ijonses International Journal on Studies and Education Science

www.ijonses.net

Artificial Intelligence for Supporting College Students with Attention-Deficit/Hyperactivity Disorder: Cognitive, Emotional, and Ethical Perspectives

Promethi Das Deep [1], Nitu Ghosh [2], Adam P. Natoli [3]

[1] Department of Educational Leadership, College of Education, Sam Houston State University, USA, 0009-0006-8974-0997
[2] Department of English, College of Humanities and Social Sciences, Sam Houston State University, USA, 0009-0000-0577-6252
[3] Department of Psychology, Montclair State University, USA, 0000-0002-2324-9242
* Corresponding author: Promethi Das Deep (pxd033@shsu.edu)

Article Info

Article History

Received:
10 July 2025

Revised:
3 October 2025

Accepted:
22 October 2025

Published:
1 January 2026

Keywords

Artificial intelligence
Attention-Deficit/Hyperactivity Disorder (ADHD)
Higher education
Cognitive assistance
Emotional regulation
AI-driven interventions
Disclosure and data privacy

Abstract

College students with Attention-Deficit/Hyperactivity Disorder (ADHD) often face academic underperformance, executive functioning challenges, and emotional regulation difficulties that hinder persistence and success in higher education. Advances in artificial intelligence (AI) offer promising opportunities to provide adaptive support through innovative tools for personalized interventions and cognitive assistance. A literature search conducted across PubMed, ERIC (Education Resources Information Center), SpringerLink, ScienceDirect, PsycINFO, and IEEE Xplore identified peer-reviewed studies relevant to ADHD in higher education and the application of AI-based tools. Findings indicate that AI-based systems, including explainable AI models and biometric frameworks, can enhance risk estimation and pattern recognition related to ADHD symptomatology, while also raising concerns about responsible data governance. Importantly, these tools do not perform clinical diagnoses; rather, they support licensed professionals by aggregating and organizing data that may inform clinical decision-making. Generative and assistive technologies, such as ChatGPT, socially assistive robots, and mobile applications, have been found to enhance academic writing, self-regulation, and executive functioning; however, their adoption is limited by gaps in digital literacy and inconsistent institutional support. Ethical considerations, including privacy, algorithmic fairness, trust, and students' willingness to disclose ADHD status, critically influence acceptance and effectiveness. The review highlights the importance of inclusive design, participatory development, and AI literacy training. When ethically implemented within institutional frameworks, AI-driven interventions can complement traditional services, fostering more accessible, supportive, and responsive learning environments for neurodivergent college students.

Citation: Deep, P. D., Ghosh, N., & Natoli, A. P. (2026). Artificial intelligence for supporting college students with Attention-Deficit/Hyperactivity Disorder: Cognitive, emotional, and ethical perspectives. I*nternational Journal on Social and Education Sciences (IJonSES), 8*(1), 1-17. https://doi.org/10.46328/ijonses.5915

ISSN: 2688-7061 / © International Journal on Social and Education Sciences (IJonSES).

Introduction

Attention-Deficit/Hyperactivity Disorder (ADHD) is a persistent neurodevelopmental disorder that often extends into adulthood (Sedgwick-Müller et al., 2022). Recent national estimates indicate that approximately 15.5 million U.S. adults (6.0%) currently live with ADHD, with more than half receiving their diagnosis during adulthood (Staley et al., 2024). In higher education, it is associated with academic and psychological challenges, while emerging artificial intelligence (AI) tools offer potential for improved detection and tailored support (Jafarian & Kramer, 2025; Kim et al., 2021).

The Evolution of ADHD: From Historical Origins to Higher Education Policy

In the early to mid-20th century, students who exhibited behaviors now linked to ADHD were frequently described as hyperactive, distractible, unruly, quarrelsome, and prone to leaving class without permission (Sedgwick-Müller et al., 2022). These students were often classified as "feeble-minded," a term that contributed to the medicalization of poor academic performance and limited the educational support available to them (Sedgwick-Müller et al., 2022).

Before the 1970s, ADHD was largely regarded as a childhood condition that would resolve by puberty (Weyandt & DuPaul, 2006). Longitudinal research, however, has shown that most individuals diagnosed in childhood continue to experience symptoms into adulthood, although the nature of these symptoms often changes, confirming ADHD as a valid adult disorder. In college populations, estimates indicate that 2% to 4% of students display ADHD symptoms (Weyandt & DuPaul, 2006).Under the Americans with Disabilities Act of 1990, college students with ADHD are eligible for educational support services, and the number of students requesting such accommodations has been steadily increasing. National data show that the proportion of college students with disabilities grew from 2.2% to 8.8% between 1978 and 1991 (Weyandt & DuPaul, 2006).

Stubbe (2000) reported that 30% to 80% of hyperactive children continue to exhibit ADHD symptoms into adolescence, with up to 65% retaining symptoms into adulthood (Stubbe, 2000). These findings challenged the earlier belief that ADHD was outgrown and contributed to its reconceptualization as a chronic neurodevelopmental disorder rather than solely a childhood behavioral condition (Stubbe, 2000). By the time of the DSM-IV (Stubbe, 2000), classification criteria had evolved to recognize ADHD across the lifespan, with an increasing emphasis on deficits in attention, inhibitory control, and self-regulation rather than limitations in learning capacity (Stubbe, 2000). Building on this perspective, Baird et al. (2000) emphasized that ADHD involves impairments in the coordination of interconnected neural and cognitive systems, particularly those related to communication, which further undermine self-regulation, organization, and time management, contributing to ongoing functional difficulties into adulthood (Baird et al., 2000).

Cortese and Coghill (2018) described ADHD as a multifactorial condition influenced by genetics, neurobiology, and environmental factors, with heritability estimates ranging from 60% to 90%. These perspectives highlight the functional challenges that persist into adulthood, including difficulties with time management, organization, and

emotional regulation, skills that are particularly crucial in higher education contexts (Cortese & Coghill, 2018). Despite advancements in clinical understanding, institutional support has lagged. In UK higher education, ADHD is frequently subsumed under the category of a Specific Learning Difference (SpLD), a classification that fails to reflect its status as a neurodevelopmental and mental health condition. This misclassification contributes to stigma, underdiagnosis, and inconsistent accommodations for affected students (Sedgwick-Müller et al., 2022). Wolf et al. (2009) highlighted that these barriers persist even when services are available, as some students avoid disclosure due to a lack of awareness about their condition or fear of being misunderstood, leading to underutilization of support (Wolf, 2001). Notably, students with ADHD were significantly more likely to be on academic probation (38.3% vs. 7%) and had lower GPAs (2.5 vs. 3.2) than their peers (Wolf, 2001).

