Outdoor sports as a tool for environmental sustainability: An educational model for schools and communities

by *Roberta Minino*[*], *Marko Joksimovic*[^], *Emahnuel Troisi Lopez*[*]

Abstract

The rising importance of responsible environmental behaviour requires educational approaches that integrate sustainability into daily practices. Outdoor physical education combines sports activities with contact with nature, offering an effective way to foster ecological awareness and promote sustainability. These practices not only improve individuals' psychophysical wellbeing but also develop sense of responsibility toward the environment. This article aims to examine the state of the art on the benefits of outdoor physical education, emphasising its role in encouraging eco-responsible behaviours and supporting sustainability. It also explores how outdoor learning environments can provide valuable insights for future developments in educational practices aimed at sustainability.
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1. Introduction

The concept of Outdoor Education has acquired a very important role in educational contexts in recent years due to its ability to promote the development of several skills such as motor, cognitive, social and environmental ones, through experiential learning within natural settings.

[*] Department of Education and Sport Sciences, Pegaso Telematic University, 80143 Naples, Italy.
[^] Faculty of Sports and Physical Education, University of Montenegro, Cetinjski put 2, 81000 Podgorica, Montenegro

This approach falls perfectly in line with the objectives of the United Nations 2030 Agenda, which set the goal of building a more sustainable and inclusive world through a framework of global targets. In particular, Outdoor Education concretely responds to Goal 4, which promotes quality education, Goal 10, which aims to reduce inequality, and Goal 11, which aims to encourage the creation of sustainable communities and cities (Bexell & and Jönsson, 2017).

Outdoor Education is an innovative educational modality involving a form of active learning, and in particular this form of learning takes place through outdoor educational activities. This process has numerous positive effects in stimulating their curiosity in learning new knowledge, improves students' problem solving and teamwork skills(Mackenzie et al., 2018). Numerous studies have shown that this approach not only promotes physical and mental well-being, but also strengthens social bonds and increases environmental awareness(Hartig et al., 2011; Pirchio et al., 2021).

One of the most interesting aspects of outdoor education is its natural alignment with physical activity. Physical experiences in nature not only enhance physical health, but also contribute to cognitive development, improving executive functions and promoting social inclusion(Fromel et al., 2017; Pomfret et al., 2023; Sutton & Wheatley, 2003). Activities such as hiking, orienteering, cycling and any other outdoor sport invite individuals of all backgrounds and abilities to actively participate and collaborate with each other (Leeder & Beaumont, 2025). Indeed, a further central aspect of outdoor activities is their ability to be designed and adapted to the needs and abilities of each individual, thus laying the foundations for authentic social inclusion. Indeed, adapted sports programs, such as accessible trekking or climbing for persons with disabilities, have been shown to improve not only the motor skills of participants, but also their sense of belonging and self-esteem(Hamilton et al., 2023; Isidoro-Cabañas et al., 2023; Warren & Breunig, 2019).

Furthermore, it has been shown that an individual, when in contact with nature, reduces stress and anxiety levels, and increases motivation, thus making the learning process more immediate and accessible (Bento & Dias, 2017).

For this reason, the inclusion of outdoor education programmes within school curricula represents a concrete opportunity to enrich students' learning experience and make learning more dynamic. Traditional education, often limited to closed spaces and frontal methods, can benefit from the integration of outdoor activities, which stimulate active involvement, creativity and the development of transversal skills.

Indeed, from a pedagogical perspective, Outdoor Education allows for an interdisciplinary approach, integrating disciplines such as science, physical education, geography and art in a single experiential context (Neville et al., 2023).

A further central element of outdoor education and outdoor sports is their ability to raise awareness among individuals and students of the importance of the environment and ecological sustainability. Activities in natural settings offer a unique opportunity to develop a direct connection with the environment, promoting responsible and ecosystem-friendly behaviour. Numerous studies have shown that experiential learning in natural environments strengthens environmental awareness and stimulates the adoption of sustainable practices, such as waste reduction, responsible use of resources and active mobility (Chawla, 2020; Rickinson et al., 2004).

The aim of this work was therefore to analyse the role of Outdoor Education in the field of physical education and school training, with particular attention to its ability to promote greater environmental awareness and to encourage sustainable behaviour. The main objective is to investigate how outdoor experiential learning can stimulate in students a more direct relationship with the environment, encouraging attitudes of respect and care for the planet, as well as contributing to their psychophysical wellbeing and the development of motor, cognitive and social skills.

A central aspect of this analysis concerns the potential of Outdoor Education in forming more ecologically aware citizens, through concrete experiences that allow them to understand the importance of biodiversity, the management of natural resources and the reduction of environmental impact. Living and learning outdoors helps students develop a sense of responsibility towards the environment, prompting them to integrate sustainable practices such as waste reduction, active mobility and respect for ecosystems into their daily lives.

