

Didactic Strategies for Inclusion: An Exploratory Investigation of Embodied Practices in the Management of Students with ADHD

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Abstract: The study explores teachers' practices and training needs related to the management of students with ADHD, with a particular focus on embodied methodologies. The investigation involved 122 lower and upper secondary school teachers through a mixed-methods questionnaire. The findings reveal a widespread perception of inadequate specific training on ADHD and an increasing demand for targeted professional development and practical tools to address everyday educational challenges. Although embodied practices are not yet widely adopted, there is a growing interest in methodologies that integrate body movement, role-playing, and mindfulness to manage behavioral and cognitive difficulties in students with ADHD. This study highlights the importance of supporting teachers through continuous professional development to enhance their ability to address the educational challenges posed by ADHD, promoting an inclusive, body-centered, and relational approach.

Keywords: ADHD, embodied education, teacher training, neurodiversity.

1. Introduction

Attention Deficit Hyperactivity Disorder (ADHD) is a neurodevelopmental condition that affects executive functioning, emotional regulation, and behavioral adaptation, with considerable impact on academic performance and social integration. In the Italian school system, students with ADHD are supported through Personalized Educational Plans (PDPs), yet traditional didactic approaches often prove inadequate in addressing their specific needs. Recent literature highlights the importance of inclusive, flexible, and multimodal teaching strategies. Among these, embodied education—based on the integration of movement, sensory experience, and emotional engagement—emerges as a promising approach aligned with the neurocognitive profile of ADHD. Embodied practices can activate brain areas involved in attention and self-regulation, offering valuable support for learning processes.

This study presents an exploratory investigation into secondary school teachers' awareness, training needs, and implementation of embodied practices in managing students with ADHD. The findings aim to inform future teacher education programs



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and promote inclusive methodologies grounded in a mind–body integrated perspective.

2. Neuroscientific and Educational Implications of ADHD

Attention Deficit Hyperactivity Disorder (ADHD) is a neurodevelopmental condition affecting 5.9% of children globally (Faraone et al., 2021) and 2.9% in Italy (Reale & Bonati, 2018), posing significant challenges for academic and social development. It is characterised by deficits in executive functions, including working memory, inhibitory control, and cognitive flexibility, leading to hyperactivity, impulsivity, and difficulties in focus. These symptoms often hinder students' ability to meet cognitive and behavioral expectations in traditional educational settings (Arenas et al., 2024; Stefanidi et al., 2023). ADHD also complicates social adaptation, as individuals struggle to adjust their behavior to align with situational demands. The condition is frequently viewed through the lens of impaired executive functioning, impacting both educational and social outcomes. The academic difficulties are further exacerbated by emotional dysregulation, which leads to disruptive behaviors in classrooms and challenges in social integration. This emotional dysregulation heightens the risk of social exclusion, stemming from both external rejection and the students' struggles with adaptive functioning and behavioral flexibility (Stefanidi et al., 2023). These dynamics emphasize the need for tailored educational methodologies that address both the emotional and cognitive aspects of ADHD. It has been linked to extensive changes in both cognitive processes and brain function, affecting not only complex executive abilities but also more fundamental mechanisms related to self-regulation and reward sensitivity (Franke et al., 2018; Michelini et al., 2022). Such deficits have been consistently observed in research involving both pediatric and adult populations (Franke et al., 2018), even if findings suggest that the nature and severity of these impairments may change with age (Kaiser et al., 2020). Recent studies suggest that ADHD is a neurodevelopmental disorder with both macrostructural and microstructural brain changes. Children with ADHD exhibit widespread structural and functional alterations in several brain areas. Neuroimaging studies show reduced volumes in the caudate, putamen, amygdala, hippocampus, and nucleus accumbens, indicating subcortical maturation delays, particularly pronounced in early life stages (Hoogman et al., 2017). Furthermore, resting-state fMRI shows increased connectivity between the caudate, putamen, and temporal, parietal, and motor regions, indicating compensatory or dysregulated neural activity (Norman et al., 2024). Functional dysconnectivity is found within fronto-striatal, fronto-parietal, and cortico-limbic networks, impairing executive functions, motivation, and emotional regulation (Gehricke et al., 2017). The superior and middle temporal gyri, frontal cortex, and cingulate gyrus are also implicated, with abnormalities in white matter tracts like the superior longitudinal fasciculus and corpus callosum, suggesting impaired neural communication (Gehricke et al., 2017). Altered amygdala connectivity may relate to emotional dysregulation, a feature often observed in affected children (Norman et al., 2024). Given the widespread alterations in brain regions responsible for attention, impulse control, working memory, and emotional regulation, children with ADHD often struggle in traditional classroom settings. These neurological differences affect how they process information, manage tasks, and sustain focus over time. Therefore, teaching methods play a critical role in either exacerbating these challenges or helping to manage them.