For instance, there was a 41% increase in ADHD disclosures in Irish universities between 2020 and 2023 (Doyle et al., 2024). Their findings reveal that, while diagnoses are rising, institutions remain largely unprepared to support neurodivergent students effectively (Doyle et al., 2024). Neurodivergent individuals are those whose neurological functioning diverges from the dominant neurotype as a result of lifelong differences in brain development. This includes individuals with neurodevelopmental conditions such as autism, attention-deficit/hyperactivity disorder (ADHD), learning disabilities, speech and language disorders, and certain genetic syndromes (Black et al., 2024). Rigid academic structures, a lack of sensory-friendly environments, and limited faculty training continue to pose challenges (Doyle et al., 2024). To address these gaps, the authors propose the development of “ADHD-friendly universities” that emphasize universal design for learning (UDL), proactive instructional support, and inclusive policy frameworks (Doyle et al., 2024).

Cognitive and Emotional Challenges of College Students with ADHD

College students with ADHD experience persistent cognitive challenges that interfere with meeting the demands of higher education (DuPaul et al., 2009). Executive functioning difficulties, including problems with sustained attention, working memory, task initiation, and goal-oriented persistence, are widespread and have a direct negative impact on academic performance (DuPaul et al., 2009). These impairments often make it difficult for students to plan, manage time effectively, and maintain organization across multiple assignments and responsibilities, which can result in missed deadlines and inconsistent academic outcomes (Weyandt & DuPaul, 2006).Even though students with ADHD typically have intellectual abilities that are similar to or above those of their peers, they often experience a higher cognitive load when trying to cope with unstructured learning environments, resulting in mental fatigue and diminished confidence in their academic abilities (Pagespetit et al., 2025).

In addition to cognitive challenges, college students with ADHD often face significant difficulties in emotional regulation (DuPaul et al., 2009). Research indicates that they experience elevated levels of anxiety, depression, and chronic stress, particularly during periods of academic pressure. These psychological symptoms are frequently linked to inattentive-type symptoms, and students with ADHD often report greater emotional distress than their non-ADHD peers (DuPaul et al., 2009). The emotional burden of ADHD in university students is often intensified by internalized stigma and the pressure to appear neurotypical. Many students adopt compensatory strategies to

conceal their symptoms, which can lead to emotional exhaustion, anxiety, and disengagement from academic life (Pagespetit et al., 2025).

College students with ADHD often struggle with academic tasks, including organizing, planning, and completing assignments on time. These difficulties are rooted in core ADHD symptoms, like inattention and executive dysfunction. However, because these challenges are not always outwardly visible, others may not recognize them as part of a legitimate neurodevelopmental disorder, which can potentially lead to misunderstanding or a lack of support (Weyandt & DuPaul, 2006). Students with ADHD and other hidden disabilities are often subject to misconceptions and stereotypes regarding the legitimacy of their condition and their need for support (DuPaul et al., 2009). This lack of understanding may contribute to social isolation and deter students from seeking accommodation, thus limiting their access to essential services (Wolf, 2001).

Research Gap and Research Questions

According to Fichten et al. (2022a), drawing on Microsoft's definition, artificial intelligence (AI) encompasses technologies that can perceive, learn, reason, assist in decision-making, and interpret data from text, voice, and images. In higher education, generative AI tools such as ChatGPT have emerged as powerful supports for personalized learning, academic writing, and interactive interventions (Fichten et al., 2022a). Recent evidence suggests that AI-assisted audio-learning modules can enhance motivation, engagement, and academic achievement, with particularly strong benefits for students experiencing higher symptom severity of ADHD (Jafarian & Kramer, 2025). Similarly, AI-driven conversational tools and mobile apps offer structured assistance for students with ADHD, though adoption is inconsistent and empirical evidence remains limited (Fichten et al., 2022a).

Although machine learning approaches have demonstrated strong **predictive accuracy** for ADHD, most studies are based on samples drawn from a single university, limiting their generalizability across diverse college populations(Kim et al., 2021; Wilder & Stratchan, 2025). Students also express uncertainty about disclosing ADHD status to AI-based educational systems, balancing potential benefits of personalization with concerns over privacy, bias, and stigma (Pierrès et al., 2025; Zhao et al., 2025). Moreover, while initial findings suggest AI-driven interventions can improve academic and emotional outcomes, systematic and large-scale research is still lacking .(Fichten et al., 2022b; Wilder & Stratchan, 2025)

In response to these gaps, the present study is guided by the following research questions. First, it explores (1) how artificial intelligence tools, such as ChatGPT, can support the diagnosis and treatment of ADHD in college students while maintaining ethical standards related to privacy and data use. Second, it examines (2) Student perceptions regarding the disclosure of ADHD status to AI-based educational systems and how these perceptions influence their acceptance and trust in such technologies, (3) the effectiveness of AI-driven cognitive and behavioral interventions in improving academic performance and emotional well-being among students with ADHD.

Method

Purpose and Design

This review employed a narrative qualitative synthesis to examine the emerging role of artificial intelligence (AI) in supporting college students with Attention-Deficit/Hyperactivity Disorder (ADHD). Specifically, it explored how AI technologies contribute to diagnosis and treatment, how students perceive disclosing their ADHD status to AI-based systems, and how cognitive and behavioral interventions impact their academic and emotional outcomes. This design was selected due to the interdisciplinary and evolving nature of the field, where qualitative studies, conceptual models, and pilot programs predominate.

