Outdoor Education and the LAI project: A conceptual framework for an educational experience

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Abstract

For several years, pedagogical research is reflecting on innovative epistemological and methodological questions, and experimented with new forms and opportunities to enhance the quality of educational experiences with special attention to the role played by the environment.
The current contribution seeks to provide a conceptual framework so as to justify the pedagogical premises supporting the holistic LAI (*Laboratorio Ambientale Interattivo*) project – IEL (Interactive Environmental Laboratory).
Developed out of a web of initiatives contingent upon the educational needs of learners, LAI/IEL promotes observable learning activities that can be designed in combination with the training of kinesthetic and relaxation (body awareness) skills in a vertical arboreal space built in the playground of schools with or without a natural environment.
The article focuses on two significant conceptual dimensions: Embodied Cognition and Outdoor Education. An articulated and contextualized description of the LAI is approached as a holistic educational commitment within the programmatic framework of a sustainable didactics.

Da alcuni anni, la ricerca pedagogica sta riflettendo sulle questioni epistemologiche e metodologiche innovative, e sperimenta nuove forme e opportunità per migliorare la qualità delle esperienze educative con particolare attenzione al ruolo giocato dall'ambiente.
Il presente contributo cerca di fornire un quadro concettuale volto a giustificare le premesse pedagogiche a sostegno del progetto olistico LAI (*Laboratorio Ambientale Interattivo*) – IEL (Interactive Environmental Laboratory).

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Concepito da una rete di iniziative che dipendono dai bisogni educativi degli studenti, il LAI/IEL promuove attività di apprendimento osservabili che possono essere progettate in combinazione con la formazione delle abilità cinestesiche e consapevolezza del proprio corpo in uno spazio arboreo verticale costruito nei cortili esterni delle scuole con o senza un ambiente naturale.
L'articolo si focalizza su due dimensioni concettuali significative: Embodied Cognition e Outdoor Education. Una descrizione articolata e contestualizzata del LAI viene affrontata come un approccio educativo olistico all'interno del quadro programmatico di una didattica sostenibile.

Keywords: ecological perspective; embodied education; outdoor education; learning activities; educational sustainability

Parole chiave: prospettiva ecologica; educazione incarnata; educazione all'aria aperta; attività di apprendimento; sostenibilità educativa

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1. Introduction

The subject of the current contribution is the educational proposal of the *Laboratorio Ambientale Interattivo* (henceforth LAI) project, in line with the quality and innovation requirements of the Italian Compulsory Educational System (SEOI). As of 2011, the LAI educational proposal focuses on primary and secondary education schools (from the age of 6 to 18) in the city of Naples. From an ecological perspective (Bronfenbrenner, 1979), the proposal was developed taking into account the educational needs of the institutions involved in the project, nurtured chorally by the stakeholders, namely, the different voices of the educational community (students, teachers, direct support professionals, families, etc.) and by the involvement of bodies such as the UISP (Italian Union of Sport For All) Campania Regional and National Committees.

Our objective is intend to present and summarise the LAI project and define the interdisciplinary conceptual axes that support it. It is beyond the scope of this paper to set out a detailed account of the empirical research methodology used to collect and process the observational data (Escolano-Pérez et al., 2019) obtained to assess its pedagogical effectiveness.

We advance that their assessment includes to conduct powerful quantitative and qualitative analyses with observational data (Escolano-Pérez et al., 2019) that arise from monitoring learners's attitude in response to the activities carried out in 'natural classroom' settings aimed at yielding processes of change in their personal dispositions, and in the way of taking advantage of learning activities: active, constructive and interactive (Chi, 2009). In order to generate in future scientific evidence about the usefulness of the LAI (Izquierdo, 2018), we have assumed the mixed methods methodology inherent to systematic observation (Izquierdo & Anguera, 2021; Anguera et al., 2020).

In other hand, our conceptual-methodological commitment interacts with the gender perspective, social inclusion, and sustainability. Lastly, we declare to incorporate both the sensitivity and resources offered by the humanistic and critical-social paradigm of Participatory Action Research (Orefice, 2006) into our institutional plan. It is crucial for the institutions involved to undertake the task to ensure the LAI values and monitor changes and demands of the society within the reference educational system.

In the sections that follow, we argue that the approaches incorporated as a theoretical foundation of the LAI project are supported by educational research. These issues are the embodied cognition-embodied education and outdoor education.

The central body of the article is completed with a brief description of the facets that give life and educational depth to the "tree-activities" experience. Finally, and by way of conclusion, we incorporate the LAI project into the programmatic order of the Agenda 2030.