2. The positive effect of Outdoor Sports

Outdoor sports encompass a wide range of sporting activities that are performed in natural environments, including cycling, boating, hiking, climbing, orienteering, skiing and surfing, and so on.

The prevalence of outdoor physical activity varies widely between countries depending on geographical, economic and cultural factors. The Scandinavian countries, for example, are among the countries that most promote outdoor sports activities. The Scandinavian countries, for example, are among those that most promote outdoor sports activities. In these

countries, *friluftsliv*, a philosophy of life, is well known. It is a complex philosophical concept, which only exists in Scandinavia, and means 'life in the open air', essentially indicating a lifestyle in contact with nature (Gelter, 1999).

In North America, the wide availability of national parks and protected areas has favoured the growth of sports such as rafting, mountain biking and climbing (Cordell, 2012). Even in Australia and New Zealand, countries with a wide variety of ecosystems, outdoor sports are widely practised, with a focus on water sports such as surfing. In contrast, in countries with a high urban density, such as Japan or South Korea, the availability of open, natural spaces is limited and high outdoor temperatures, often exacerbated by the urban heat island phenomenon, can reduce opportunities for outdoor physical activity. However, in recent years, efforts have increased to create green spaces and infrastructures that encourage outdoor physical activity, seeking to mitigate the negative effects of climate change and improve the quality of the urban environment (Asano et al., 2022).

Fortunately, many other countries, as well as Japan and South Korea, are taking action to counter this limitation. They are investing in the creation of infrastructures and natural spaces to encourage the practice of outdoor physical activities, as well as incorporating and approving projects within educational contexts for many reasons.

It is now widely known that sport in general (i.e. outdoor or indoor) offers numerous physical health benefits, improving general fitness and preventing chronic diseases(Agarwal, 2012; Zureigat et al., 2024). With regard to outdoor sports in particular, scientific studies have shown that the regular practice of outdoor activities improves cardiovascular health and reduces the risk of hypertension and heart disease (Poli et al., 2025). Outdoor physical activity, as well as indoor ones, also helps in controlling body weight and preventing type 2 diabetes due to the combination of aerobic exercise and increased energy expenditure. In addition, movement in natural environments strengthens the immune system and the musculoskeletal system, helping to reduce the risk of osteoporosis and fractures, as exposure to nature and sunlight boosts vitamin D production and improves the immune system (Kil & Yang, 2012).

In addition to the physical benefits, which we can consider fairly equivalent to indoor sports, outdoor sports have a positive impact on mental health. Exercise in contact with nature has been associated with a reduction in stress and anxiety levels, with measurable effects on reducing cortisol production(Bratman et al., 2012). It also stimulates the release of endorphins and serotonin, improving mood and reducing symptoms of anxiety and depression (Maas et al., 2009; Pretty et al., 2005; White et al., 2019). Studies

have shown that exposure to natural landscapes and physical activity combined improve concentration and memory, contributing to the development and enhancement of executive functions (Berman et al., 2008). In addition, the regular practice of outdoor sports has been associated with improved sleep quality and emotional regulation, which are key aspects of overall well-being (Bowler et al., 2010).

3. Outdoor Sports and Awareness for Sustainability

Practising outdoor sports is not only a way to stay physically active and have better physical and mental wellbeing (Matos et al., 2017), but also represents a vital platform to promote ecological awareness and commitment to environmental sustainability (Louv, 2005). This is an issue that has become increasingly relevant in the current global context, in which climate change, with its devastating impacts on the environment, calls for an urgent need to adopt responsible behaviour and to sensitise new generations towards the preservation of our planet. In this perspective, through participation in outdoor activities, students have the opportunity to immerse themselves in natural environments, developing a deep connection with nature. This direct contact stimulates a greater understanding of biodiversity and the fragile ecological balances that mark our ecosystems. Indeed, recent studies have shown that regular exposure to natural landscapes not only improves psychological well-being, but also increases empathy towards living beings, fostering inclusion and acceptance of diversity, and the desire to protect the environment (Gladwell et al., 2013).

In the global context in which we live, increasingly characterised by climate and environmental challenges, it is crucial that new generations understand the importance of responsible consumption and resource conservation. And as we have just reported, the practice of outdoor sports offers a unique opportunity to build ecological awareness, encouraging young people to become responsible citizens committed to environmental protection. Activities such as forest orienteering, trekking in protected areas, climbing on local cliffs or rafting in clean rivers not only stimulate an interest in adventure, but also educate individuals of all age groups on the sustainable management of resources, the importance of biodiversity and the need to minimise human impact on the environment(Messina et al., 2015; Salazar et al., 2024).