Search Strategy

This study employed a qualitative literature review to synthesize recent advancements in the use of artificial intelligence (AI) to support college students with Attention-Deficit/Hyperactivity Disorder (ADHD). A comprehensive literature search was conducted between January and July 2025 using academic databases, including PubMed, ERIC (Education Resources Information Center), SpringerLink, ScienceDirect, PsycINFO, and IEEE Xplore. Search strings were customized for each database using Boolean operators (AND, OR) and a range of keyword combinations such as: “artificial intelligence” AND “ADHD” AND “college students”; “machine learning” AND “neurodivergent” AND “higher education”; “AI tools” AND “attention deficit” AND “student engagement”; “AI and emotional regulation” AND “ADHD” AND “postsecondary education”; “adaptive learning systems” AND “cognitive intervention” AND “ADHD”; “virtual assistant” OR “robotic tutor” AND “ADHD” AND “university students”; and “ChatGPT” OR “generative AI” AND “executive functioning” AND “learning outcomes.”

Each search was limited to studies published between 2000 and 2025 in order to capture the historical development of research on attention-deficit/hyperactivity disorder (ADHD) in higher education, as well as the progression of artificial intelligence applications over the past twenty-five years. This timeframe enabled the inclusion of both foundational theoretical perspectives and recent empirical contributions related to the use of artificial intelligence in the diagnosis, support, and cognitive development of college students with ADHD. To ensure academic rigor and quality, database filters were applied to include only peer-reviewed journal articles, high-quality conference proceedings, white papers, and institutional research reports originating from recognized academic or research institutions. Literature that did not meet these standards, including unpublished manuscripts, blog entries, non-reviewed opinion articles, and other forms of grey literature, was excluded. Additionally, studies lacking methodological clarity, such as those with insufficient information on the research population, the artificial intelligence tools utilized, or the outcome measures, were also excluded to preserve the validity and interpretability of the findings.

To increase the breadth and sensitivity of the search, a backward citation tracking technique was implemented. This involved manually screening the reference lists of all initially selected full-text articles to identify additional studies relevant to the review that had not appeared in the original search results. Articles identified through this

process were retrieved, screened, and assessed for inclusion using the same criteria as those applied during the primary search. The screening process followed a staged approach. Initially, titles and abstracts were reviewed to determine preliminary relevance to the review's research questions. Articles deemed potentially eligible were retrieved in full and assessed against the established inclusion and exclusion criteria. When eligibility was unclear or contested, the final decision was reached through collaborative discussion among the reviewers.

Inclusion and Exclusion Criteria

To maintain the focus and integrity of the review, a clearly defined set of inclusion and exclusion criteria was systematically applied throughout the screening process (see Figure 1). To ensure the methodological rigor and thematic coherence of this review, a structured set of inclusion and exclusion criteria was applied during the selection process. An initial pool of over 90 sources was identified through a combination of database searches and backward citation tracking. Titles and abstracts were screened for relevance based on several inclusion standards.

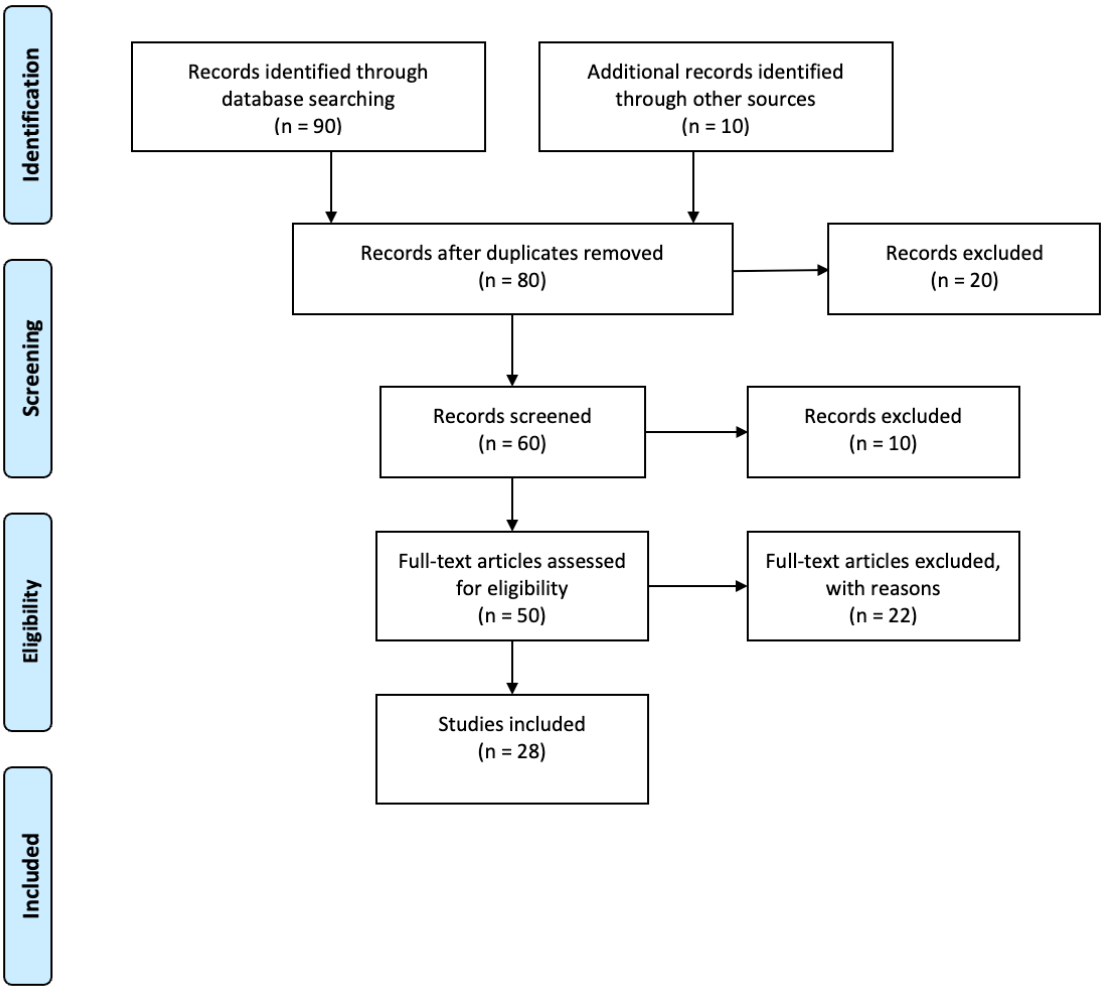

Figure 1. PRISMA Flow Diagram

Studies were considered eligible if they met four primary criteria. (1) They examined artificial intelligence tools

or systems that were implemented within educational contexts, with a specific focus on higher education settings. (2) They focused on students formally diagnosed with attention-deficit/hyperactivity disorder (ADHD) or addressed ADHD-related challenges such as executive functioning deficits or emotional dysregulation in postsecondary learners. (3) They offered either empirical data or a meaningful conceptual framework relevant to at least one of the guiding research questions, whether related to diagnosis, disclosure, or intervention outcomes. (4) The studies demonstrated methodological or theoretical clarity, ensuring that the findings could support thematic synthesis.

