functional Impairment Rating Scale-Parent Report (WFIRS-P). In terms of therapeutic engagement, real-time AI feedback improved flow and intrinsic motivation by reducing stress during task execution. Additionally, AI-generated images acted as positive reinforcement, boosting students' confidence. Both groups demonstrated high levels of participation, suggesting that creative activities are particularly engaging for students with ADHD (Xu et al., 2025).

Methodological Quality and Risk of Bias

The results of the risk of bias assessment for each individual study are integrated into the "Methodology" column of Table 1. A systematic synthesis of these assessments reveals that three studies (33.3%) were classified as having a low risk of bias, four studies (44.4%) as moderate risk, and two studies (22.2%) as high risk. Following the quality assessment of the nine included studies, most were found to be of moderate to high methodological quality. Specifically, the randomized controlled trials (RCTs) (Aldakhil, 2024; Xu et al., 2025) and the experimental study by Katsarou et al. (2025) demonstrated a low risk of bias regarding intervention protocols and participant selection. The moderate-risk category included four studies (Berrezueta-Guzman et al., 2021; Faria et al., 2020;

Mahmoudi-Dehaki & Nasr-Esfahani, 2025; Su et al., 2024), which generally provided robust outcomes but were limited by smaller sample sizes or lack of randomization. However, certain quasi-experimental studies (Aslam et al., 2025; Lalwani et al., 2025) exhibited a higher risk of bias due to small sample sizes and the absence of a control group and notable sample heterogeneity, as several studies combined participants with different neurodevelopmental profiles without conducting ADHD-specific subgroup analyses. Beyond sample characteristics, the significant variability in intervention duration and the lack of standardized assessment tools across the reviewed studies further complicate the comparative evaluation of AI effectiveness and limit the precision of the overall conclusions. Despite these limitations, all studies provided clear reporting on AI intervention mechanisms and their respective outcomes for students with ADHD, justifying their inclusion in the qualitative synthesis.

DISCUSSION, CONCLUSION, and RECOMMENDATIONS

The synthesis of current empirical evidence demonstrates that AI-based interventions for students with ADHD represent a notable evolution from static instructional methods to dynamic, ecologically sensitive support systems. This review highlights that AI does not merely function as a digital substitute for traditional teaching but acts as a cognitive and emotional scaffold that addresses the core neurodevelopmental deficits of ADHD, such as inattention, impulsivity, and executive dysfunction (Antshel et al., 2016; Tanner & Hsu, 2025). The findings suggest that AI provides a form of "scaffolding" that aligns with the Zone of Proximal Development, offering just enough support to allow neurodivergent students to succeed in tasks that would otherwise be cognitively overwhelming (Vygotsky & Cole, 1978). This transition from human-dependent support to AI-driven scaffolding addresses a long-standing gap in traditional developmental models, which often struggle to provide the high frequency of feedback required for neurodivergent learners (Antoniou et al., 2021; DuPaul et al., 2021).

A critical finding of this review is the efficacy of AI in fostering academic engagement through real-time physiological feedback. As evidenced by Faria et al. (2020), the use of EEG-based game frameworks allowed for a 96% accuracy rate in detecting concentration states. This level of precision is vital for students with ADHD, whose engagement levels are notoriously fluctuant. By identifying these states, AI systems can dynamically adjust the difficulty or pace of a task, preventing the "cognitive overload" that often leads to task abandonment in this population (Katsarou et al., 2025). This aligns with broader educational theories suggesting that personalized feedback loops are essential for maintaining the "flow" state in neurodivergent learners (Luckin et al., 2016). However, it is noteworthy that this physiological precision is currently concentrated in primary education samples. The lack of similar data for adolescents and university students represents a missed opportunity to understand how AI might mitigate the more internalized forms of inattention, such as mind-wandering, that become more prevalent in older age groups (Biederman et al., 2010). Without targeted interventions for higher education, students with ADHD remain at risk for lower academic trajectories compared to their neurotypical peers (DuPaul et al., 2021).

