

OUTDOOR EDUCATION AND PHYSICAL ACTIVITY TO STIMULATE CREATIVE THINKING AND INCLUSION IN SCHOOL

EDUCAZIONE ALL'APERTO E ATTIVITÀ FISICA PER STIMOLARE IL PENSIERO CREATIVO E L'INCLUSIONE A SCUOLA

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ABSTRACT

A study of 130 middle school students showed that an outdoor physical education program significantly improves creativity, particularly in students with ADHD. The intervention also increased motivation and sense of belonging, confirming this approach's effectiveness in promoting creativity and well-being at school.

Uno studio su 130 studenti di scuola media ha mostrato che un programma di educazione fisica all'aperto migliora significativamente la creatività, in particolare negli alunni con ADHD. L'intervento ha anche aumentato la motivazione e il senso di appartenenza, confermando l'efficacia di questo approccio per promuovere creatività e benessere a scuola.

KEYWORDS

Outdoor education; Physical education; Creativity; Inclusion; ADHD
Educazione all'aperto; Educazione fisica; Creatività; Inclusione; ADHD

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Introduction

In recent years, outdoor education has been recognised as a teaching methodology capable of promoting experiential learning, psychophysical wellbeing and inclusion. It is not just a matter of moving educational activities outside the classroom, but of proposing a pedagogical approach that values the relationship with the natural environment and situated learning. In this sense, outdoor education is in line with the theories of active and progressive education, from Dewey to Montessori, according to which doing, direct experience and the physical dimension are essential elements for meaningful learning. International literature suggests that outdoor physical activities stimulate not only cognitive and socio-relational dimensions, but also creativity and inclusion (Waite, 2017).

Lower secondary school is a privileged context for experimenting with such approaches, as children of this age group undergo significant cognitive and emotional changes that require innovative and motivating methodologies. At a time when students often tend to show a decline in motivation, inattention and relational difficulties, the adoption of alternative and dynamic educational practices can be a valuable tool for encouraging participation and active involvement.

Creativity, understood as the ability to generate new, original and useful ideas (Runco & Jaeger, 2012), is now considered a key competence for lifelong learning and a necessary resource for addressing the challenges of contemporary society (Robinson, 2011). It is not only linked to the artistic field, but cuts across all areas of knowledge: from mathematics to science, from technology to relationships. Creativity involves the ability to think divergently, to imagine alternative scenarios, to combine familiar elements in new ways and to adapt flexibly to new situations. In education, creativity is no longer seen as an innate talent possessed by a few, but as a distributed and developable skill that can emerge and consolidate in appropriate contexts. Numerous studies emphasise that it can be fostered through experiences that stimulate curiosity, encourage exploration, and reduce the fear of making mistakes (Craft, 2005). Creativity thrives in an open learning environment, where mistakes are seen as opportunities for growth rather than penalties.

Physical and sporting activities offer ideal conditions for this type of learning, as they stimulate physical problem-solving processes (adapting to spaces, rules, unexpected events), encourage cooperation and promote personal expression through movement. The physical and cognitive dimensions are closely intertwined: moving in natural environments, facing motor challenges and collaborating in team games becomes an opportunity to activate divergent thinking (generating multiple solutions), cognitive flexibility (adapting strategies), originality (proposing new ways of interacting or moving) and elaboration (developing and refining ideas).

Furthermore, creativity plays an inclusive role: activities that require imagination, invention and collaboration allow each pupil to contribute their own resources, regardless of their traditional academic performance. In this sense, creativity is linked to the theme of valuing differences and is a powerful tool for building a sense of belonging and mutual recognition within the class group.

The new challenges of contemporary pedagogy require us to go beyond the transmission of knowledge in order to promote educational processes centred on autonomy, critical thinking and the ability to deal with complex situations (Morin, 2000). From this perspective, schools are called upon to create learning environments that combine disciplinary rigour and creativity, stimulating a flexible, innovative and inclusive attitude in students. Outdoor education practices meet these needs by offering concrete and meaningful experiences, valuing contact with nature and stimulating physical and experiential learning that strengthens the link between theory and practice (Beames, Higgins & Nicol, 2012).