2. Embodied cognition perspective

Cognitive neuroscience explores the neural basis of cognition, including perception, attention, language comprehension, memory, problem solving, and decision making (McClelland & Ralph, 2015). In light of this new area of scientific interest, cognitive neuroscience in the education field addresses inclusivity stemming from the variety of individual (typical or atypical) learning modes, and the observable differences between individuals and groups. The seminal metaphor of "embodied cognition", in its impartial version, works as a guiding concept for the LAI project (Fischer et al., 2010; Howard-Jones, 2014; Zadina, 2015), on which to base the holistic interactive learning under the condition that the teaching incorporates the nature-based learning, with other words, the nature experiences. Following Schilhab (2021), we are interested in defining the concept of direct experience as an amalgamation of: sensory experiences, socio-affective and emotional experiences, memories and

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pass experiences. However, the concept of nature that we incorporate, contemplates direct interaction with natural phenomena and processes, but also includes natural experiences induced outdoor or indoor and/or linked to culture.

Researchers belonging to the Mind-Brain-Education movement are exploring the impact of sensorimotor activity beyond the age of two on different academic skills (Osgood-Campbell, 2015), following on, and thus, broadening the path started by Piaget (1954). Additionally, it should be noted that teaching experts interested in embodied education have a number of creditworthy publications (Jensen & McConchie, 2020; Patten & Campbell, 2011) at their disposal, so as to advance the dialogue between theorists, researchers and teachers on Brain-Based Learning (Agostini & Francesconi, 2021).

Having validated the *embodied cognition* metaphor for educational purposes, the first question to be resolved is to clarify what we mean by brain-based learning when we link school education and cultural values to the relationship mind-brain (Howard-Jones, 2009). A second aspect to address is the selection of other references related to *embodied education,* since these can shape the way of seeing and interpreting the dynamics of kinesthetic, cognitive, and socio-affective mediation in LAI learning activities (Ceciliani, 2018; Waller et al., 2017).

Brain-based learning

The neuro-scientific study of learning has aligned itself with the synaptic plasticity hypothesis (Martin et al., 2000) and with the search for patterns of connectivity between neurons and brain structures that operate jointly. Learning, forming memory, and remembering are interconnected functions as the brain learns by incorporating and retaining information. Effective recovery in response to life problems means effective learning (Morgado, 2014). Biological changes observed in the neural networks involved in the formation of different types of memory (implicit memory, explicit memory, working memory) have been interpreted as evidence supporting the brain structures identified in *embodied learning* processes (Tarozzi & Inguaggiato, 2018).

The effective school learning is now explained as an active and self-directed construction of meaning involving collaborative social interaction and reference to the students' real living environment. The question arising is how individual brain-mind relationships, supported by biological and psychological evidence, are likely to contribute to a better understanding of teaching-learning processes in the critical construction of curricular disciplinary knowledge (Torrens, 2019). A progressive approach may provide a varied response to how to shape new teaching-learning strategies taking into consideration the contributions of educational neuroscience.

Taking as a starting point the cognitive systems stablished for primary education (reading, calculation, attention, motivation to result achievement, etc.) and the advances in the biological study of basic sensory processing systems – on which higher cognitive functions are built when growing up, Goswami (2015) provides a research agenda with tangible results in the field of oral language. He argues ideas and methods based on the principles of Brain-Based Learning to be tested in the classroom.

Embodied education

In the field of physical education, movement, sensorimotor or kinaesthetic activities are gaining ground as playing a key role in reading, mathematics, and scientific thinking comprehension (Osgood-Campbell, 2015). The theoretical approaches to active education and developmental psychology have long requested to unveil the profound impact of embodiment on abstract mental representations: ideas and understanding take shape through sensorimotor and tactile interactions with the environment. The significance of body motion in classroom learning activities has been the research focus in cases of visuomotor coordination deficits. It is well known today that schoolchildren who have problems in motor development are likely to also experience learning,

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attention, relational communication disorders, etc. (Dewey et al., 2002). Teacher-mediated movement education (Santoianni & Striano, 2006) offers effective learning opportunities for person-world adaptation. However, the environments where curricular intellectual activities take place, those including kinaesthetic activity, need further investigation and creative thinking (Osgood-Campbell, 2015).