Furthermore, the role of Socially Assistive Robots (SARs) and robotic assistants emerged as a powerful tool for bridging the "executive function gap". Studies such as those by Berrezueta-Guzman et al. (2021) and Lalwani et al. (2025) suggest that robots provide a structured, non-judgmental environment that facilitates task prioritization and time management. The reduction in symptoms, specifically distractions and impulsive sound emissions, observed when students worked with robotic assistants (Berrezueta-Guzman et al., 2021) indicates that the physical presence of an AI agent can serve as an external regulator of behavior. This is particularly relevant for homework completion, where the absence of a teacher often leads to a breakdown in self-regulation (DuPaul et al., 2021). The efficacy of SARs across both primary (Berrezueta-Guzman et al., 2021) and higher education (Lalwani et al., 2025) illustrates a "lifespan" utility of robotic assistants, suggesting that while the complexity of tasks changes, the funda-mental need for an external organizational proxy remains a constant for the ADHD brain. This external regulation is crucial because social profiles among youth with ADHD often reveal significant impairments in social awareness and relationship skills that traditional classroom settings may exacerbate (Pintos Lobo et al., 2025).

Psychosocially, AI interventions appear to be uniquely positioned to enhance Social and Emotional Learning (SEL). The integration of AI with counseling, as seen in the use of digital journaling and “Mood Trackers”, allows for a more granular under-standing of a student’s emotional landscape (Su et al., 2024). For students with ADHD, who often struggle with emotional dysregulation and social communication (Pintos Lobo et al., 2025), AI tools like those described by Aslam et al. (2025) provide a safe space to recognize and label emotions. The long-term durability of these psychosocial benefits, evidenced by the seven-week follow-up in Saudi children (Aldakhil, 2024), suggests that AI-driven play and counseling can lead to sustainable improvements in the overall quality of life. However, while these digital tools promote emotional self-awareness, they must be carefully integrated to ensure they do not replace the development of authentic interpersonal social bonds, which are already compromised in this population (Healey & Rucklidge, 2006; Pintos Lobo et al., 2025). Critically, all identified psychosocial studies were conducted in primary school settings, highlighting a significant research void. Given that psychosocial challenges in ADHD often evolve into more severe interpersonal and vocational difficulties in adulthood, the absence of AI-based social-emotional tools for secondary and university students is a concerning gap that limits our understanding of AI’s preventative potential.

An overlooked but significant dimension revealed in this review is the synergy between AI and human educators. Mahmoudi-Dehaki and Nasr-Esfahani (2025) demonstrated that when AI handles the technical aspects of feedback (e.g., in hand-writing fluency), human tutors are liberated to provide higher-level emotional encouragement. This hybrid model minimizes student anxiety and transforms the learning experience from one of constant correction to one of collaborative growth. This suggests that the future of ADHD intervention lies not in the replacement of human professionals, but in the augmentation of clinical and pedagogical expertise through AI-driven data analytics (Mahmoudi-Dehaki & Nasr-Esfahani, 2025; Wang & Xue, 2024). By automating the “drudgery” of repetitive skill monitoring, AI allows the human element to focus on the “affective loop” of learning, which is essential for building the resilience and self-esteem that students with ADHD often lack (Ali et al., 2024; Antoniou et al., 2021; DuPaul et al., 2021). Nevertheless, the implementation of such hybrid models requires a standardized international definition of ADHD to assist in the development of coherent educational policies and equitable technology access (Tanner & Hsu, 2025).