Several exclusion criteria were also applied to remove studies that lacked relevance, specificity, or analytical depth. (1) Research limited to K–12 populations or clinical samples outside of educational contexts was excluded, as the review concentrated on postsecondary learners. (2) Articles that referenced artificial intelligence only briefly or tangentially, without offering substantive engagement, were not considered. (3) Studies that did not isolate ADHD outcomes or failed to distinguish ADHD-specific findings from broader neurodevelopmental data were also removed. (4) Additionally, sources unavailable in full-text or published in languages other than English were excluded due to limitations in access and interpretability.

The initial search yielded approximately 90 records from databases and 10 additional records from other sources. After removing duplicates and screening titles and abstracts for relevance, 80 full-text articles were assessed against predefined inclusion and exclusion criteria. Ultimately, 28 peer-reviewed studies were included for qualitative synthesis, focusing on the application of artificial intelligence (AI) to support college students with Attention-Deficit/Hyperactivity Disorder (ADHD). The PRISMA flow diagram (Tricco et al., 2018) was used to illustrate the screening and selection process.

Rationale for Narrative Review

Given the heterogeneity of research designs, technologies, and outcome measures in the selected literature, a narrative review was deemed the most suitable method for synthesizing findings on the use of artificial intelligence (AI) to support college students with ADHD. The reviewed studies encompassed a wide range of AI tools, including generative models like ChatGPT, executive function coaching systems, robotic tutors, and adaptive learning platforms. These tools were explored through diverse research methodologies, such as qualitative case studies, conceptual frameworks, experimental pilot trials, and systematic scoping reviews. Likewise, the studies addressed various outcome domains, including academic achievement, emotional regulation, cognitive processing, ethical considerations, and user perceptions of AI tools. This variation made the quantitative synthesis or meta-analysis methodologically inappropriate (Green et al., 2006)

As supported by Sukhera (2022), narrative reviews are particularly effective when exploring complex, interdisciplinary, and rapidly evolving topics that require interpretation across multiple frameworks and paradigms (Sukhera, 2022). Unlike systematic reviews, which prioritize methodological uniformity and narrowly focused research questions, narrative reviews allow for greater conceptual depth and flexibility in drawing connections across diverse bodies of knowledge (Baethge et al., 2019; Green et al., 2006). This flexibility is

especially critical in fields where technological and psychological research intersect and where emerging innovations have yet to be studied through large-scale randomized trials or longitudinal designs (Sukhera, 2022).

In this context, a narrative synthesis enabled an integrative exploration of how AI technologies are reshaping educational and mental health support for neurodivergent learners in higher education. It also allowed for critical examination of ethical tensions, such as data privacy and transparency, as well as the subjective and socio-emotional dimensions of student-AI interaction (Sukhera, 2022). The review followed guidelines for rigor in narrative synthesis, including clear research questions, justification for inclusion and exclusion, transparent documentation of the selection process, and reflexive interpretation of emerging themes (Baethge et al., 2019; Green et al., 2006; Sukhera, 2022).

Results and Discussion

How artificial intelligence tools, such as ChatGPT, can support the diagnosis and treatment of ADHD in college students while maintaining ethical standards related to privacy and data use.

Artificial intelligence tools, particularly explainable AI (XAI), can help identify and mitigate biases affecting students with ADHD in educational settings by providing data-driven insights into student learning behaviors (Lee et al., 2025). These technologies highlight the importance of upholding ethical standards related to fairness, consent, and responsible data use in educational settings (Lee et al., 2025).This section examines how AI can enhance educational support for students with ADHD, inform personalized interventions, and address data privacy considerations in college settings.

AI-Based Predictive and Assessment Innovations

Artificial intelligence tools, particularly explainable AI (XAI), can help uncover and address bias in predicting academic outcomes for college students with ADHD. Lee et al. (2025) employed machine learning and SHAP explanations to investigate how behavioral and self-reported learning strategies contribute to potential prediction errors in this population. Their findings underscore the importance of designing AI with ethical and responsible principles that respect privacy, consent, and fairness in the use of educational data (Lee et al., 2025). Das and Khanna (2021) proposed a non-invasive framework for ADHD detection using pupillometric biomarkers recorded during a visuospatial working memory task. Their machine learning models, trained on time-series pupil data, achieved an AUROC of 0.856, highlighting the method's potential for scalable screening applications in clinical or academic settings. Mikolas et al. (2022) developed a machine learning model using anonymized psychiatric medical records to identify ADHD among children and adolescents in a help-seeking clinical population (Mikolas et al., 2022). By training a support vector machine on real-world clinical data, the study demonstrated the feasibility of scalable predictive models that integrate behavioral ratings and neuropsychological measures. While accuracy (66.1–68.8%) fell short of clinical utility thresholds, the approach highlights the potential of AI-assisted assessment and the importance of responsible data governance when handling sensitive medical records (Mikolas et al., 2022).