Particular attention should be paid to pupils with ADHD, for whom contact with open environments and structured physical activities can have positive effects on both behaviour and creative abilities (Barkley, 2015). Several studies have shown that the natural environment and physical activities can reduce symptoms of inattention and hyperactivity, while improving self-regulation, concentration and problem-solving skills (Taylor & Kuo, 2009). Furthermore, outdoor education promotes inclusive dynamics, as it reduces the barriers associated with traditional school contexts and values individual differences as a resource for the group (Mannion, Fenwick & Lynch, 2013).

In light of these considerations, the integration of outdoor physical activities with educational objectives appears to be a pedagogical strategy capable not only of supporting the development of creativity, but also of responding to new educational challenges related to inclusion, well-being and the enhancement of differences. The research presented here fits into this theoretical framework and aims to investigate, using both quantitative and qualitative approaches, the effects of outdoor education combined with physical activities on creativity and inclusive processes in lower secondary schools.

1. Research objective

This study aims to systematically investigate the effects of a teaching intervention that integrates outdoor education with physical education activities on the development of creativity and the perception of inclusion among peers in students at a lower secondary school in Naples. The intervention aims to understand whether and to what extent an experiential and physical approach can promote the development of the creative dimensions identified by the Torrance Test of Creative

Thinking (TTCT) – fluency, flexibility, originality and elaboration – compared to a traditional physical education programme carried out exclusively in the gym.

The overall objective is therefore twofold: on the one hand, to quantitatively verify, through the TTCT, the improvement in creative skills in students involved in outdoor activities; on the other hand, to qualitatively investigate, through interviews and observations, the students' perception of their involvement, their sense of belonging to the group and the dynamics of inclusion that develop during the activities.

In addition to this, particular attention was paid to pupils diagnosed with ADHD, who were distributed equally between the experimental group and the control group. In this subgroup, the specific objective is to assess whether outdoor activities can provide a privileged context for the expression of creativity and the reduction of relational and behavioural barriers, promoting processes of self-regulation, motivation and active participation.

In summary, the specific objectives of the research are:

- To quantify the impact of outdoor and physical education activities on the development of the four dimensions of creativity (fluidity, flexibility, originality, elaboration).
- To compare the results of the experimental group with those of the control group, highlighting the differences in the progress achieved.
- To investigate pupils' perceptions of their educational experience, with particular attention to their sense of inclusion and their relationship with their peers.
- To analyse teachers' observations regarding the evolution of students' creative and collaborative behaviours during the course.
- Assess whether and to what extent the intervention had different effects on students with ADHD compared to their peers, both in terms of creative development and participation and inclusion.

Through this dual qualitative-quantitative perspective, the study aims to provide empirical evidence on the effectiveness of outdoor education as an innovative and inclusive methodology capable of integrating the cognitive, emotional and social development of students in an urban school setting.

The research sample consists of 130 students attending a lower secondary school located in the urban area of Naples. The age range of the pupils involved is between 11 and 13 years, corresponding to the transition from childhood to adolescence, a particularly important period for the development of socio-cognitive and creative skills.

The students were divided into two equivalent groups:

- Experimental group (n=65), which participated in outdoor education combined with physical education activities.
- Control group (n=65), which continued to attend the usual physical education classes in the gym, without any methodological changes.

To ensure a balance between the two groups, the distribution was randomised, ensuring homogeneity with respect to basic variables such as age, gender and school level. Within the overall sample, 12 pupils with a clinical diagnosis of ADHD were identified on the basis of certificates submitted by their families and validated by the school; they were divided evenly between the experimental group (n=6) and the control group (n=6), so as to allow a more accurate comparative analysis of the effectiveness of the intervention on this subgroup.

Participation in the study also involved physical education teachers and some curriculum teachers, who were asked to contribute to the qualitative observations. Before the start of the research, informed consent was obtained from the students' families, with particular attention to privacy and the use of data exclusively for scientific purposes.

The choice of a medium-large sample representative of a complex urban context such as Naples allows us to draw significant conclusions about the transferability of the educational model under investigation. Furthermore, the presence of students with ADHD, distributed equally in the two groups, makes it possible to explore the inclusive dimension of the intervention and verify whether outdoor education can be configured as a teaching practice capable of reducing gaps related to attention and behavioural difficulties, while enhancing the creative potential of students.