Limitations of the Study

Despite the promising findings, several significant limitations persist in the current literature. First, the limited number of identified empirical studies (n = 9) restricts the scope of the synthesis and prevents the application of meta-analytical techniques to quantify overall effect sizes. Second, the interventions exhibit significant technological heterogeneity, ranging from socially assistive robots to EEG-based game frameworks and digital journaling platforms, which complicates the direct comparison of outcomes and limits the generalizability of findings across different technological platforms. This heterogeneity is further compounded by differences in intervention duration—from single sessions to longitudinal eight-week programs—and the use of diverse measurement tools (ranging from standardized tests like DASH-2 to subjective qualitative surveys), which may lead to varying levels of evidence regarding the efficacy of AI-based support. Third, there is a clear geographical and demographic imbalance; most studies are conducted in specific cultural contexts (e.g., Brazil, Saudi Arabia, Taiwan, Greece), which may affect the cross-cultural validity of the results. Second, methodological heterogeneity remains a challenge. While some studies employed rigorous Randomized Controlled Trials (Aldakhil, 2024; Xu et al., 2025), others relied on quasi-experimental designs with very small sample sizes, limiting the statistical power and generalizability of the findings (Lalwani et al., 2025; Mahmoudi-Dehaki & Nasr-Esfahani, 2025). Third, there is a lack of research focusing on comorbidity Fifth, a significant issue regarding variability in participant characteristics and sample heterogeneity was observed. A considerable number of the included studies (e.g., Faria et al., 2020; Katsarou et al., 2025; Su et al., 2024) involved participants with diverse neurodevelopmental disorders, such as Autism Spectrum Disorder, Intellectual Disability, and Dyslexia, in addition to ADHD, frequently failing to differentiate the results for the ADHD subgroup. This heterogeneity limits the internal validity of the review, as it remains unclear whether the observed AI benefits are specific to ADHD or influenced by the complex interaction of these comorbid conditions. Ultimately, the interaction of these methodological variances (size, duration, tools) means that current findings should be viewed as exploratory rather than definitive. Sixth, the absence of longitudinal data (except for Aldakhil, 2024) leaves questions regarding the long-term impact of AI on cognitive development and potential dependency on these tools. Additionally, the systematic review process itself has certain constraints, as it was restricted to English and Greek publications, potentially overlooking relevant studies in other languages, while the exclusion of "gray literature" may have introduced a reporting bias in favor of positive results. Finally, a profound developmental imbalance exists within the current body of research; seven out of the nine identified studies focus exclusively on primary education. This skew leaves the needs of adolescents in secondary education and adults in higher education largely unaddressed, particularly regarding psychosocial interventions.

Future Research Directions

Future research should prioritize the following: (a) Large-scale, multi-site RCTs to establish robust evidence base across different age groups, with a concerted effort to address the research void in the secondary education sector. (b) Longitudinal designs that track students over several years to assess the sustainability of academic and psychosocial gains and to ensure that AI assistance does not hinder the development of internal self-regulation skills. (c) Comparative studies that evaluate which AI modalities (e.g., robots vs. software-based apps) are most effective for specific ADHD subtypes (Inattentive vs. Hyperactive-Impulsive) across different developmental stages. (d) Ethical investigations into data privacy and the potential for AI to replace human social interaction in therapeutic settings. (e) Developing and testing AI-driven psychosocial tools for university students to support the transition to independent adult living and complex social navigation.

Practical Applications and Implications

The findings of this systematic review offer several actionable pathways for clinicians, educators, and parents. First, AI-based tools should be formally integrated into Individualized Education Programs (IEPs) as "dynamic scaffolds" that provide real-time adjustments for concentration and task management (Katsarou et al., 2025). For instance, EEG-based games can be utilized as preparatory "warm-up" activities to calibrate a student's focus before high-stakes academic tasks (Faria et al., 2020). Second, Socially Assistive Robots (SARs) can be deployed in home settings to support homework completion, acting as non-judgmental organizational proxies that reduce family conflict and student anxiety (Berrezueta-Guzman et al., 2021; Lalwani et al., 2025). Third, school counselors can utilize AI-driven mood trackers and digital journaling to identify "at-risk" emotional states in real-time, allowing for more targeted and timely psychosocial interventions (Su et al., 2024). Finally, the adoption of these technologies must be accompanied by clear ethical guidelines and legislative frameworks concerning data privacy, particularly regarding the sensitive biometric and emotional data collected from neurodivergent minors, ensuring that these overlooked developmental areas in policy are addressed (Singh, 2025; Tanner & Hsu, 2025).