Generative and Assistive AI for Academic Support

Beyond assessment support, generative AI tools such as ChatGPT are increasingly used by university students with ADHD to overcome academic challenges, particularly in writing (Zhao et al., 2025). Zhao et al. (2025) found that students commonly employed ChatGPT for summarizing dense readings, overcoming writer's block, organizing ideas, and enhancing clarity and coherence in their assignments. These tools helped students manage common barriers, such as concentration difficulties and anxiety related to structuring text or starting writing tasks. Many participants reported that ChatGPT reduced cognitive load and improved focus, fostering a greater sense of control and confidence in academic writing (Zhao et al., 2025). However, concerns were raised about misinformation, academic integrity, and a lack of institutional clarity regarding the appropriate use of AI. Participants also expressed strong interest in AI literacy training and inclusion in university policy-making (Zhao et al., 2025). Fichten et al. (2022a) documented similar findings across eight studies exploring the use of assistive technologies by postsecondary students with disabilities. Students with ADHD were found to frequently use tools such as Siri, Alexa, Grammarly, and IFTTT to support time management, reduce distractions, and improve writing quality (Fichten et al., 2022a).These AI-based technologies and mobile tools were recognized as having "tremendous potential" to assist students in academic contexts (Fichten et al., 2022a). However, the studies also revealed that adoption rates remained low. Many students lacked awareness of the tools' capabilities, and few reported using apps recommended by disability service professionals (Fichten et al., 2022a). Digital literacy gaps and a lack of institutional promotion or structured training further hindered meaningful integration. Despite the widespread availability of these technologies, including those from major platforms such as Google and Microsoft, students often fail to realize their academic utility (Fichten et al., 2022a). Wilder and Strachan (2025) investigated how an AI-powered interview training tool, *Big Interview*, could support students with ADHD in high-stress academic and career-readiness scenarios. The platform incorporated real-time feedback using eye-tracking data and adaptive prompts to enhance self-regulation, improve verbal fluency, and build cognitive flexibility (Wilder & Stratchan, 2025). Students reported that these features helped reduce performance anxiety and increased their confidence during simulated interviews. The authors concluded that AI-driven training environments can be effective for improving executive functioning skills in students with ADHD, particularly in tasks that demand emotional regulation and rapid cognitive shifting (Wilder & Stratchan, 2025).

Ethical Considerations: Privacy, Trust, and Access Equity

While the application of AI presents several benefits, researchers repeatedly highlight ethical concerns (Zhao et al., 2025). Zhao et al. (2025) reported that students with disabilities expressed concerns about how ChatGPT and similar tools handled their data, with several participants raising concerns about inaccuracy, misuse, surveillance, and potential academic misconduct (Zhao et al., 2025). These uncertainties underscore the pressing need for institutional policies that define acceptable AI usage, ensure equitable access, and provide training to foster digital literacy among neurodiverse students (Zhao et al., 2025). Fichten et al. (2022a) noted that students with ADHD and other disabilities often underutilize AI tools due to limited awareness and institutional barriers. They recommend that affordable AI solutions be provided and that students be included in the co-design process (Fichten et al., 2022a). They further stressed that developers must evaluate not only the usefulness of AI tools but

also potential privacy concerns, which should be made transparent to students (Fichten et al., 2022a). While the framework showed promise, Das and Khanna (2021) cautioned that small and unrepresentative datasets could bias outcomes, making ethical oversight and large-scale validation essential before clinical adoption. Wilder and Stratchan (2025) cautioned that AI-driven platforms utilizing biometric and cognitive data, such as eye tracking and speech analysis, pose significant risks if informed consent and strict data protection measures are not enforced. For college students with ADHD, these systems can unintentionally create environments of surveillance and vulnerability, underscoring the ethical imperative for institutions to safeguard privacy while promoting equitable participation (Wilder & Stratchan, 2025). Jafarian and Kramer (2025) emphasized the importance of transparency when integrating AI into education by informing students that some of the audio content had been generated by AI and might not be entirely accurate. This level of disclosure helps build trust and ensures students, including those with ADHD, are aware of potential limitations before relying on such tools (Jafarian & Kramer, 2025).

Student perceptions regarding the disclosure of ADHD status to AI-based educational systems and how these perceptions influence their acceptance and trust in such technologies.

Conditional Willingness to Disclose Based on Perceived Utility

Students are more willing to disclose their ADHD diagnosis to AI-based systems when they perceive that doing so will enhance their academic support or learning outcomes (Pierrès et al., 2025). In a qualitative interview study conducted by Pierrès et al. (2025) at the University of Zurich and the Zurich University of Applied Sciences, twenty higher education students with formally diagnosed ADHD were interviewed to explore their views on disclosing their diagnosis to AI-based systems. Participants expressed a clear preference for AI tutors over early warning systems, citing the ability of AI tutors to offer customized learning support and reduce stigma through non-human interaction. Students felt more inclined to disclose when the AI was designed to assist them directly with learning, rather than labeling or monitoring their academic behavior (Pierrès et al., 2025).

Lee et al. (2025) demonstrated that even when predictive models appear unbiased at a surface level, subtle disparities can still emerge in how AI interprets ADHD-related learning behaviors. Their analysis showed that features such as post-quiz review (*CA reading*) were more strongly linked to prediction errors for students with ADHD compared to their peers without ADHD(Lee et al., 2025). The authors emphasized that current feature designs may not adequately capture the unique but effective strategies employed by students with ADHD, which risks misrepresenting their abilities. Without qualitative insights into how students perceive these limitations, Lee et al. (2025) cautioned that such systems may be viewed as inaccurate or unfair, potentially reducing students' willingness to disclose their ADHD status unless they perceive a clear academic benefit.

Privacy Concerns and Distrust of Surveillance-Oriented AI

While some students were open to disclosing their ADHD, many expressed significant concerns regarding privacy, data protection, and the potential misuse of sensitive information (Pierrès et al., 2025). Pierrès et al. (2025) reported that students feared re-identification due to the rarity of certain conditions, which could compromise anonymization in AI-based educational technologies. These concerns were particularly heightened

in the context of early warning systems (EWS), where students worried that such tools might inaccurately flag them, leading to stigmatization or biased treatment by faculty (Pierrès et al., 2025). Several participants feared that lecturers might form stereotypical assumptions or grade unfairly if they had access to disability-related data. As a result, there was a clear preference for AI systems that preserved student agency, especially systems that allowed students to control what data was shared, who had access to it, and how interventions were initiated (Pierrès et al., 2025).

Students expressed significant concerns about the privacy implications of disclosing their ADHD status in AI-based educational technologies. Pierrès et al. (2025) noted that disability-related data is considered sensitive under European Union law and requires heightened protection. Integrating such information into AI systems, particularly early warning systems, raised fears of re-identification, especially given the rarity of conditions like ADHD (Pierrès et al., 2025). Participants worried that these systems might inaccurately flag them, leading to stigmatization or unfair treatment by faculty. As a result, many students called for greater control over their data, including the ability to decide what information is shared and who can access it (Pierrès et al., 2025). Zhao et al. (2025) noted that students with disabilities, including ADHD, dyslexia, dyspraxia, and autism, expressed concerns about generative AI. Their main worries centered on the inaccuracy of AI outputs, risks to academic integrity, subscription cost barriers, and breaches of personal privacy. Some students also refrained from using generative AI altogether due to these concerns (Zhao et al., 2025).