3. Current and Embodied Approaches in Education for ADHD students

In the Italian educational system, students diagnosed with ADHD are entitled to specific support measures to ensure their right to education. Following the Ministerial Directive of December 27, 2012, the protections granted to students with Specific Learning Disorders (Law 170/2010) were extended to include ADHD. These students may receive a Personalized Educational Plan (PDP), which outlines tailored teaching strategies, individualized accommodations, and the use of specific learning tools. Common compensatory tools include text-to-speech software, audio recorders, word processors with spell-check, calculators, and concept maps. These aids do not reduce cognitive demands but help students manage tasks affected by their condition. Dispensatory measures may also be applied to reduce the impact of particularly challenging tasks, such as shorter tests, extended time, or scheduled oral exams. Traditional methods, often based on passive learning (e.g., lectures, textbook work), tend to disengage students with ADHD, who benefit more from dynamic and interactive approaches. Rigid classroom structures and long sedentary periods clash with ADHD students' need for movement and sensory input, often exacerbating learning barriers (Goldberg, 2022; Arenas et al., 2024). This highlights the need to rethink conventional pedagogical models. Evidence-based strategies include clear instructions with visual cues, breaking tasks into steps, and using multimodal methods such as visuals, interactive technologies, and experiential learning (Moore et al., 2017). The classroom environment is also adapted to minimize distractions, allow movement, and support peer modeling. Peer-mediated learning plays a key role in promoting engagement and participation. Approaches such as peer tutoring, cooperative learning, "Think-Pair-Share", partner reading, and educational games foster social interaction, shared responsibility, sustained attention, and task persistence (Piffner, 2011). They also offer natural opportunities for repetition, feedback, and reinforcement. Overall, the most effective model is holistic, inclusive, and student-centered, addressing ADHD not through separate special education placements but through flexible and responsive practices within mainstream classrooms (DuPaul et al., 2011; Miranda et al., 2006).

3.1 Embodied Education as a strategy for ADHD

Emerging research underscores the potential of embodied educational practices in addressing these challenges. Embodied Education is a pedagogical approach that sees the body as an active and essential part of the learning process. Learning means living a concrete, bodily, emotional, and relational experience, where the body serves as a mediator between the environment, thought, and knowledge (Gomez Paloma et al., 2016). Learning occurs through action, movement, sensory perception, and emotional involvement, in an integrated mind-body perspective. Embodied education breaks away from the idea of purely abstract or transmissive knowledge and values situated, active, inclusive, and multisensory educational experiences (Damiani and Gomez Paloma, 2018; D'Anna et al. 2021). From this perspective, embodied education emphasizes the importance of activating the body to facilitate learning, where movement, spatial awareness, rhythm, and sensory input become valuable educational tools. Activities involving symbolic play, theatrical expression, or educational movement stimulate brain areas linked to memory and attention, making the learning process more meaningful and lasting. In this scenario, integrating motor activities into

learning, using gesture to memorize and answer questions or educational dance and expressive movement, engaging students through symbolic play and theatrical expression, offering multisensory workshops, making dynamic use of classroom space, promoting emotional and bodily awareness, encouraging cooperative physical learning, are all desirable practices that enhance the learning process.