Contribution

This systematic literature review makes a valuable contribution to the fields of special education and educational psychology by providing a structured synthesis of the emerging AI-ADHD intervention landscape. It moves beyond general technology reviews to specifically categorize AI benefits into academic and psychosocial domains across different educational levels. By identifying the potential role of real-time adaptation and non-judgmental feedback, this work provides the scientific community with an exploratory framework for understanding how AI addresses specific neurodevelopmental deficits. Most notably, this review uncovers the notable imbalance in research distribution, serving as an important observation for researchers to expand AI-based psychosocial studies into secondary and higher education. By exposing these overlooked developmental areas, the present work provides a preliminary conceptual guide for future scholarly inquiry and helps bridge the gap between emerging technology and pedagogical theory.

Conclusions

In conclusion, AI-based interventions may act as a dynamic cognitive and emotional scaffold for students with ADHD, showing potential to support academic engagement and psychosocial resilience through real-time personalization. Although current evidence remains concentrated in primary education, the synergy between AI and human expertise offers a preliminary data-informed pathway toward more inclusive educational practices. Ultimately, AI serves not as a replacement but as a valuable augmentation of human intervention, providing adaptive support that can assist neurodivergent learners in their developmental trajectories.

Funding

No funding was received from any individual or institution for this research.

Ethics and Conflict of Interest

Registration and Protocol; this systematic review was not registered in a public database (e.g., PROSPERO), and a formal review protocol was not prepared prior to the commencement of the study. The review was conducted in strict accordance with the PRISMA 2020 statement guidelines to ensure reporting transparency and methodological rigor. The research complied with ethical principles and there are no conflicts of interest among the authors.

Author Contribution

First and second author contributed to the study conception, the data collection, the formal analyses as well as the writing of the first draft and the final version of the manuscript. Third, fourth and fifth author commented on the draft version of the manuscript and contributed to the writing of its final version. All authors read and approved of the final manuscript.

Data Availability

No analytic code was used, as the synthesis was strictly qualitative. The data that support the findings of this study are available on request from the corresponding author.

Corresponding Author

Correspondence to Thanos TOULOUPIS, t.touloupis@aegean.gr

REFERENCES

Abrahão, A. L. B., & Elias, L. C. dos S. (2021). Students with ADHD: Social skills, behavioral problems, academic performance, and family resources. *Psico-USF*, *26*, 545-557. https://doi.org/10.1590/1413-82712021260312

Aldakhil, A. F. (2024). Investigating the impact of an AI-based play activities intervention on the quality of life of school-aged children with ADHD. *Research in Developmental Disabilities*, *154*, 104858. https://doi.org/10.1016/j.ridd.2024.104858

Ali, A., Collier, K., & Mayomi, T. (2024). Navigating ADHD in higher education: Evaluating psychosocial interventions for student self-esteem, well-being, and quality of life. *BJPsych Open*, *10*(S1), S17-S18. https://doi.org/10.1192/bjo.2024.106

Alshammari, M. E. (2025). Promoting Emotional and Psychological Well-being in Students through a Self-Help ChatGPT Intervention: Artificial Intelligence Powered Support. *International Journal of Instruction*, *18*(3), 511-530. https://e-iji.net/ats/index.php/pub/article/view/788

Antoniou, E., Rigas, N., Orovou, E., & Papatrechas, A. (2021). ADHD and the importance of comorbid disorders in the psychosocial development of children and adolescents. *Journal of Biosciences and Medicines*, *09*(04), 1. https://doi.org/10.4236/jbm.2021.94001

Antshel, K. M., Zhang-James, Y., Wagner, K. E., Ledesma, A., & Faraone, S. V. (2016). An update on the comorbidity of ADHD and ASD: A focus on clinical management. *Expert Review of Neurotherapeutics*, *16*(3), 279-293. https://doi.org/10.1586/14737175.2016.1146591

Aslam, S., Tahir, D. S., Ahsan, H., & Zahra, M. (2025). The role of AI in developing emotional regulation skills in children with learning difficulties. *The Critical Review of Social Sciences Studies*, *3*(3), 1375-1390. https://doi.org/10.59075/5hpwzc58