2. Participant inclusion criteria

To ensure the homogeneity of the sample and the validity of the results, specific inclusion criteria were defined for the selection of students participating in the research.

All students:

- were regularly enrolled and attending a lower secondary school located in the urban area of Naples;
- were aged between 11 and 13 (corresponding to the first, second and third years of lower secondary school);
- had regular school attendance (absences not exceeding 25% of the annual hours scheduled for physical education);
- did not have severe motor disabilities or medical conditions that would contraindicate participation in moderate-intensity physical activities;
- had received informed consent from their families to participate in the project and for the collection/analysis of data.

Specific inclusion criteria for students with ADHD
For the subgroup of students diagnosed with Attention Deficit/Hyperactivity Disorder (ADHD), additional selection criteria were adopted:

- presence of a certified clinical diagnosis of ADHD issued by a child neuropsychiatrist or child and adolescent neuropsychiatry service (NPIA), in accordance with DSM-5 or ICD-10 criteria;
- school placement in mainstream classes with certification filed with the school;
- absence of severe comorbidities (e.g., low-functioning autism spectrum disorders, severe intellectual disability, acute psychiatric disorders) that could compromise participation in the proposed activities;
- voluntary participation of the students themselves, in addition to the consent of their families, as an essential motivational factor;
- balanced distribution in the two groups (experimental and control) to allow for comparative analysis.

3. Data analysis tools

To ensure a rigorous qualitative-quantitative approach, the study involved the integrated use of standardised tools and qualitative assessment techniques in order to investigate both the cognitive dimensions related to creativity and the experiential and relational aspects experienced by the pupils.

Quantitative analysis

The Torrance Test of Creative Thinking (TTCT, Figural Form), one of the most widely used and internationally validated tools for measuring creative thinking (Torrance, 1974), was used to assess creative abilities. The test allows four fundamental dimensions of creativity to be measured:

- Fluidity: the ability to produce a large number of ideas in response to a stimulus;
- Flexibility: the ability to move from one category of thought to another, generating diverse solutions;
- Originality: the ability to propose unusual or innovative responses;
- Elaboration: degree of development, enrichment and detail of the ideas proposed.

The TTCT was administered at two distinct moments: pre-test (before the start of the intervention) and post-test (at the end of the programme), thus allowing a statistical comparison between the scores of the two groups (experimental and control).

4. Qualitative analysis

At the same time, in order to explore the subjective perceptions of the pupils and observe dynamics that are not always detectable through standardised tools, various qualitative tools were used:

- Semi-structured interviews with pupils, aimed at gathering personal experiences of outdoor activities, with particular attention to the perception of inclusion, the level of involvement and satisfaction with the experiences offered. The interviews were conducted in small groups to encourage spontaneity and reduce any conditioning.

- Systematic observations during the activities, conducted by external researchers and the teachers involved, using structured grids that examined behaviours related to collaboration, the ability to generate creative solutions and active participation.
- Interviews with teachers, aimed at gathering the views of physical education teachers and other curriculum teachers on the evolution of student behaviour, with specific reference to the dimensions of fluidity, flexibility, originality and elaboration.

The data collected were transcribed in full and then subjected to thematic analysis (Braun & Clarke, 2006), divided into several phases:

1. Familiarisation with the data: repeated reading of the transcripts and observation grids, with preliminary annotation of emerging concepts.
2. Initial coding: identification and categorisation of relevant text segments, assigning descriptive codes related to inclusion, motivation, participation and creative behaviours.
3. Theme construction: grouping of codes into thematic macro-categories (e.g., 'peer collaboration', 'difficulty management', 'creative expression through the body').
4. Theme review: comparison between researchers to reduce subjectivity and ensure interpretative consistency; triangulation with quantitative data to verify the convergence of results.
5. Definition and naming of themes: formalisation of final categories and selection of significant excerpts from interviews and observations to illustrate the results.
6. Interpretation and integration: linking the themes that emerged with the theoretical framework and research objectives in order to highlight the relationship between outdoor education, creativity and inclusion.

The adoption of this analytical process ensured transparency, consistency and reliability in the interpretation of qualitative data, reducing the risk of subjective bias and promoting solid triangulation with quantitative results.