3.2 Neuroscientific Impacts of Embodied Practices in ADHD Education

An embodied education framework offers valuable insights into the educational needs of students with ADHD by emphasizing the interplay between cognitive processes and physical interactions with the environment. They often face challenges with executive functions such as working memory and cognitive flexibility and this theoretical lens provides a foundation for developing targeted, practical strategies aimed at improving their learning outcomes (Macrine & Fugate, 2021; Chan et al., 2022). Tailored interventions integrating movement and sensory-motor functions can address specific educational and developmental challenges for this population. The structural and functional neurological characteristics of ADHD further justify the application of embodied educational strategies. By integrating movement, sensory engagement, and emotional experience into the learning process, embodied practices activate the same brain areas that are typically altered in ADHD. For instance, motor-based activities stimulate the basal ganglia and prefrontal cortex (Leisman et al., 2014; D'Agati et al., 2010), enhancing attention and behavioral regulation; expressive movement and dance may engage the limbic system, including the amygdala and hippocampus, supporting emotional expression and memory consolidation (Hackney et al., 2024); multisensory tasks and theatrical play seems to activate the superior and middle temporal gyri, improving social cognition and language processing (Dionne-Dostie et al. 2015; Jeong et al., 2021) and stimulating neuroplasticity in the ADHD brain (Hoy et al., 2024). Furthermore, dynamic spatial use and cooperative embodied tasks may promote inter-regional communication across white matter tracts such as the superior longitudinal fasciculus and corpus callosum, which are often compromised in ADHD. By aligning educational practice with the neurofunctional needs of ADHD learners, embodied education may offer a scientifically grounded, inclusive approach that supports self-regulation, motivation, and cognitive engagement (Videla et al., 2025). Given the promising potential of embodied educational practices in supporting children with ADHD, it becomes crucial to investigate teachers' understanding of these approaches and their experiences with integrating them into the classroom. For this reason, exploratory research has been conducted to understand the level of knowledge and the experiences of teachers regarding embodied educational practices. The goal was to gather insights that could inform the development of targeted training programs or specific activities aimed at enhancing their ability to support students with ADHD effectively through embodied education practices.

4. Methodology

This study aims to provide a coherent and up-to-date overview of the teaching practices and methodologies adopted and considered effective for intervention with students with ADHD, with particular reference to embodied practices. Specifically, the study aims to:

- Explore the strategies and methodologies actually used in classrooms with students with ADHD;
- Assess the presence and extent of the use of embodied teaching practices in managing the behavior and learning of these students;
- Identify the training needs perceived by teachers, with a specific focus on the demand for practical tools and innovative approaches;
- Understand the potential attributed to embodied practices by teachers who have experimented with them or would like to introduce them into their teaching activities.

The goal is to contribute to pedagogical reflection and the design of training paths that can support teachers in their daily work with students with ADHD, promoting inclusive teaching that is attentive to the bodily and relational dimensions of learning. To this end, an exploratory survey was conducted using a questionnaire administered to a sample of 122 teachers from various school levels (secondary school, both first and second grade). The questionnaire, distributed online via Google Forms between January and March 2025, was structured with both closed and open-ended questions and collected information related to:

- Demographic and professional characteristics (gender, years of experience, educational qualification, school level, teaching type);
- Previous experiences with students with ADHD;
- Training received on ADHD and perception of its adequacy;
- Strategies and teaching methodologies considered useful for managing ADHD;
- Knowledge and application of embodied practices.

The data analysis was based on a methodological triangulation: closed responses were processed using descriptive analysis tools (frequencies, percentages), while open-ended responses were analyzed through thematic categorization, with the aim of highlighting recurring themes, problem areas, and emerging proposals directly from the teachers' voices.