Berrezueta-Guzman, J., Pau, I., Martín-Ruiz, M.-L., & Máximo-Bocanegra, N. (2021). Assessment of a robotic assistant for supporting homework activities of children With ADHD. *IEEE Access*, *9*, 93450-93465. https://doi.org/10.1109/ACCESS.2021.3093233

Biederman, J., Petty, C. R., Evans, M., Small, J., & Faraone, S. V. (2010). How persistent is ADHD? A controlled 10-year follow-up study of boys with ADHD. *Psychiatry research*, *177*(3), 299-304. https://doi.org/10.1016/j.psychres.2009.12.010

Chacko, A., Merrill, B. M., Kofler, M. J., & Fabiano, G. A. (2024). Improving the efficacy and effectiveness of evidence-based psychosocial interventions for attention-deficit/hyperactivity disorder (ADHD) in children and adolescents. *TRANSLATIONAL PSYCHIATRY*, *14*(1), 244. https://doi.org/10.1038/s41398-024-02890-3

Chronis, A. M., Jones, H. A., & Raggi, V. L. (2006). Evidence-based psychosocial treatments for children and adolescents with attention-deficit/hyperactivity disorder. *Clinical Psychology Review, Attention Deficit Hyperactivity Disorder From A Neurosciences And Behavioral Approach*, *26*(4), 486-502. https://doi.org/10.1016/j.cpr.2006.01.002

D'Agati, E., Curatolo, P., & Mazzone, L. (2019). Comorbidity between ADHD and anxiety disorders across the lifespan. *International Journal of Psychiatry in Clinical Practice*, *23*(4), 238-244. https://doi.org/10.1080/13651501.2019.1628277

Doulou, A., Pergantis, P., Drigas, A., & Skianis, C. (2025). Managing ADHD symptoms in children through the use of various technology-driven serious games: A systematic review. *Multimodal Technologies and Interaction*, *9*(1), 8. https://doi.org/10.3390/mti9010008

DuPaul, G. J., Evans, S. W., Owens, J. S., Cleminshaw, C. L., Kipperman, K., Fu, Q., & Benson, K. (2021). School-based intervention for adolescents with attention-deficit/hyperactivity disorder: Effects on academic functioning. *Journal of School Psychology*, *87*, 48–63. https://doi.org/10.1016/j.jsp.2021.07.001

DuPaul, G. J., Gormley, M. J., Anastopoulos, A. D., Weyandt, L. L., Labban, J., Sass, A. J., Busch, C. Z., Franklin, M. K., & Postler, K. B. (2021). Academic trajectories of college students with and without ADHD: Predictors of four-year outcomes. *Journal of Clinical Child & Adolescent Psychology*, *50*(6), 828-843. https://doi.org/10.1080/15374416.2020.1867990

DuPaul, G. J., Kern, L., Gormley, M. J., & Volpe, R. J. (2011). Early intervention for young children with ADHD: Academic outcomes for responders to behavioral treatment. *School Mental Health*, *3*(3), 117-126. https://doi.org/10.1007/s12310-011-9053-x

DuPaul, G. J., Jitendra, A. K., Volpe, R. J., Tresco, K. E., Lutz, J. G., Junod, R. E. V., Cleary, K. S., Flammer, L. M., & Mannella, M. C. (2006). Consultation-based academic interventions for children with ADHD: Effects on reading and mathematics achievement. *Journal of Abnormal Child Psychology*, *34*(5), 633–646. https://doi.org/10.1007/s10802-006-9046-7

Eiraldi, R. B., Mautone, J. A., & Power, T. J. (2012). Strategies for implementing evidence-based psychosocial interventions for children with attention-deficit/hyperactivity disorder. *Child and Adolescent Psychiatric Clinics*, *21*(1), 145-159. https://doi.org/10.1016/j.chc.2011.08.012

Evans, S. W., Langberg, J. M., Egan, T., & Molitor, S. J. (2014). Middle and high school based ınterventions for adolescents with ADHD. *Child and Adolescent Psychiatric Clinics of North America*, *23*(4), 699–715. https://doi.org/10.1016/j.chc.2014.05.004

