Teacher Beliefs and Practices About the Inclusion of Learners with ADHD

Philip Haynes

Faculty of Arts, Macquarie University

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Dr. Poulomee Datta

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This paper examines teacher beliefs and practices regarding the inclusion of learners diagnosed with Attention Deficit/Hyperactivity Disorder (ADHD). It aligns with Koutsoklenis & Honkasilta (2023) perspective that ADHD is a cognitive difference rather than a medical disorder. The paper assumes that accommodating learners with ADHD is part of normal teaching practice.

ADHD: How it Manifests

ADHD is often characterised in the classroom by problematic behaviour, poor school performance, inability to sit still, impatience, answering questions without raising hands, or daydreaming. Persistent patterns of inattention, disorganisation, and hyperactivity-impulsivity are typical (American Psychiatric Association [APA], 2022). ADHD significantly impacts academic performance due to difficulties in sustaining attention and completing tasks. Social interactions may also suffer, leading to issues in forming and maintaining relationships (Barkley, 2014). ADHD symptoms vary across age groups as children's brains develop (Biederman et al., 2000).

According to the United States Centers for Disease Control and Prevention (2024), approximately 11.5% of U.S. children aged 3-17 have been diagnosed with ADHD. ADHD occurs in approximately 6–10% of Australian children and adolescents and 2–6% of adults (Graetz et al., 2001; Sawyer et al., 2018). This high prevalence of ADHD challenges the notion that it is a disorder and suggests that it is a normal variation within the population.

The NSW Department of Education (2021) provides evidence-based strategies for ADHD. Many other resources are available, for example, the United States, not-for-profit, Children and Adults with Attention-Deficit/Hyperactivity Disorder (CHADD), offers practical approaches to recognising ADHD in the classroom and various strategies for managing it (CHADD, 2023).

Teachers play a critical role in identifying ADHD due to the school environment's demands, which may reveal symptoms of inattention not present at home. Their experience with children of similar age and development aids in identifying ADHD (Seixas et al., 2012). Attention problems may become more apparent with boring or cognitively challenging tasks

(American Psychiatric Association [APA], 2022). Impulsivity symptoms can lead to relationship problems with parents or friends (Leffa et al., 2022).

Teachers should be aware of the high co-morbidity rate of ADHD with autism spectrum disorder (ASD) (Lai et al., 2019). These are distinct conditions, each requiring specific management practices, even if there is some overlap. This is also true for conditions such as intellectual disabilities and behavioural disorders like oppositional defiant disorder (ODD) (American Psychiatric Association [APA], 2022), as well as anxiety and major depression (Arnold et al., 2011).

People with ADHD, particularly adolescents, have a three times higher risk of drug use disorders (Schipper et al., 2015) and increased risks of sexually transmitted diseases, teenage pregnancies, and accidents and injuries (Leffa et al., 2022).

ADHD is associated with dysregulation of dopamine pathways in the brain, particularly in the prefrontal cortex and basal ganglia, critical for attention, impulse control, and executive function (American Psychiatric Association [APA], 2022; Willcutt et al., 2005). Executive functions (EF) are cognitive processes essential for controlling behaviour and achieving goals. Impairment in these areas affects working memory, making it difficult to follow instructions, complete tasks, and organise activities. Additionally, it impacts cognitive flexibility, planning, organisation, and emotional regulation (Willcutt et al., 2005).

Given the integral nature of dopamine to ADHD, lifestyle factors such as diet, exercise, video games, and social media are key. While evidence of dietary restrictions being effective is scant (Nigg & Holton, 2014), sufficient protein is a key precursor for dopamine production, which can be impacted by conditions such as coeliac disease that can reduce vitamin B12 levels (Akmatov et al., 2021).

Sleep is also critical for managing ADHD (Sciberras, 2022). ADHD symptoms may be more pronounced in tired students, and high rates of sleep issues are associated with ADHD (Becker, 2020). Stimulants, a common treatment for ADHD, can also cause sleep issues due to dose timing (e.g. analogous to a late coffee) (Faraone et al., 2019). Teachers should monitor the classroom for tired students as part of regularly monitoring students' physical welfare.

Strengths, Learning Needs, and Issues of Concern

Understanding the strengths and learning needs of students with ADHD requires a multifaceted approach that incorporates neurobiological, cognitive, and educational perspectives. ADHD, characterized by symptoms of inattention, hyperactivity, and impulsivity, impacts students' learning experiences and outcomes (Faraone et al., 2019).

Strengths of Students with ADHD

Creativity and Innovation: Students with ADHD often demonstrate high levels of creativity and the ability to think outside the box. They can generate imaginative ideas and solutions to problems, which can be harnessed in a learning environment that values innovation (White & Shah, 2011).

Hyper-focus: Although ADHD is associated with inattention, students can also experience periods of hyper-focus on tasks that interest them. This can be advantageous in subjects they find engaging, allowing them to achieve deep concentration and productivity (Ashinoff & Abu-Akel, 2021).