Yu and Fang (2024) noted that while AI-assisted exercise interventions for patients with ADHD offer promising predictive capabilities**,** they require the extensive use of sensitive neurophysiological and behavioral data. The authors explained that ensuring reliable outcomes depends on high-quality data collection and processing; however, this remains challenging due to the diversity, complexity, and associated privacy risks of such information (Yu & Fang, 2024). Jafarian and Kramer (2025) found that students trusted AI more when its limits were clearly explained, but when this was not done, they became distrustful (Yu & Fang, 2024).

Trust Fostered Through Empathetic, Adaptive, and Inclusive Design

Participants in the study by Pierrès et al. (2025) also emphasized the importance of trust in AI interactions. Students favored systems that were not only helpful but also respected their autonomy. The ability to choose what information to share and when to share it was cited as a critical factor in building trust. Participants described AI tutors as supportive and collaborative, whereas early warning systems were seen as judgmental and potentially harmful to their academic reputation. This perception significantly influenced students' decisions about disclosure (Pierrès et al., 2025).

Zhao et al. (2025) emphasized that students with disabilities, including those with ADHD, wanted to be actively involved in shaping institutional AI policies. They argued that AI tools should be designed inclusively, with features that accommodate diverse learning needs and styles (Zhao et al., 2025). While some students reported that generative AI reduced cognitive load and helped them structure their writing, others, especially those with dyslexia or visual impairments, found text-heavy interfaces overwhelming. The authors concluded that inclusive

AI design, combined with training and transparency, is crucial for creating a supportive learning environment (Zhao et al., 2025).

Yu and Fang (2024) demonstrated how AI systems could be adaptive to individual behavioral and cognitive patterns through their integration of machine learning and cognitive modeling techniques. While their study focused on therapeutic interventions, the adaptive mechanisms described, such as tailoring feedback based on real-time behavior, mirror what students with ADHD seek in educational settings (Yu & Fang, 2024). Lee et al. (2025) concluded that students' trust in AI systems can be enhanced through the application of explainable artificial intelligence (XAI). By employing transparent methods such as SHAP values to show which features influence performance predictions, XAI provides students with clearer insight into how their learning behaviors are interpreted (Lee et al., 2025).This transparency helps reduce hidden bias and enables students with ADHD to make more informed decisions about disclosing their condition in educational contexts. To further promote fairness, the authors recommend refining feature design and incorporating participatory processes that actively involve neurodivergent learners in the development of predictive models and educational technologies (Lee et al., 2025).

The effectiveness of AI-driven cognitive and behavioral interventions in improving academic performance and emotional well-being among students with ADHD.

Socially Assistive Robotics and Ambient Companionship Boost Academic Engagement

Socially assistive robots (SARs) have shown promising outcomes in fostering academic engagement among college students with ADHD by serving as non-judgmental study companions that provide subtle companionship and motivation (O'Connell et al., 2024). In a three-week participatory design study at the University of Southern California, a socially assistive robot named *Blossom* was placed in the dorms of students with self-reported ADHD symptoms (O'Connell et al., 2024). The robot performed idle motions and provided passive companionship during study tasks. Results revealed that 91% of participants voluntarily continued using the robot into the second week, indicating high acceptability and usability (O'Connell et al., 2024). The robot appeared to serve as an effective "body double," helping students initiate and sustain focus during academic tasks, which aligns with the neurodivergent community's concept of body doubling to enhance executive function performance (O'Connell et al., 2024).

For instance, Lalwani et al. (2024) developed *Productivity CoachBot*, a QTrobot equipped with tailored modules for conversation, schedule generation, voice-note reminders, Pomodoro timers, and engagement detection to directly support time and task management in students with ADHD. Preliminary evaluations with university students indicated that the robot generated realistic schedules, provided timely reminders, and sustained focus during Pomodoro cycles (Lalwani et al., 2024). Notably, the engagement detection module tracked eye gaze and head movements, prompting the robot to initiate supportive dialogue or mindfulness exercises when signs of disengagement were observed. Participants reported that these features reduced procrastination and enhanced task manageability, underscoring the robot's potential as both a study companion and a structured productivity coach (Lalwani et al., 2024).

AI-Enhanced Self-Regulation and Executive Function Training in Virtual Environments

AI tools that integrate cognitive assessments and behavioral analytics can support self-regulation and improve academic-related performance in virtual interviews and learning settings (Wilder & Stratchan, 2025).In a study conducted at Howard University, researchers combined eye-tracking technology and executive function tests (e.g., the NIH Card Sorting test) to assess how college students with ADHD perform in AI-enhanced interview simulations (Wilder & Stratchan, 2025). Higher-performing participants demonstrated balanced attention to both the content and the interviewer's engagement, whereas lower-performing participants fixated excessively on the content alone (Wilder & Stratchan, 2025).

Importantly, cognitive flexibility predicted better performance outcomes, indicating that AI systems can be used not only to assess but also to train executive functioning skills necessary for success in virtual environments Building on this, Lee et al. (2025) examined how explainable AI (XAI) methods can uncover hidden biases in predictive models that underestimates the performance of students with ADHD. Their study revealed that behavioral and self-reported survey features related to self-regulated learning were strongly associated with prediction errors, suggesting that traditional models often fail to account for the unique learning strategies used by students with ADHD. By incorporating more nuanced representations of self-regulation into model design, AI systems could better support neurodiverse learners and provide fairer, more accurate evaluations (Lee et al., 2025).

Digital Interventions and Intelligent Virtual Assistants Enhance Emotional and Organizational Support

AI-based apps, virtual assistants, and mobile tools play a significant role in enhancing both academic and emotional well-being for post-secondary students with ADHD (Fichten et al., 2022a). Fichten et al. (2022a) examined eight studies and found that students with ADHD leveraged mainstream AI-based and mobile tools to manage schoolwork, deadlines, and communication tasks. These technologies provided organizational scaffolding and reduced anxiety by automating repetitive tasks and facilitating effective time management (Fichten et al., 2022a). Liu et al. (2023) emphasized that integrating AI into digital mental health platforms could deliver individualized interventions at scale, promoting emotional well-being and reducing anxiety among college students. They advocate for leveraging big data and AI to enhance personalization in mental health apps for this population (Liu et al., 2023).