Ek, U., Fernell, E., Westerlund, J., Holmberg, K., Olsson, P.-O., & Gillberg, C. (2007). Cognitive strengths and deficits in schoolchildren with ADHD. *Acta Paediatrica*, *96*(5), 756-761. https://doi.org/10.1111/j.1651-2227.2007.00297.x

Evans, S. W., Van der Oord, S., & Rogers, E. E. (2020). Academic functioning and interventions for adolescents with ADHD. In *ADHD in adolescents: Development, assessment, and treatment* (pp. 148-169). The Guilford Press.

Faria, D. R., Bird, J. J., Daquana, C., Kobylarz, J., & Ayrosa, P. P. S. (2020). Towards ai-based interactive game intervention to monitor concentration levels in children with attention deficit. *International Journal of Information and Education Technology*, *10*(9), 641-648. https://doi.org/10.18178/ijiet.2020.10.9.1437

Giannakopoulos, G. (2025). Adolescents with ADHD in the school environment: A comprehensive review of academic, social, and emotional challenges and interventions. *Journal of Clinical Images and Medical Case Reports*, *6*(3). 1-14. https://doi.org/10.52768/2766-7820/3528

Gual-Montolio, P., Jaén, I., Martínez-Borba, V., Castilla, D., & Suso-Ribera, C. (2022). Using artificial intelligence to enhance ongoing psychological interventions for emotional problems in real- or close to real-time: A systematic review. *International Journal of Environmental Research and Public Health*, *19*(13), 7737. https://doi.org/10.3390/ijerph19137737

Hand, E. D., & Lonigan, C. J. (2025). Examining the dimensions of inhibition and its relations to early academic skills and externalizing behaviors in a preschool-age sample. *Early Childhood Research Quarterly*, *73*, 39-48. https://doi.org/10.1016/j.ecresq.2025.05.003

Hasan, M. R., & Khan, B. (2023). An AI-based intervention for improving undergraduate STEM learning. *PLOS ONE*, *18*(7), e0288844. https://doi.org/10.1371/journal.pone.0288844

Healey, D., & Rucklidge, J. J. (2006). An investigation into the psychosocial functioning of creative children: The impact of ADHD symptomatology. *The Journal of Creative Behavior*, *40*(4), 243-264. https://doi.org/10.1002/j.2162-6057.2006.tb01276.x

Katsarou, D. V., Mantsos, E., Papadopoulou, S., Sofologi, M., Efthymiou, E., Vasileiou, I., Megari, K., Theodoratou, M., & Kougioumtzis, G. A. (2025). Exploring AI technology in Grammar performance testing for children with learning disabilities. *Education Sciences*, *15*(3), 351. https://doi.org/10.3390/educsci15030351

LaForett, D. R., Murray, D. W., & Kollins, S. H. (2008). Psychosocial treatments for preschool-aged children with Attention-Deficit Hyperactivity Disorder. *Developmental Disabilities Research Reviews*, *14*(4), 300-310. https://doi.org/10.1002/ddrr.36

Lalwani, H., Saleh, M., & Salam, H. (2025). A study companion for productivity: Exploring the role of a social robot for college students with ADHD. *2025 20th ACM/IEEE International Conference on Human-Robot Interaction (HRI)*, 1438-1442. https://doi.org/10.1109/HRI61500.2025.10974238

Liu, H., Peng, H., Song, X., Xu, C., & Zhang, M. (2022). Using AI chatbots to provide self-help depression interventions for university students: A randomized trial of effectiveness. *Internet Interventions*, *27*, 100495. https://doi.org/10.1016/j.invent.2022.100495

Liu, J., Jiang, Z., Li, F., Zheng, Y., Cui, Y., Xu, H., & Li, Y. (2025). Prevalence and comorbidity of attention deficit hyperactivity disorder in Chinese school-attending students aged 6–16: A national survey. *Annals of General Psychiatry*, *24*(1), 23. https://doi.org/10.1186/s12991-025-00558-w

Luckin, R., Holmes, W., Griffiths, M., & Forcier, L. B. (2016). *Intelligence unleashed: An argument for AI in education*. Pearson.