5. Results

Sample characteristics

The sample consists of 122 teachers, with a predominant female representation (77.9%) compared to 22.1% male. The average age is approximately 42.64 years. Teaching experience varies: 33.6% have less than one year, 35.2% have over five years, and the remaining 31.2% have between 1 and 5 years. Regarding educational qualifications, 59.8% hold a Master's degree, 2.5% have a PhD, 9.8% a postgraduate Master's certificate, while 27.9% hold other types of degrees. Most teachers (92.6%) work in upper secondary schools, while 7.4% are employed in lower secondary education. Additionally, 54.1% are special education teachers, and 45.9% work in mainstream classes. A relevant aspect concerns experience with students diagnosed with ADHD: 42.6% have had direct experience, while 57.4% have not. Of those with experience, 25.9% worked with ADHD students for 2 to 6 months, and 44.4% for over a year. Despite this, 59.8% have not received specific training on ADHD, and only 40.2% have attended related courses or professional development programs.

Among them, 68.6% consider the training insufficient for effectively managing ADHD in the classroom. In terms of self-perceived preparedness, 27% feel poorly prepared, 43.4% adequately prepared, 27% well prepared, and only 2.5% feel excellently prepared.

Experiences with Students with ADHD

42.6% of teachers reported teaching experience with students with ADHD, while the majority, 57.4%, have never worked with students with this diagnosis. Among those with direct experience, the duration of the interaction varies considerably: a small portion (1.9%) worked with students with ADHD for only one month; 25.9% had experiences lasting between 2 and 6 months, while 27.8% reported a duration between 7 months and one year. The largest percentage (44.4%) stated that their experience exceeded one year, indicating prolonged and presumably more significant exposure to such educational situations.

Training on ADHD

Despite a fair percentage of teachers having direct contact with students with ADHD, specific training on the subject appears to be limited. Only 40.2% of the sample has received some form of specialized training, while 59.8% have had no access to any targeted training. This figure, already critical, is further emphasized when considering the quality and adequacy of the training received. Among the 70 teachers who received specific training, the majority (68.6%) do not consider it sufficient to ensure effective management of students with ADHD. Only 31.4% believe the actual skills are adequate. Additionally, the subjective evaluation of general preparedness in managing students with ADHD shows a modest level of confidence. 27% of teachers perceive themselves as poorly prepared, while the relative majority (43.4%) consider themselves sufficiently prepared, though without full mastery. Only another 27% rate themselves as good at managing these students, and a minimal percentage (2.5%) claims to be excellently prepared. Overall, the data portray a teaching staff that, while somewhat exposed to situations involving students with ADHD, does not feel adequately supported by specific training. Clear and widespread training needs emerge, not only in terms of quantity but especially concerning the quality and practical utility of the professional development programs offered.

Resources and Teaching Methodologies Perceived as Necessary for Effective Management of Students with ADHD

In the questionnaire, teachers were asked to indicate which resources, supports, or teaching methodologies they consider necessary to improve the educational management of students with ADHD. A qualitative thematic coding of the responses revealed nine main categories, each with its corresponding percentage. The most frequently cited category is teacher professional development (30.4%), including requests for courses, master's programs, seminars, and specific updates on ADHD and teaching strategies, highlighting a strong need for both theoretical and practical skills. Next is the use of technology and digital tools (26.4%)—such as educational apps, time management software, audiobooks, audiovisual aids, and digital devices—seen as helpful for enhancing attention, motivation, and personalized learning. Personalized and inclusive teaching strategies (22.4%)—including IEPs, flexible methods, and differentiated instruction—reflect a growing focus on student-centered education and equity. Cooperative, experiential, and hands-on

learning (18.4%) is also seen as effective, with references to peer tutoring, circle time, and practical activities that promote active engagement. The need for a structured environment and organizational supports (16.0%) emerged through mentions of clear routines, functional workstations, task division, and timers to support attention and behavior regulation. The emotional-relational dimension (14.4%) was highlighted through the importance of empathy, motivation, emotional regulation, and positive reinforcement, emphasizing the role of educational climate and meaningful relationships. Visual and structured compensatory tools (13.6%)—such as concept maps, worksheets, storyboards, visual agendas, and checklists—are seen as useful for supporting comprehension, organization, and working memory. A smaller portion of responses (9.6%) emphasized family involvement and team collaboration, stressing the value of cooperation between school, family, and specialists. Lastly, 4.8% of responses were non-specific or general ("I don't know," "It depends"). Overall, the data reveal widespread teacher awareness of the need for multi-level interventions—training, organizational support, teaching strategies, and relational approaches—to effectively and inclusively address the educational needs of students with ADHD.