In a complementary way, socially assistive robots (SARs) extend this support into physical learning spaces by providing non-verbal attentional cues, such as subtle motions and presence, that help students with ADHD sustain focus and reduce procrastination (O'Connell et al., 2024). Wilder and Stratchan (2025) applied a digital intervention that combined an AI-driven interview training platform with eye-tracking and cognitive assessments. The Big Interview system analyzed students' responses and provided structured feedback, while the Tobii Pro Fusion eye tracker measured visual attention to detect balanced engagement or maladaptive fixation (Wilder & Stratchan, 2025). Additionally, standardized tests of executive functioning and self-regulation provided further insights. Together, these tools created a personalized intervention that improved focus, reduced anxiety, and strengthened self-regulation for students with ADHD (Wilder & Stratchan, 2025).

Limitations of the Current Review

This review offers a comprehensive synthesis of how artificial intelligence supports college students with ADHD; however, several limitations should be acknowledged. Although early studies were included to establish historical context, most of the available evidence is relatively recent and remains in the early phases of development. Technologies such as generative AI tools, socially assistive robotics, and adaptive learning platforms have not yet been validated through long-term implementation. Their benefits should therefore be interpreted as promising rather than definitive. The methodological rigor of the included studies also varies. Many rely on small samples, qualitative feedback, or exploratory designs, which are common in emerging fields but limit the ability to draw firm causal inferences or assess scalability. Another consideration is the geographic concentration of research in North America and Europe, which raises questions about the applicability of findings to under-resourced or culturally distinct settings. In such contexts, differences in digital infrastructure, institutional policy, and cultural attitudes toward disability disclosure may shape the effectiveness and adoption of AI tools in ways not fully captured here. While ethical themes such as privacy, trust, and algorithmic fairness were discussed, this review did not extend to a full legal or policy analysis. Issues such as institutional responsibilities, consent protocols, and algorithmic accountability remain underexplored and require further interdisciplinary investigation.

Suggestions for Future Research

Future research should incorporate systematic reviews and meta-analyses to consolidate emerging evidence on AI-based interventions for college students with ADHD, as the current literature remains fragmented and exploratory. Available studies often rely on brief assessments and subjective reporting, which limits the evidence for causal effects and sustained academic outcomes. Addressing these gaps will require multi-institutional studies with sufficiently powered and demographically diverse samples to rigorously evaluate sustained outcomes such as student engagement, persistence, grade point average, retention, and graduation rates. Such work should also consider cultural influences and varying levels of AI literacy, which may critically shape students' adoption, trust, and overall experiences with AI tools.

Conclusion

As colleges and universities seek more effective ways to support neurodivergent learners, artificial intelligence presents new opportunities to bridge gaps in academic and mental health services. This review examined the potential of artificial intelligence to support college students with ADHD by addressing core questions related to diagnosis, disclosure, and intervention. AI tools have been shown to enhance identification accuracy and personalize treatment through non-invasive, data-driven approaches that supplement traditional clinical assessments. Students' willingness to disclose their ADHD status to AI systems is shaped by perceived usefulness, trust in design, and concerns over data privacy and fairness; empathetic, transparent, and adaptive systems encourage greater engagement. AI-driven cognitive and behavioral interventions, including socially assistive technologies, executive function training, and virtual assistants, also show promise in improving academic performance and emotional well-being. Taken together, these findings demonstrate that AI can address both the

cognitive and emotional dimensions of ADHD in higher education, though successful implementation will depend on ethical design, user-centered development, and institutional commitment to inclusive digital practices.

Acknowledgements

The author would like to thank Dr. Tapu Ghosh and Apu Ghosh for their continuous guidance, encouragement, and valuable support throughout the development of this study.

References

Baethge, C., Goldbeck-Wood, S., & Mertens, S. (2019). SANRA—a scale for the quality assessment of narrative review articles. *Research Integrity and Peer Review*, *4*(1). https://doi.org/10.1186/s41073-019-0064-8

Baird, J., Stevenson, J. C., & Williams, D. C. (2000). The Quarterly Review Of Biology The Evolution Of Adhd: A Disorder Of Communication? In *Thte Quarterly Review of Biology* (Vol. 75, Issue 1).

Black, M. H., Helander, J., Segers, J., Ingard, C., Bervoets, J., de Puget, V. G., & Bölte, S. (2024). Resilience in the face of neurodivergence: A scoping review of resilience and factors promoting positive outcomes. In *Clinical Psychology Review* (Vol. 113). Elsevier Inc. https://doi.org/10.1016/j.cpr.2024.102487

Cortese, S., & Coghill, D. (2018). Twenty years of research on attention-deficit/hyperactivity disorder (ADHD): Looking back, looking forward. *Evidence-Based Mental Health*, *21*(4), 173–176. https://doi.org/10.1136/ebmental-2018-300050

Doyle, A., Healy, O., Paterson, J., Lewis, K., & Treanor, D. (2024). What does an ADHD-friendly university look like? A case study from Ireland. *International Journal of Educational Research Open*, *7*. https://doi.org/10.1016/j.ijedro.2024.100345

DuPaul, G. J., Weyandt, L. L., O'Dell, S. M., & Varejao, M. (2009). College students with ADHD: Current status and future directions. *Journal of Attention Disorders*, *13*(3), 234–250. https://doi.org/10.1177/1087054709340650

Fichten, C., Jorgensen, M., Havel, A., Vo, C., Libman, E., Fichten, C., Jorgensen, M., Havel, A., Vo, C., & Libman, E. (2022a). AI-Based and Mobile Apps: Eight Studies Based on Post-Secondary Students' Experiences. In *Journal on Technology and Persons with Disabilities Santiago, J* (Vol. 10). https://scholarworks.csun.edu/handle/10211.3/223460

Fichten, C., Jorgensen, M., Havel, A., Vo, C., Libman, E., Fichten, C., Jorgensen, M., Havel, A., Vo, C., & Libman, E. (2022b). AI-Based and Mobile Apps: Eight Studies Based on Post-Secondary Students' Experiences. In *Journal on Technology and Persons with Disabilities Santiago, J* (Vol. 10). https://scholarworks.csun.edu/handle/10211.3/223460

Green, B. N., Johnson, C. D., & Adams, A. (2006). *Writing narrative literature reviews for peer-reviewed journals: secrets of the trade*.