In light of the methodological and didactic model outlined by Goswami (2015), and of her encouraging, cautious proposal on the role of kinaesthetic activity in learning intellectual, motivational and affective curricular skills (Osgood-Campbell, 2015), it is possible to state that education that is based on brain-mind debate is committed to the development of teaching and learning strategies based on widely recognised principles of how the brain works in relation to cognitive functions (Jensen & McConchie, 2020). Individual brain-mind debate is embedded in the psychosocial and natural communicative environment provided by the culture of events involved in the lifelong learning process all new generations embrace. Body and motor experience plays a decisive role in the development of intellectual skills (attention, memory, organisation, problem solving), affective-emotional skills (empathy, stress management) and social skills (effective communication, positive relationships).

In addition, the theoretical recognition of the role of action agrees with the theory of mirror neurons (Rizzolatti et al., 1996) and with the theory of *embodied cognition*, according to which cognition also depends on body type characteristics (information contained in the motor system). In particular, the mirror neurons theory has examined how body fully contributes to interpreting actions performed by others and to clarifying their meaning, such a system would work both when an individual acts and when this individual observes another individual acting. In this perspective, a significant outcome is the fact that we are biologically inclined to recognise what a person is doing; the same process occurs with objects: observing an object means being able to automatically understand what we are able to do with it. This also means, thus, to be ready for potential action, in harmony with the surrounding context, both material and social (Francesconi & Tarozzi, 2012). The dynamic process of action (or potential action) and perception (Paloma, 2013) allows the individual to operate in compliance with the singular body alphabet, an alphabet that is pre-linguistic, pre-conceptual and is the basis for future experiences, as well as for the acquisition of body awareness.

In summary, the embodied cognition-embodied education conceptual axis of the LAI project incorporates:

a) The importance of the effects of movement and conscious learning on human cognitive processes.
b) The embodied conception of school activities that promote the holistic development of the person.
c) Linking the contents of the learning activities with the challenges posed by the natural and built environmental dynamics of the environments in which one is educating.

The deployment of these criteria is posed as a didactic problem addressed from the outdoor education perspective.

3. Outdoor Education perspective

The term *Outdoor Education* (OE) includes a great variety of educational experiences characterized by active teaching that takes place in environments outside the school and which is based on the characteristics of the territory and the social and cultural context in which the school is located. The training offer of OE includes a great variety of educational activities ranging from perceptive-sensory experiences (teaching garden, visits to farms, museums, parks, etc.) to experiences based on socio-motor and exploratory activities typical of adventure education (orienteering, trekking, sailing, etc.), to school projects that combine openness to the natural world with technology (coding, robotics, tinkering, etc.), up to educational paths deeply inspired by the Northern European tradition.

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Originally from northern European countries and widespread there as a response to indoorization phenomena which, starting from the industrial revolution onwards, were the expression of the changed relationship between man and the environment. Today, OE is an educational and pedagogical proposal which also offers a response to the lifestyles imposed by the recent pandemic.

From this point of view it should be noted that it is not enough to leave the classroom to be able to talk about OE but the planning and implementation of OE educational experience require an interdisciplinary approach; the activation and care of interpersonal relationships; the activation of ecosystem relationships.

Furthermore, with the term OE we are not referring only to experiences that take place in natural contexts (school gardens, parks, farms, etc.) but also to educational paths created in urban environments (museums, squares, city parks, etc.), where a direct and concrete relationship with the real world and the involvement in its entirety of the subject in training is guaranteed (cognitive, physical, affective and relational dimensions).

In recent years, OE has gained widespread popularity in Italy (Bortolotti, 2019; Farné , 2018), partly on the basis of the frequent indicators of discomfort and malaise produced by the 'welfare society', which have also produced in children and adolescents what is called *Nature Deficit Disorder*. This phenomenon was due to the progressive expropriation, starting from childhood, of experiences carried out in direct contact with the environment (especially the natural one), to the psychophysical damage caused by a sedentary lifestyle connected to the persistent 'imprisonment' in school and domestic spaces, and partly to the new lifestyles imposed by the pandemic that have encouraged the use and valorization of outdoor spaces as spaces for learning.

The educational experiences of OE have not only highlighted the benefits that the ecosystem brings to human growth, they are also pushing for a structural and sociocultural rethinking of the school system and of the society. In fact, OE has become an increasingly global field of educational experimentation and research, where established and influenced practices have been introduced into modernising and democratising nations in order to support their growth through education (Becker et al., 2018).

The experiences conducted within OE, although often in an experimental way, have received attention and served as study opportunity within the academic community all over the world and have highlighted the impact of outdoor educational experiences on learning as well as on engagement, motivation, socialization at different educational levels.