Mahmoudi-Dehaki, M., & Nasr-Esfahani, N. (2025). Supporting 2e bilingual students with motor dysgraphia and ADHD in writing: Efficacy and acceptability of human-AI hybrid tutoring. *Journal of Advanced Academics*, *36*(4), 640-670. https://doi.org/10.1177/1932202X251348549

Martin, A. F., Rubin, G. J., Rogers, M. B., Wessely, S., Greenberg, N., Hall, C. E., Pitt, A., Logan, P. E., Lucas, R., & Brooks, S. K. (2025). The changing prevalence of ADHD? A systematic review. *Journal of Affective Disorders*, *388*, 119427. https://doi.org/10.1016/j.jad.2025.119427

Masi, L. (2015). ADHD and comorbid disorders in childhood psychiatric problems, medical problems, learning disorders and developmental coordination. *Clinical Psychiatry*, 1(1), 1-9. https://doi.org/10.21767/2471-9854.100005

Pfiffner, L., Barkley, R., & Dupaul, G. (2006). *Attention-deficit hyperactivity disorder. 1: A handbook for diagnosis and treatment* (3rd ed). Guilford Press.

Pintos Lobo, R., Peraza, J. A., Salo, T., Meca, A., Smith, D. D., Feeney, K. E., Schmarder, K. M., Sutherland, M. T., Gonzalez, R., Musser, E. D., & Laird, A. R. (2025). Social profiles among youth with attention-deficit/hyperactivity disorder (ADHD): Evidence from the ABCD study. *Developmental Cognitive Neuroscience*, *75*, 101591. https://doi.org/10.1016/j.dcn.2025.101591

Santos, W. M. dos, & Albuquerque, A. R. de. (2019). School interventions for ADHD: A literature review (2000-2018). *Psicologia: Teoria e Prática*, *21*(3), 205-227. https://doi.org/10.5935/1980-6906/psicologia.v21n3p205-227

Singh, A. (2025). Artificial intelligence-based interventions for the management of attention-deficit/hyperactivity disorder (ADHD): A systematic review of current evidence. *Journal of Information Systems Engineering and Management*, *10*(55s), 506-518.

Su, S.-W., Hung, C.-H., Chen, L.-X., & Yuan, S.-M. (2024). Development of an AI-based system to enhance school counseling models for asian elementary students with emotional disorders. *IEEE Access*, *12*, 159121-159136. https://doi.org/10.1109/ACCESS.2024.3483456

Tanner, S., & Hsu, Y.-C. (2025). Standardized international definitions of ADHD to assist with the development of educational policies and technology. *TechTrends*, *69*(2), 254-257. https://doi.org/10.1007/s11528-025-01047-3

Tourjman, V., Louis-Nascan, G., Ahmed, G., DuBow, A., Côté, H., Daly, N., Daoud, G., Espinet, S., Flood, J., Gagnier-Marandola, E., Gignac, M., Graziosi, G., Mansuri, Z., & Sadek, J. (2022). Psychosocial interventions for attention deficit/hyperactivity disorder: A systematic review and meta-analysis by the CADDRA guidelines work group. *Brain Sciences*, *12*(8), 1023. https://doi.org/10.3390/brainsci12081023

Tresco, K. E., Lefler, E. K., & Power, T. J. (2010). Psychosocial interventions to improve the school performance of students with attention-deficit/hyperactivity disorder. *Mind & Brain: The Journal of Psychiatry*, *1*(2), 69-74.

Vygotsky, L. S., & Cole, M. (1978). *Mind in society: Development of higher psychological processes*. Harvard university press.