Jafarian, N. R., & Kramer, A. W. (2025). AI-assisted audio-learning improves academic achievement through motivation and reading engagement. *Computers and Education: Artificial Intelligence*, *8*. https://doi.org/10.1016/j.caeai.2024.100357

Kim, S., Lee, H., & Lee, K. (2021). Can the mmpi predict adult adhd? An approach using machine learning

methods. *Diagnostics*, *11*(6). https://doi.org/10.3390/diagnostics11060976

Lalwani, H., Elgarf, M., & Salam, H. (2024). Productivity CoachBot: a Social Robot Coach for University Students with ADHD. In *Proceedings of the 2024 ACM/IEEE International Conference on Human-Robot Interaction (HRI '24)* (Vol. 1).

Lee, H. J., Belitz, C., Nasiar, N., & Bosch, N. (2025). XAI Reveals the Causes of Attention Deficit Hyperactivity Disorder (ADHD) Bias in Student Performance Prediction. *15th International Conference on Learning Analytics and Knowledge, LAK 2025*, 418–428. https://doi.org/10.1145/3706468.3706521

Liu, X.-Q., Guo, Y.-X., & Xu, Y. (2023). Risk factors and digital interventions for anxiety disorders in college students: Stakeholder perspectives. *World Journal of Clinical Cases*, *11*(7), 1442–1457. https://doi.org/10.12998/wjcc.v11.i7.1442

Mikolas, P., Vahid, A., Bernardoni, F., Süß, M., Martini, J., Beste, C., & Bluschke, A. (2022). Training a machine learning classifier to identify ADHD based on real-world clinical data from medical records. *Scientific Reports*, *12*(1), 12934. https://doi.org/10.1038/s41598-022-17126-x

O'Connell. (2024). *Design and Evaluation of a Socially Assistive Robot Schoolwork Companion for College Students with ADHD*. 533–542.

Pagespetit, È., Pagerols, M., Barrés, N., Prat, R., Martínez, L., Andreu, M., Prat, G., Casas, M., & Bosch, R. (2025). ADHD and Academic Performance in College Students: A Systematic Review. *Journal of Attention Disorders*, *29*(4), 281–297. https://doi.org/10.1177/10870547241306554

Pierrès, O., Darvishy, A., & Christen, M. (2025). *Perceived Risks and Benefits of Disclosing ADHD to AI-based Educational Technologies: Semi-structured Interviews*. https://doi.org/10.21203/rs.3.rs-6106311/v1

Sedgwick-Müller, J. A., Müller-Sedgwick, U., Adamou, M., Catani, M., Champ, R., Gudjónsson, G., Hank, D., Pitts, M., Young, S., & Asherson, P. (2022). University students with attention deficit hyperactivity disorder (ADHD): a consensus statement from the UK Adult ADHD Network (UKAAN). *BMC Psychiatry*, *22*(1). https://doi.org/10.1186/s12888-022-03898-z

Staley, B. S., Robinson, L. R., Claussen, A. H., Katz, S. M., Danielson, M. L., Summers, A. D., Sherry, ;, Farr, L., Blumberg, S. J., & Tinker, S. C. (2024). *Morbidity and Mortality Weekly Report Attention-Deficit/Hyperactivity Disorder Diagnosis, Treatment, and Telehealth Use in Adults-National Center for Health Statistics Rapid Surveys System, United States, October-November 2023*. https://www.cdc.gov/mmwr/mmwr_continuingEducation.html

Stubbe, D. E. (2000). *ATTENTION-DEFICIT I HYPERACTIVITY DISORDER OVERVIEW Historical Perspective, Current Controversies, and Future Directions* (Vol. 9, Issue 3).

Sukhera, J. (2022). Narrative Reviews: Flexible, Rigorous, and Practical. *Journal of Graduate Medical Education*, *14*(4), 414–417. https://doi.org/10.4300/JGME-D-22-00480.1

Tricco, A. C., Lillie, E., Zarin, W., O'Brien, K. K., Colquhoun, H., Levac, D., Moher, D., Peters, M. D. J., Horsley, T., Weeks, L., Hempel, S., Akl, E. A., Chang, C., McGowan, J., Stewart, L., Hartling, L., Aldcroft, A., Wilson, M. G., Garritty, C., … Straus, S. E. (2018). PRISMA extension for scoping reviews (PRISMA-ScR): Checklist and explanation. In *Annals of Internal Medicine* (Vol. 169, Issue 7, pp. 467–473). American College of Physicians. https://doi.org/10.7326/M18-0850

Weyandt, L. L., & DuPaul, G. (2006). ADHD in college students. In *Journal of Attention Disorders* (Vol. 10, Issue 1, pp. 9–19). https://doi.org/10.1177/1087054705286061

Wilder, T. L., & Stratchan, N. E. (2025). Artificial Intelligence-Enhanced Interview Success: Leveraging Eye-Tracking and Cognitive Measures to Support Self-Regulation in College Students with Attention-Deficit/Hyperactivity Disorder. *Education Sciences*, *15*(2). https://doi.org/10.3390/educsci15020165

Wolf, L. E. (2001). College students with ADHD and other hidden disabilities: Outcomes and interventions. In *Annals of the New York Academy of Sciences* (Vol. 931, pp. 385–395). Blackwell Publishing Inc. https://doi.org/10.1111/j.1749-6632.2001.tb05792.x

Yu, D., & Fang, J. hui. (2024). Using artificial intelligence methods to study the effectiveness of exercise in patients with ADHD. *Frontiers in Neuroscience*, *18*. https://doi.org/10.3389/fnins.2024.1380886

Zhao, X., Cox, A., & Chen, X. (2025). The use of generative AI by students with disabilities in higher education. *Internet and Higher Education*, *66*. https://doi.org/10.1016/j.iheduc.2025.101014