At a primary school level, research has shown positive outcomes when associating childhood experiences with direct contact with nature and the outdoor environment (Cagle, 2017; Chawla, 2015), leading to socio-emotional benefits such as emotional regulation and improved social skills (Bang et al., 2018; Tillmann et al., 2018).

Moreover outdoor there is evidence that OE experiences enhance facets of pupils' environmental perception (Bogner, 2002) and contribute to develop student's awareness of environmental issues and sensitivity to environmental problems.

Moreover, high school students who have access to them are more likely to show better academic performance (Matsuoka, 2010), as they are encouraged to engage in physical activity (Picavet et al., 2016), and experience increased social cohesion (Weinstein et al., 2015). At the University level, research has demonstrated that green spaces on campus are associated with an improvement in the quality of life among university students (Gulwadi et al., 2019).

Over the years, OE has managed to create a wide range of inspiring educational activities and projects in the education world. These activities can be categorised into two domains: *Outdoor Learning*, which refers to 'formal educational activities', where curricular learning pathways are conducted outside the school building, according to the characteristics of the territory and the socio-cultural context in which the school is located

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(Bortolotti, 2019); *Outdoor Adventure Education*, which encompasses all out of school hour activities, where associative realities offer educational activities, as well as excursions and related activities.

OE urges a shift in the pedagogical vision since it involves overcoming models that hinder the implementation of 'authoritative' educational processes in settings other than the classroom. It encourages consideration of the resources the outdoor environment offers as learning opportunities, which can generate cross-curricular and interdisciplinary knowledge in an engaging and inclusive manner (Bortolotti, 2019).

The recent Guidelines for the implementation of Outdoor Education (Giunti et al., 2021) list a series of essential and peculiar elements such approach bears. These include teaching in environments beyond the school, considering that there is a correlation between indoor and outdoor space, deemed both a learning environment and a place where outdoor curricular activities are designed and implemented as an extension to what takes place in the classroom. Such approach promotes interaction between disciplines belonging to the humanities and scientific fields. Additionally, active teaching methods are emphasised as they aim to help students gain direct experience through hands-on activities, involving the use of the body and the five senses, yield an active participation and an enhanced relationship among both peers and teachers.

Active, or experiential, teaching is an approach that aims to involve students in the learning process, holding them accountable for their own academic achievement. This teaching technique aims to disrupt the traditional rhythms of teaching by offering creative initiatives that increase students' involvement, motivation, excitement, attention and perceived usefulness, and class applicability (Binek-Rivera & Mathews, 2004; Bonwell & Eison, 1991; Guthrie & Cox, 2001; Stewart-Wingfield & Black, 2005). Studies have shown that students involved in active/experiential teaching processes acquire superior synthesis, analysis and evaluation skills compared to students instructed in traditional teaching methodologies (Hackathorn et al., 2011).

It is shown that engaging in physical activity and having active first-hand experience for at least one hour a day unequivocally contribute to enhanced reading, writing, mathematical skills, and improved concentration. In this way, outdoor activity is an invaluable resource for teaching (Ericsson, 2008).

It must be acknowledged that, although teachers recognise the educational potential of outdoor teaching, and the fact that shared experiences in the outdoor environment enhance traditional classroom teaching, their initial training often lacks an Outdoor Education pathway. This gap is often filled by external entities or associations dedicated to outdoor education within the local community.

Rethinking and reassessing the environments is an essential element to allow teachers the necessary flexibility to conduct the different types of teaching required by the Italian education system. This includes increasing hands-on and physical activities, promoting sustainability, and integrating the use of green spaces and technology into teaching practices. These form solid ground for the teaching personnel to work conjointly in a conscious and effective manner. Outdoor experience will promote personal and professional growth by enhancing the emotional competencies that are essential for a teacher to be a facilitator in their students' learning path.

OE and OL related network experiences among active Italian schools, such as the Movimento delle Avanguardie educative (AE), the Outdoor Education network (Giunti et al., 2021) known as 'open-air schools' or the 'network of forest schools', highlight the importance of implementing educational paths in natural environments within the school context. Besides, they emphasise the significance of transferable skills achievable thanks to a redesigned education, auxiliary to institutional training for teachers and educators, which collaterally innovates their professionalism. By giving shape to this sense of 'well-being', everyone feels an integral asset to the school, setting the tone to a pleasant learning environment for students as well (Schenetti, 2022).