Wang, E., Chang, W.-L., Shen, J., Bian, Q., Huang, P., Lai, X., Chang, T.-Y., Shaoying, H., Ziyue, Z., Wang, Z., Xue, H., & Kues, S. (2022). Effect of artificial intelligence on one-to-one emotional regulation and psychological intervention system of middle school students. *International Journal of Neuropsychopharmacology*, *25*(Suppl 1), A62–A63. https://doi.org/10.1093/ijnp/pyac032.086

Wang, Y., & Xue, L. (2024). Using AI-driven chatbots to foster Chinese EFL students' academic engagement: An intervention study. *Computers in Human Behavior*, *159*, 108353. https://doi.org/10.1016/j.chb.2024.108353

Wolf, L. E. (2001). College students with ADHD and other hidden disabilities. *Annals of the New York Academy of Sciences*, *931*(1), 385-395. https://doi.org/10.1111/j.1749-6632.2001.tb05792.x

Wong, K. P., Qin, J., Xie, Y. J., & Zhang, B. (2023). Effectiveness of technology-based ınterventions for school-age children with attention-deficit/hyperactivity disorder: Systematic review and meta-analysis of randomized controlled trials. *JMIR Mental Health*, *10*(1), e51459. https://doi.org/10.2196/51459

Wu, R., & Yu, Z. (2024). Do AI chatbots improve students learning outcomes? Evidence from a meta-analysis. *British Journal of Educational Technology*, *55*(1), 10-33. https://doi.org/10.1111/bjet.13334

Xu, J., Lin, R., Zhang, A., Chen, Q., Li, D., Chen, J., Song, M., Chen, S., Yang, B., Li, L., Xu, H., Peng, J., Tang, Y., Yang, W., Luo, X., Zhou, X., Wang, J., & Huang, G. (2025). AI-assisted drawing therapy for children with ADHD: A randomised controlled trial. *Complementary Therapies in Medicine*, *94*, 103262. https://doi.org/10.1016/j.ctim.2025.103262

Zoëga, H., Valdimarsdóttir, U. A., & Hernández-Díaz, S. (2012). Age, academic performance, and stimulant prescribing for ADHD: A nationwide cohort study. *Pediatrics*, *130*(6), 1012-1018. https://doi.org/10.1542/peds.2012-0689

About the Authors:

Ilias Tsolakidis
Ilias Tsolakidis is a PhD candidate at the Department of Early Childhood Education (Aristotle University of Thessaloniki). He holds a BA in Primary Education and an MSc in Special Education, with research focusing on ADHD. He is also pursuing a degree in Psychology at Aristotle University of Thessaloniki. His research interests include special education, applied psychology in educational settings, and the development of evidence-based interventions for individuals with special educational needs.

Thanos Touloupis
Thanos Touloupis is an Assistant Professor in "Educational Psychology" at the Department of Primary Education of the University of the Aegean (Greece). His research interests concern problematic online behavior of school and university students without and with special educational needs, and on socio-emotional and academic factors associated with this behavior. Additionally, he is interested in the interdisciplinary implementation of related prevention programs in the school community.

Anastasia Alevriadou
Anastasia Alevriadou is a Professor of Psychology at Aristotle University of Thessaloniki. She holds a PhD in Psychology and has extensive expertise in Special Education and Cognitive Psychology. Her academic work includes over 150 publications in national and international journals, seven books, and participation in numerous international research projects. She was a Fulbright Scholar at Ohio State University's Nisonger Center in 2019 and has served as a visiting professor at several European universities.

Stergiani Giaouri

Stergiani Giaouri is a psychologist and Professor at the Department of Early Childhood Education at the University of Western Macedonia (Greece). Her research focuses on special and inclusive education, neurodevelopmental disorders, psychoeducational assessment, and the psychosocial development and counseling of children and adolescents. She has extensive experience in research, teaching, and professional training, has published widely in peer-reviewed journals, and participates in national and European research projects.

Dimitrios Chasapis

Dimitrios Chasapis is secondary school teacher of Greek Language and Literature and a PhD candidate in the field of "Educational/School Psychology" at the Department of Primary Education at the University of the Aegean (Greece). He has pursued postgraduate studies in Greek literature, in Special Education as well as in Information and Communication Technologies use in Humanities and Social Sciences. His research interests concern students' problematic use of new technologies, as well as psycho-educational contributors and outcomes.