5. Educational intervention

The educational intervention was designed with the aim of integrating *outdoor education* methodologies with physical education activities, in a two-month programme consisting of two weekly meetings lasting 90 minutes each. The activities were carried out in the school's outdoor spaces and in neighbouring green areas, so as to encourage direct contact with the natural environment and stimulate experiential learning.

The motor activities were designed to stimulate the four dimensions of creativity identified by the TTCT (fluidity, flexibility, originality, elaboration) through teaching based on movement, problem-solving and collaboration. In particular, the following activities were carried out:

- Cooperative and team-building activities (e.g. relay games, collaborative courses, development of common strategies), aimed at developing conceptual fluidity and the ability to generate numerous motor solutions in a short time (Lubart, 2003).
- Motor problem-solving exercises (e.g. overcoming natural obstacles, creating paths with materials from the environment), aimed at stimulating cognitive flexibility and the ability to adapt to constantly changing contexts (Guilford, 1967).
- Physical and symbolic expression activities (e.g. representing emotions, stories or concepts through movement and mimicry), with the aim of encouraging originality and imagination (Craft, 2005).
- Moments of reflection and re-elaboration in small groups, during which students discussed the strategies adopted, re-elaborated the activities carried out and proposed variations or improvements, stimulating the ability to process and enrich ideas (Torrance, 1974).

The methodology adopted focused on the body and direct experience as privileged tools for learning, in line with the principles of experiential education (Kolb, 1984) and the constructivist perspective, according to which knowledge is actively constructed through interaction with the environment and with others (Vygotsky, 1978).

Particular attention was paid to students with ADHD: to encourage their active participation, the activities were structured in a dynamic and varied way and were relatively short in duration, so as to maintain high motivation and reduce the risk of inattention. The outdoor motor approach offered them the opportunity to

channel their energy into constructive and creative tasks, as already highlighted by studies that emphasise the effectiveness of movement and contact with nature in managing symptoms of inattention and hyperactivity (Taylor & Kuo, 2009; Barkley, 2015).

Finally, inclusiveness was ensured through the choice of cooperative activities, which allowed each pupil to contribute their own resources to the success of the group. In this sense, the intervention had not only cognitive value, but also socio-relational value, helping to build a positive, supportive and learning-friendly environment, in line with research on the effectiveness of outdoor education in promoting well-being and social cohesion (Beames, Higgins & Nicol, 2012; Waite, 2017).

6. Analysis of quantitative data

Analysis of the results obtained through the Torrance Test of Creative Thinking (TTCT) showed significant differences in the development of creative skills for both neurotypical students (n=118) and those diagnosed with ADHD (n=12), equally distributed across the two research groups. In the experimental group, composed of 59 neurotypical students and 6 with ADHD (), the improvements were consistent and transversal across all dimensions of creativity. Neurotypical students recorded an average increase of +20% in fluency, +17% in flexibility, +22% in originality and +16% in elaboration, confirming their greater ability to generate numerous, diverse, innovative and enriched ideas compared to the initial phase. At the same time, students with ADHD showed even more significant progress: fluency increased by +28%, flexibility by +22%, originality by +31% and elaboration by +20%. These results suggest that the outdoor environment, characterised by dynamic stimuli and cooperative activities, particularly encouraged the generation of new and unconventional ideas in pupils with attention difficulties, allowing them to channel their energy into constructive and creative tasks.

In the control group, also composed of 59 neurotypical students and 6 with ADHD, progress was much more modest and not statistically significant: between +3% and +6% for both categories of students, with no significant changes in flexibility and originality. This trend confirms that traditional motor activities carried out in the gym had a limited impact on the development of creative skills.

The comparison between the two groups highlights that the outdoor educational intervention had a positive impact not only on neurotypical students, who were

able to strengthen complex cognitive processes such as divergent thinking and problem solving, but above all on students with ADHD, for whom the experience proved to be a privileged context for creative expression and the reduction of attentional and behavioural barriers. These results are confirmed in the literature, which emphasises the role of outdoor education and structured physical activities in promoting self-regulation, concentration and creative thinking (Kirk, 2010; Craft, 2005; Taylor & Kuo, 2009; Barkley, 2015).