In this light, the LAI project, which sees its origins precisely in the environment and experiences lived and conducted within the school context, encompasses all the necessary phases for conducting and carrying out

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learning in both natural and formal environments. It highly regards the role of the teachers and their 'experiential' training, the re-evaluation of 'external' and 'internal' school environment, and the integration with the surrounding territory and local community.

4. LAI project: The experience setting

Acording with what exposed until here, the LAI project is an educational proposal based on the recognition of a relationship between individuals and the natural environment as highly valuable in facilitating learning, within the framework of sustainable environmental education.

Overall, the LAI starts off with an essential basic choice, that is rediscovering the value of the natural environment as an activator of emotional and cognitive processes (Brosch & Steg, 2021), coupled with educational practices based on psycho-pedagogical assumptions which acknowledge a close interrelation between corporeal and cognitive dimensions in the learning process. The LAI stems from the processing of initiatives, launched throughout the years, that involved performing (outdoor and indoor) tasks conducted according to the specific methodologies of mountain sports, particularly rock climbing.

As of the pedagogical framework of Outdoor Education (Bortolotti & Sorzio, 2014) and Embodied Cognition studies that focus on the body as a vehicle for learning (Beilock, 2008; Colombetti, 2013; Paloma et al., 2016; Rivoltella, 2012), the LAI is thought of as a tool aimed at developing affective, bodily-kinesthetic, and cognitive skills through the integration of physical-motor into curriculum-based activities, so as to convey new emotional states in the approach to learning experiences.

Indeed, bodily and motor experience play a crucial role in the development of intellectual abilities (attention, memory, organisation, problem solving skills), affective-emotional abilities (empathy, stress management) and social ones (effective communication, positive relationships) (Adolph & Hoch, 2019).

Tree-classroom didactic background

The project seeks to make use of the indoor and outdoor school spaces as active learning places, at the same time providing students with the opportunity to reconnect with nature, and the school to establish a relationship with the surrounding territory.

For the LAI pedagocical proposal, a natural setting has been identified as a concrete alternative to the traditional classroom setting, introducing the tree, given its symbolic, cultural, social, and environmental value (Gagliano, 2022; Jung, 1983; Kohn, 2021; Mancuso, 2015; Simard, 2022;) as an innovative factor for the establishment of a learning environment encoded as 'tree-classroom' (Dati, 2018). Furthermore, trees and plants can not only have a positive impact on psychophysical well-being (Simard, 2022), but they can also reduce air pollution (Hirabayashi & Nowak, 2016; McDonald et al., 2016), absorb radiation, provide shade outdoor (Bowler et al., 2010), and reduce exposure to noise through the destructive absorption of sound waves (Van Renterghem et al., 2015).

The pedagogical planning of the LAI, in a broader curricular perspective, is structured in 3 teaching modules designed according to the different levels of education:

- Module A: Primary schools
- Module B: Secondary schools – first grade
- Module C: Secondary schools – second grade

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The three modules are considered in the framework of a progressive experiential learning path, able to provide students with the tools, the strategies and knowledge necessary to achieve a full awareness of its active role in the educational paths proposed by the school.

The Modules are thought to guide the learner and the teacher towards a more experiential and participatory learning-teaching path. The teacher doesn't have only to communicate educational content to the learners, but he must encourage them to be more protagonists of their learning, more responsible and, consequently, more motivated and autonomous.

The pedagogical objectives of the three modules can be summarized in three main focuses: know, know how to do and know how to be. In the progressive planning of the pedagogical proposal, the focus of module A will be 'the knowledge', the focus of module B the 'how to do' and the one of module C 'how to be'. The following histogram (Figure 1) illustrates the three focuses mentioned above.