Embodied Educational Practices Known by Teachers and Usable to Improve Learning for Students with ADHD

When asked, “*Are you familiar with embodied educational practices that can improve the learning quality of students with ADHD?*”, 61.8% of teachers (n=102) responded negatively, while 38.2% were familiar with them. This suggests limited theoretical awareness despite the growing relevance of these practices in educational and neuroscientific contexts. From the open responses of teachers familiar with embodied practices, seven key categories emerged, with relative frequencies calculated as percentages of total mentions (n=50). The most represented category was learning through movement (38%), which includes activities like moving lessons, motor educational games, yoga, and body-integrated teaching, reflecting embodied cognition theory. The mindfulness and body self-regulation category (16%) includes meditation, mindful breathing, and emotional management practices aimed at behavioral regulation. Role-playing and dramatization (12%) and active and cooperative teaching strategies (12%) were also frequently mentioned, emphasizing symbolic representation and active participation. Experiential and outdoor learning made up 10% of mentions, aligning with approaches like Waldorf education. Less frequent categories include multisensory learning (8%) involving manipulatives and sensory activities, and body and relational awareness practices (4%), aimed at fostering self-knowledge and understanding others.

Embodied Practices Perceived as Most Effective in Managing Students with ADHD

In response to the question, “*Which of the embodied educational practices you have used do you find most effective with students with ADHD and why?*”, 37 teachers provided open-ended answers, which were categorized into 10 thematic areas based on frequency and rationale. The most cited category was mindful movement and integrated motor activities (40.5%), including strategies like movement-based learning, educational dance, skipping rope, and motor games. Teachers noted these help channel hyperactivity, enhance motor self-regulation, and improve focus through physical engagement. Sensory and manipulative practices followed (16.2%), involving sensory

games, manipulative materials, and environmental interaction. These support emotional regulation and sustained attention. Role-playing and dramatization (13.5%) were valued for promoting emotional involvement, peer cooperation, and social skill development. Facial expressions and body language (8.1%) were highlighted as key tools for non-verbal communication and emotional connection. Other less frequent but relevant practices included:

- Breathing and body awareness (5.4%) for relaxation and calming.
- Experiential and hands-on learning (5.4%) for engaging, active learning.
- Metacognition and reflection (5.4%) for fostering self-awareness and regulation.
- Spaced learning (2.7%) for alternating activities and breaks to aid memory.

Additionally, 18.9% of respondents reported no direct experience or training in embodied practices, signaling a need for professional development. Another 8.1% gave general responses, reflecting positively on embodied methods without specifying a practice. Overall, structured physical activities were perceived as most effective for students with ADHD, combining movement, emotional regulation, and cognitive engagement.

Additional comments

From the qualitative analysis of open-ended responses provided by a subgroup of teachers ($n = 12$), eight thematic categories emerged, reflecting the perceived educational, organizational, and emotional needs in managing students with ADHD. The most frequently mentioned category concerns the need for professional training (33.3%), with teachers expressing the desire to deepen their competencies through specific courses, digital education, and greater awareness of neurodevelopmental disorders within the school context. Next, with a frequency of 16.7%, is the need for practical tools and structured materials for daily teaching, along with attention to the individual rhythms and needs of students, encouraging a move away from standardized approaches. Other relevant aspects (each at 8.3%) include: the need for support and collaborative work to counter professional isolation; the use of play, sports, and group activities to promote socialization and behavioral regulation; the importance of active listening and empathetic relationships; the value of motivation and the positive channeling of students' energy; and an openness to experimental and flexible teaching methods. These findings highlight the importance of supporting teachers not only at the technical-methodological level but also in relational, organizational, and collaborative dimensions, in order to build truly inclusive environments for students with ADHD.