In summary, the quantitative data confirm that outdoor education integrated with physical activity is an effective and inclusive teaching strategy, capable of supporting the creative skills of all students, offering pupils with ADHD opportunities for growth that are comparable – and in some cases superior – to those of their neurotypical peers.

7. Qualitative data analysis

The qualitative analysis, conducted through semi-structured interviews with pupils and teachers and through systematic observations during the activities, provided further insights into the impact of outdoor education on the experiential, relational and inclusive levels.

From the students' point of view, the majority of participants in the experimental group said they found the activities engaging, stimulating and fun, emphasising how the outdoor environment fostered a sense of freedom, creativity and collaboration with their peers. Many described the cooperative activities as opportunities to strengthen their sense of belonging and create new relationships: *'When we work together and s outside, it's easier to get to know each other, no one is left behind'* (neurotypical student, 12 years old); *'I feel part of the team, even if I'm not as fast as the others'* (student with ADHD, 11 years old).

Students with ADHD, in particular, repeatedly reported feeling that the environment was more inclusive and less judgemental than traditional gym classes. They highlighted how being able to move freely and try out personal strategies reduced their feelings of frustration: *'Outdoors, I don't always feel like I'm being told off for moving around too much'* (student with ADHD, aged 12). In addition, motor problem-solving activities were perceived as a privileged space for expressing energy and creativity: *'I like to invent different ways to overcome the obstacles; there is no single right way'* (student with ADHD, aged 13).

From the teachers' point of view, observations confirmed an increase in motivation, active participation and cooperation among students in the experimental group. A physical education teacher said: *'Even the shyest children found the courage to propose new solutions when working outdoors'*. Other teachers noted an improvement in collaboration skills and a decrease in conflicts: *"During team games, the children learned to support each other, and this reduced exclusionary behaviour"* (curriculum teacher).

Particular emphasis was placed on pupils with ADHD, who are usually perceived as more inattentive or impulsive, but who showed visible progress in collaboration and concentration on the task. As one teacher observed: *'Outdoors, they are able to channel their energy better; they do not see it as a limitation but as a resource'*.

Overall, the qualitative data confirm and enrich the quantitative results: the intervention not only stimulated creative skills, but also promoted inclusion, well-being and a positive relational climate. The voices of students and teachers emphasise how outdoor education, when integrated with physical education methodologies, can be an effective pedagogical tool for combining learning, creativity and social cohesion (Beames, Higgins & Nicol, 2012; Waite, 2017).

8. Discussion

The results of the study significantly confirm the effectiveness of outdoor education integrated with physical activity as an innovative and inclusive teaching tool, capable of stimulating creativity and promoting positive relational dynamics. The increase observed in the four dimensions of creative thinking (fluidity, flexibility, originality, elaboration), which was more marked in the experimental group than in the control group, is in line with the literature that recognises outdoor environments as a favourable context for generating divergent ideas and experimenting with alternative solutions (Craft, 2005; Kirk, 2010). In particular, contact with nature and the use of the body in cooperative activities have enabled experiential learning that strengthens not only cognitive skills but also socio-emotional skills, in accordance with Kolb's experiential education models (1984) and Vygotsky's constructivist perspectives (1978).

A significant aspect concerns the positive impact recorded in students with ADHD. Structured motor activities in open spaces allowed these pupils to channel their energy and reduce impulsive behaviour, confirming the research of Taylor and Kuo (2009) and Barkley (2015), according to which nature and movement provide

concrete support for attention and behavioural regulation. The improvement in the creative dimensions of students with ADHD, in some cases greater than that of their neurotypical peers, highlights the inclusive potential of such practices, which reduce the barriers of the traditional school setting and value individual differences as resources for the group (Mannion, Fenwick & Lynch, 2013). This data appears particularly significant when considering that these students, often perceived as 'problematic' or 'inattentive', have had the opportunity to experience success, recognition and creative protagonism.

From a pedagogical point of view, it emerges that creativity should not be understood solely as the production of original ideas, but as a relational and inclusive skill. In fact, creative processes developed mainly within collaborative contexts, in which students learned to build solutions together, negotiate strategies and recognise individual contributions as part of a common project. This confirms Csikszentmihalyi's (1996) view of creativity as a systemic phenomenon, the result of interaction between the individual, the group and the cultural context. In this sense, outdoor education has created the environmental and social conditions for creativity to emerge not as an isolated act, but as a collective process.