Adaptability and Resilience: Many students with ADHD develop strong adaptability and resilience due to their need to navigate a world that often does not accommodate their differences. These traits can be strengths in dynamic and changing environments (Schipper et al., 2015).

Learning Needs of Students with ADHD

Dopamine Pathways and Regulation: ADHD is linked to dysregulation in dopamine pathways, which affects impulse control and EF (Volkow et al., 2009). Educational strategies need to account for this by providing frequent, small rewards to sustain attention and motivation (Tripp & Wickens, 2009).

Dual-Process Theory: Educational approaches must consider that students with ADHD may rely more on Type 1 (intuitive) processes due to challenges in engaging Type 2 (reflective) processes that require working memory and sustained attention (Evans & Stanovich, 2013). Tailoring tasks to be manageable and incrementally challenging can help bridge this gap.

Satisficing and Decision Making: Simon (1956) satisficing model suggests that students with ADHD might settle for satisfactory solutions rather than optimal ones due to cognitive

load constraints. Structured decision-making frameworks and scaffolding can support better outcomes (Gigerenzer & Gaissmaier, 2011).

Behavioural Economics: Kahneman (2003) work on behavioural economics highlights the importance of understanding cognitive biases and heuristics. Applying these principles can help design interventions that are more aligned with how students with ADHD process information and make decisions.

Critical Analysis of Current Research

Recent studies have expanded our understanding of ADHD and its impact on learning. Véronneau-Veilleux et al. (2022) propose a mechanistic model that links ADHD symptoms to phasic imbalances during learning, emphasizing the need for targeted interventions that address these imbalances. This aligns with findings from neuroimaging studies that show differences in dopamine transporter density in individuals with ADHD (Volkow et al., 2009). White & Shah (2011) argue that the creative potential of individuals with ADHD is often overlooked in traditional educational settings. Integrating project-based learning and opportunities for creative expression can capitalize on these strengths. Similarly, Ashinoff & Abu-Akel (2021) discuss hyper-focus as a double-edged sword that can be harnessed for deep learning in areas of interest.

Moreover, Schipper et al. (2015) highlight the resilience and adaptability of students with ADHD, suggesting that supportive educational environments that recognize and build on these traits can enhance educational outcomes.

A comprehensive approach to understanding and addressing the learning needs of students with ADHD must be rooted in current, relevant, and credible research. By acknowledging their strengths—such as creativity, hyperfocus, and resilience—and addressing their unique learning needs through tailored educational strategies, we can provide a supportive and effective learning environment.

Inclusive Teaching Practices

The inclusive teaching practices for students with ADHD in mainstream classrooms, while similar to those for other conditions, require broader learning design considerations due to the high prevalence of comorbidities with ADHD (DuPaul & Stoner, 2014, p. 74) and the

cognitive nature of the condition. These considerations must be included during the Universal Design for Learning (UDL) process. Given the genetic component of ADHD and its association with academic and workplace underachievement, particularly in Indigenous communities (Zubrick et al., 2005), issues of social disadvantage are also a vital consideration. With recent technology advances such as AI, effectively creating differentiated content requires educators to be technology savvy (CAST, 2024).

Given the prevalence of ADHD as a condition affecting executive cognitive functions, it is relevant to include broader concepts of teaching and supporting EF development (Ellefson et al., 2018). This can improve specific lessons and broader student academic achievement (Gunzenhauser & Nückles, 2021) and, as Cardoso et al. (2019) report, produce direct, long-term benefits to school performance, reduce academic challenges, and contribute to reducing social and mental health problems. This goes hand in hand with the need to invest in appropriate technology support and suitable classroom environments.

Differentiated Content Approaches and Neuropsychological Stimulation

Given the necessity of supporting both Type 1 and Type 2 neural pathways for students with ADHD, learning design tasks should balance those requiring more reflective cognitive capabilities with those that are more drill-based. It is also important to establish which parts of the teaching program are investigation and practical-oriented. Using technologies such as generative AI, a dependency map of tasks can be created, starting from key concepts that must be mastered quickly to more advanced concepts that can be subsequently delivered. This visual concept map can show the end-to-end student journey across the curriculum.

Achieving inclusive learning outcomes for ADHD students requires both differentiated content and a variety of learning approaches, which can be prohibitive to achieve manually in real-world school settings. Instead, a “digital twin” that models the students’ learning needs may be constructed (Lindgren & Moshell, 2011) to support the automation of these functions. The following section provides a simplified example of this approach.

Example: AI Automated Differentiated Content Preparation

> **Teacher:** Prepare an explanation of hydrogen and oxygen for a Year 7 science student with low literacy and for a high IQ Year 12 student studying chemistry.