6. Discussion

The results provide a detailed and meaningful overview of teachers' perceptions, experiences, and needs regarding the management of students with ADHD, with particular attention to embodied educational practices. The gathered evidence allows for reflection on multiple levels: educational, experiential, methodological, and relational. A key finding concerns the widespread direct experience with students with ADHD, involving approximately 43% of the sample. However, this experience does not automatically translate into a perception of competence: the majority of teachers

do not feel adequately prepared to manage such situations. Only a small proportion consider themselves "optimally prepared," and nearly 60% have not received any specific training on ADHD. Even among those who have had access to training programs, there is a predominant judgment of inadequacy regarding the effectiveness and applicability of the skills acquired. This data highlights a gap between experiential exposure and professional preparation, suggesting the urgent need to enhance training offerings both quantitatively and qualitatively. The analysis of the resources and teaching methodologies considered necessary by teachers confirms this need, with a strong demand for professional development (30.4%) and operational, digital, and organizational tools. The importance of personalized, inclusive, and cooperative-experiential strategies is also emphasized, reflecting an increasing awareness of the educational complexity related to ADHD. Responses indicate that teachers not only perceive the need to be trained but also show a clear orientation towards active, dynamic, and participatory methodologies, consistent with current inclusive and neuroeducational perspectives. In this context, embodied practices emerge as an area still underexplored but promising. Only 38.2% of the sample reports being familiar with them, and fewer than a third provide concrete examples of their use. However, among those who have applied them, there is clear recognition of their value: activities that integrate bodily movement in a structured and conscious way (e.g., motor games, learning in movement, educational dance) are considered the most effective in managing ADHD, as they help regulate hyperactivity, improve concentration, and promote multisensory and engaging learning. Practices such as role-playing, mindfulness, and sensory activities are also appreciated for their ability to stimulate attention, support emotional regulation, and strengthen social skills. The limited dissemination of embodied practices among teachers can be interpreted in light of two factors: on one hand, the limited training on the topic; on the other, the lack of systematization and institutional recognition of these approaches within the Italian educational system. Therefore, there is a need to further disseminate both the theoretical and practical knowledge of embodied practices, not only as an innovative tool but as an integral part of inclusive teaching, particularly effective in neurodivergent contexts. Finally, teachers' open-ended responses provide a deeper understanding of the daily challenges and perceived needs: the demand for collaborative support, structured materials, adequate spaces, and an empathetic and flexible approach paints a picture of a school that, despite being driven by will and dedication, often lacks concrete tools to address the complexity of today's educational needs. Overall, the data collected highlights the existence of an educational and innovative potential that is still partially untapped, which could be enhanced through targeted school policies, continuous training programs centered on embodied practices, and greater recognition of the bodily and relational dimensions of learning in managing ADHD.

7. Conclusions

The study highlights the existence of an urgent and widespread training need among teachers regarding ADHD, which should be addressed through updated, practical, and experience-centered training programs. Teachers recognize the usefulness of inclusive, personalized, cooperative, multisensory, and technology-supported strategies but often lack the operational tools to implement them. The

body is recognized by the interviewed teachers as a pedagogical resource to foster attention, emotional regulation, and meaningful learning, and embodied practices are seen as a potential integrated response to the educational needs of students with ADHD, promoting active and situated learning. In light of these results, it is hoped that both initial and in-service teacher training include specific modules on ADHD and embodied methodologies, enhancing the integration of neuroscience, pedagogy, and active teaching. Furthermore, it would be advisable to promote a school culture that recognizes the transformative potential of the body in learning, moving beyond approaches that are still too centered on the written word and the static nature of the school environment.

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