Another element that emerged from the observations concerns the perception of well-being at school. The outdoor environment was experienced by students as more free, stimulating and less judgemental, reducing the performance pressure typical of classroom teaching or physical education lessons in the gym. This aspect is particularly relevant in the context of European education policies, which recognise wellbeing and creativity as key dimensions of citizenship skills (Council of the European Union, 2018). Providing contexts in which students can feel welcomed, valued and motivated means promoting not only academic learning but also personal and social growth.

From a methodological point of view, the qualitative data collected through interviews and observations enriched and complemented the quantitative evidence. The students' testimonies highlighted emotional and motivational experiences that are difficult to detect through standardised tests. Many students emphasised how the outdoor experience made it 'easier to get to know each other', 'more fun to work together' and 'more natural to feel part of the group'. These elements indicate that learning is never a purely cognitive process, but involves emotions, relationships and motivations, confirming the importance of adopting a holistic approach to education.

A further point for reflection concerns the transformative potential of outdoor practices. If integrated permanently into school curricula, they could help to overcome a vision of school centred on the transmission of knowledge in favour of dynamic, participatory and interdisciplinary educational processes. Creative physical activities in natural contexts can in fact connect scientific, artistic and relational skills, contributing to a more comprehensive education for students.

Of course, the study also has its limitations: the relatively short duration of the intervention (two months) does not allow us to establish with certainty the stability of the progress observed in the long term. Furthermore, the research was conducted in a specific urban context (Naples), so the transferability of the results to other geographical and cultural contexts requires further verification. However, the complexity and richness of the Neapolitan context represent a significant testing ground for inclusive educational methodologies.

Looking ahead, it would be desirable to extend the trial period, include a larger and more diverse sample, and use longitudinal methodologies to investigate the effects of outdoor education on creativity development and medium- to long-term well-being. A further development could be to involve families and the local community, thereby strengthening the educational continuity and openness of the school to the local area.

Overall, the data indicate that the combination of outdoor education and physical education can be an effective pedagogical tool that can also be transferred to complex urban contexts such as Naples. In addition to enhancing creative skills, the intervention contributed to the construction of meaningful and inclusive relationships, suggesting the need to integrate these methodologies into school curricula in a more structured way. Ultimately, it is a question of imagining a school that is not limited to transmitting knowledge, but is capable of cultivating creativity, inclusion and wellbeing, thus responding to the educational needs of the new generations and the challenges of contemporary society.

Conclusions

This study has shown how the integration of outdoor education activities with physical education can be an effective pedagogical practice in promoting creativity, inclusion and well-being among lower secondary school students. Quantitative data showed significant improvements in the four dimensions of creative thinking (fluency, flexibility, originality and elaboration), with a particularly positive impact

on students with ADHD, who benefited markedly from the conditions of freedom, movement and collaboration offered by the outdoor environment. These findings are consistent with Torrance's research (1974), which identifies movement and variety of stimuli as crucial factors in activating h r divergent thinking, and with the studies by Taylor and Kuo (2009), according to which contact with nature improves attention and self-regulation skills in pupils with attention difficulties.

At the same time, qualitative data confirmed that these experiences fostered a widespread sense of participation, belonging and cooperation, creating a more positive and inclusive school environment. This result is consistent with the literature that recognises outdoor education as a privileged context for building meaningful relationships and valuing individual differences (Mannion, Fenwick & Lynch, 2013; Waite, 2017).

These results are significant not only scientifically, but also for their practical implications in education: the systematic adoption of outdoor activities integrated into school curricula can be a concrete response to contemporary pedagogical challenges, aimed at enhancing creativity (Runco & Jaeger, 2012; Robinson, 2011), individual differences and the development of transversal skills (Morin, 2000). At the same time, the study suggests the need for further longitudinal and comparative research to investigate the sustainability and transferability of such practices in different school and cultural contexts. Ultimately, outdoor education, combined with physical activity, is a strategic resource for schools capable of combining learning, inclusion and innovation, promoting the integral development of students (Beames, Higgins & Nicol, 2012; Kirk, 2010).

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