> **Educational Robot:** For a Year 7 Science Student with Low Literacy: Hydrogen and oxygen are two very simple gases. Hydrogen is the lightest gas and is used in things like balloons and fuel. Oxygen is the gas we need to breathe to stay alive. Together, they make water, which we drink and use every day.

> **Educational Robot:** For a High IQ Year 12 Student Studying Chemistry: Hydrogen (H) is the lightest and most abundant element in the universe, with one proton and one electron, commonly found in molecular form (H). Oxygen (O), with eight protons and eight electrons, is a highly reactive non-metal and a crucial element for combustion and respiration processes. In its diatomic form (O), it supports aerobic life. The reaction of hydrogen with oxygen (2H + O 2HO) releases significant energy and forms water, illustrating a fundamental exothermic redox reaction.

Neuropsychological Stimulation

Reducing the requirement for Type 2 cognitive functions involves prioritising key concepts to be learned to a level where they are processed using Type 1 cognitive approaches. This task involves "drill-style" learning activities that ideally induce dopamine production. As highlighted by Cardoso et al. (2019), this approach significantly improves EF development. Gunzenhauser & Nückles (2021) also identify the potential to improve academic outcomes through targeting specific skill training.

The Classroom

Classroom Environment Design: Barrett et al. (2015) report that effective classroom design can explain 16% of a 65% improvement in student performance. This is supported by Fisher & Godwin (2011), emphasizing the importance of inclusive design for both pedagogical and behavioural considerations.

Positive Behaviour for Learning: To ensure students with ADHD are neither distracted by poor behaviour nor contributing to it: 1. **Clear Expectations:** Set clear, consistent expectations and provide visual schedules to help students understand routines. This approach can reduce anxiety and improve behaviour for students with disabilities. 2. **Reinforcement**

Strategies: Use positive reinforcement to encourage desired behaviours. Implement a token economy system or reward chart to motivate students and reinforce positive actions (Cooper et al., 2007).

ADHD Stakeholder Management Strategies

Given the broad nature of ADHD, its educational and behavioural challenges, and requirements for medical and ongoing support, a range of stakeholders are involved in student support.

Supporting Initial Diagnosis and Treatment

Classroom teachers are well positioned to identify and record symptoms of potential ADHD. They should work with the school counsellor to prepare a briefing for guardians on the observed behaviour and suspected ADHD.

Based on observations, the teacher and school counsellor should contact the child's guardians to provide initial recommendations, likely including a medical evaluation.

If a child is referred to a psychiatrist or other medical professional, the teacher may provide additional information to support the diagnosis and recommendations.

Given the potential cost and complexity of ADHD treatment, many families may seek support from NGOs such as the ADHD Foundation. Subject to privacy considerations and in consultation with the school counsellor, provide or receive advice.

If a parent elects not to seek medical support, the school counsellor may make an internal assessment to determine how the child will be supported.

Supporting Ongoing Medical Treatment and Physical/Mental Health

As ADHD is often supported with medication therapy (DuPaul & Stoner, 2014, p. 213), and given the importance of good health, particularly sleep, part of teaching involves supporting ADHD students to remain as "learning fit" as possible.

This includes receiving reports from the school counsellor on medical interventions like the use of stimulants (DuPaul & Stoner, 2014, p. 276), monitoring the student's well-being, especially if other comorbidities such as autism exist, and helping with the calibration of medication doses and timing.

Teachers should make in-class assessments of student behaviour, speak with the student about their medical treatment, and help them receive support if needed.

Given the potential for risky behaviour by students with ADHD (excessive use of social media, drug taking, etc.), teachers should monitor for common signs.

Peer Engagement

When considering group work, the teacher must appropriately consider student social learning dynamics to ensure effective outcomes.

Behaviour Management

Behaviour is a key consideration with students with ADHD. Participating in the school's PBL program, assisted by other Department resources (New South Wales Department of Education, 2021), is essential.

Where additional support from a school special learning service officer (SLSO) is required, engage with the SLSO to address and monitor different aspects of teaching and behaviour management.

Home/School Academic and Executive Function Learnings

Given the different learning needs of students with ADHD, particularly with potential social disadvantage, it may involve working with parents to ensure the student and their schoolwork are well organized. They should actively manage planned activities and learn organizational techniques such as checklists, visual cues, and goal setting.

Strong evidence indicates that executive functions (EF) can be developed through training Diamond & Lee (2011). Aligning educational programming with the student's other activities, such as exercise, is key. For example, Diamond & Ling (2016) report that physical training alone fails to improve EF, yet with EF training, overall performance improves significantly across all dimensions. The school's physical education (PE) department becomes a vital collaborator in improving student outcomes.

Conclusion

A comprehensive approach to supporting students with ADHD involves understanding their unique strengths and needs, implementing inclusive teaching practices, and ensuring

coordinated stakeholder support. By integrating current research and innovative strategies, educators can create an environment that fosters academic success and personal growth for all students.

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