Consequently, it is essential to provide educational contexts that support this awareness. It is therefore equally important to consider that the new generations need educational venues that make them aware of this

topic(Børresen et al., 2023). Therefore, it is crucial to recognise that new generations require educational spaces that raise awareness about environmental sustainability. Considering the points discussed so far, it becomes clear that outdoor educational activities, combined with physical activities and sports in natural environments, are key elements in fostering an understanding of environmental sustainability among younger generations.

Furthermore, shared experiences in nature through outdoor sports create a sense of community and a collective commitment to sustainability. Groups of students practising outdoor sports together develop a collaborative mindset, encouraging discussions on ecological issues and joint actions to address environmental challenges. The networks and social connections created through these experiences can encourage young people to undertake ecological initiatives outside the school environment as well, such as participating in environmental volunteering projects or supporting awareness-raising campaigns (Sandford et al., 2008).

4. Inclusion of Outdoor Sports in Educational Setting

Based to what has been reported so far, the importance of including outdoor motor and sports activities in educational settings is clear. The inclusion of outdoor sports in the physical education curricula represents a fundamental educational strategy that goes beyond the simple traditional approach, offering a viable alternative to conventional teaching practices.

By supplementing the traditional teaching approach with motor activity outdoors and in contact with nature, schools not only enrich the learning experience, but also promote holistic development in students.

Outdoor sports encourage active, hands-on learning, where students are not mere receivers of information, but become active participants in their own educational process. This mode of learning enables the development not only of physical skills, but also of social, cognitive and transversal skills, such as resilience, leadership and risk management, all of which are essential for personal growth.

Outdoor activities foster socialisation and the building of interpersonal bonds, as they frequently require teamwork, communication and cooperation. This is particularly relevant in classes where students may come from different cultural and socio-economic backgrounds. Shared experience in a natural setting facilitates inclusion, allowing each pupil to contribute his or her unique abilities, fostering a culture of empathy and mutual support.

In addition, the teaching of outdoor sports also offers an important opportunity for the integration of theory with practice. Schools can develop interdisciplinary projects that link physical education with natural sciences, environmental education and even art education. For example, while students practice orienteering, they can learn to read maps, understand local ecosystems and discuss the importance of environmental conservation. In addition, nature itself becomes an exploratory laboratory: students can observe the effects of weather and climate conditions on fauna and flora, thus integrating theoretical knowledge with practical experience. The inclusion of activities outside the traditional classroom helps to break the monotony of the education system by incorporating what are termed 'active breaks', which are essential for young students to break the sedentary nature of the classroom and improve concentration for the next lesson.

The integration of outdoor sports into school curricula also has positive long-term effects, encouraging students to maintain an active and healthy lifestyle by continuing outdoor activities even after they leave school.

To ensure that the integration of outdoor sports is effective, it is crucial that schools adequately train their teaching staff to develop structured programmes that optimise the benefits of these outdoor experiences. Investment must be made in the training, resources and infrastructure that support these initiatives. Only in this way will education systems be able to reap the full benefits of outdoor sports, fostering a more active, competent and aware generation of students.

Indeed, recent studies has shown that the specific preparation of teachers in outdoor methodologies significantly improves their self-efficacy and competence in integrating such activities into the school curriculum, ensuring more structured and safe experiences for students(Dyment & Potter, 2015).

One of the key aspects of training is learning teaching strategies that foster an interdisciplinary approach, combining physical education with other disciplines, such as environmental science and sustainability education (Quay et al., 2020). Properly trained teachers are able to exploit natural environments as learning laboratories, offering students immersive experiences that facilitate the link between theory and practice.

Conclusions

In conclusion, this literature analysis shows that outdoor education and outdoor sports are fundamental as educational strategies for enhancing experiential learning and the holistic development of students. This approach

not only promotes motor, cognitive and social skills, but also instils a deep environmental awareness, helping to form more ecologically responsible citizens.

Numerous studies have shown that integrating outdoor sports activities into schooling stimulates curiosity and motivation, as well as improving students' mental and physical well-being. Direct interaction with the natural environment results in greater empathy for ecological issues and an active commitment to sustainability, thus supporting the goals of the UN 2030 Agenda.

Therefore, it is essential that educational institutions recognise the importance of these programmes and invest in the training of teachers and the creation of adequate infrastructure. Only in this way will it be possible to maximise the benefits of Outdoor Education and ensure that students not only acquire knowledge and skills but also develop a sense of responsibility towards the environment around them. In a global context where environmental challenges are increasingly pressing, the adoption of teaching methodologies incorporating Outdoor Education represents a decisive step towards a sustainable and inclusive future.

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