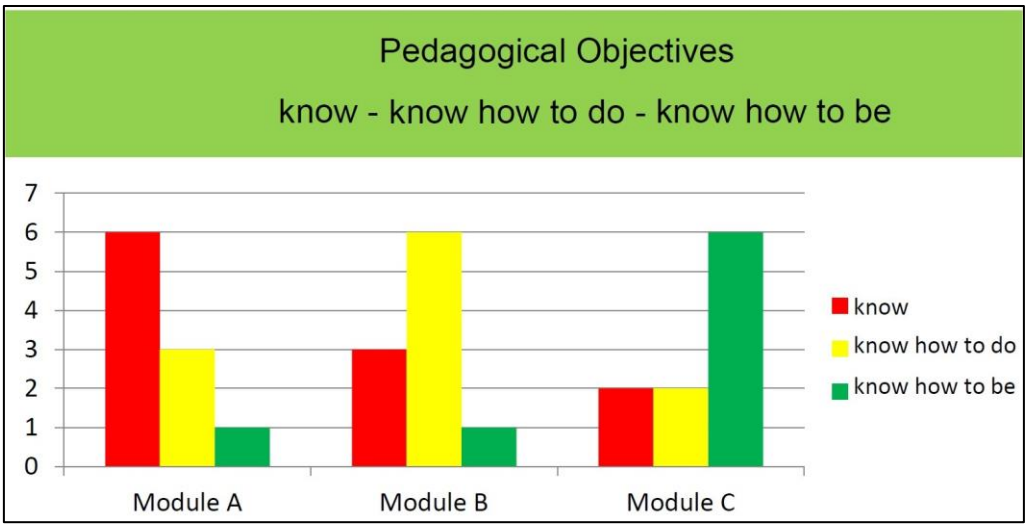

Figure 1 Pedagogical objectives of LAI's modules explained by a histogram (source: Stefano Dati)

From a methodological point of view, the LAI provides four learning experiences, which do not necessarily follow a hierarchical or chronological order and are implemented in each teaching module: the classroom, the laboratory, the emotional teaching and the 'tree-classroom'.

The classroom experience focuses on the teaching content provided by the curricular programme, with the aim of providing the right contribution of knowledge to ensure a good integration in the operating and cooperative environments. Traditional disciplines are not distorted because the innovation is in the strategies adopted for the transmission of knowledge. In this perspective, the teacher organizes the didactic proposals involving direct experience, manipulation and observation, stimulates the student to recall everything that the environment, the object or the topic recalls to their memory (brainstorming), organizes collective activities to reconstruct the acquired information, stimulates the students' curiosity and teaches strategies to remember association of ideas; collection of narrative sequences; use of maps, graphs, tables. The classroom experience can be carried out both indoor (traditional-horizontal classroom) and outdoor (natural classroom). Module A of primary schools encourages this experience.

The experience of the laboratory develops in a dynamic learning environment (Dewey, 1930). The students, guided by the teachers, design interactive lessons to be carried out in groups using LIM, iPhone, tablets and PCs

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(data supplied by the school). In the final phase teachers and students will realize a role playing that will tell the lived experience. Module B of the secondary schools encourages this experience.
The didactic-emotional experience is defined as 'cognitive – empathic'. Through group work, teachers are called to practice an emotional teaching through a mindfulness path (Baer, 2012) with the purpose of enhancing the awareness that the students have of their own sensory sphere (Boulch, 1971) and emotional (Mayer & Salovey, 1993), allowing them to develop skills and competences on the perceptual-emotional and socio-affective levels. Module C of secondary schools of secondary grade focuses on this experience.
The experience of the classroom on the tree involves the creation of an educational setting in height: the trees are set up with ergonomic wooden platforms, designed as eco architecture - compatible for the plant, equipped with furnishings and teaching materials, a kit of grips for sport climbing, and/or self-supporting stairs. This experience includes practical sessions of learning the techniques of tree-climbing and sport climbing, thanks to which students will be able to carry out the educational activities by accessing the classroom on the tree. For this type of setting, it is essential that the sport is carried out with the help of special Personal Protective Equipment (PPE) and the support of a team of qualified sports operators, a psychologist, and a group of teachers.
The classroom on the tree stimulates the different intelligences of the students, especially the body-kinaesthetic and the naturalistic one, according to the classification elaborated in the context of the theory of the Multiple Intelligences (Gardner, 1985) and focuses on the benefits of the movement on social, emotional and cognitive dimensions (Shi & Feng, 2022). This experience plays a central role in all 3 Pedagogical Modules.
All the experiences of the LAI relate to the interdisciplinary subjects whose knowledge is conveyed and learned in an interactive, creative, and dynamic way (Figure 2).

Figure 2. Photorealistic rendering of the natural vertical and horizontal classroom (source: Stefano Dati)

The realisation of the setting consists in the choice of a natural space inside or outside the school, and the employment of the principles of the 'laboratory' experience.

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Trees are equipped with ergonomically designed wooden platforms, created as eco-friendly architecture for the plant, equipped with teaching materials and classroom objects, a sport climbing grip kit, and/or self-supporting stepladders. For such setting it is essential that the sports activity is carried out with the aid of proper Personal Protective Equipment (PPE) and the support of a team of qualified sports operators, a psychologist and a team of teachers.
The following graph sums up the three stages required by the LAI approach:

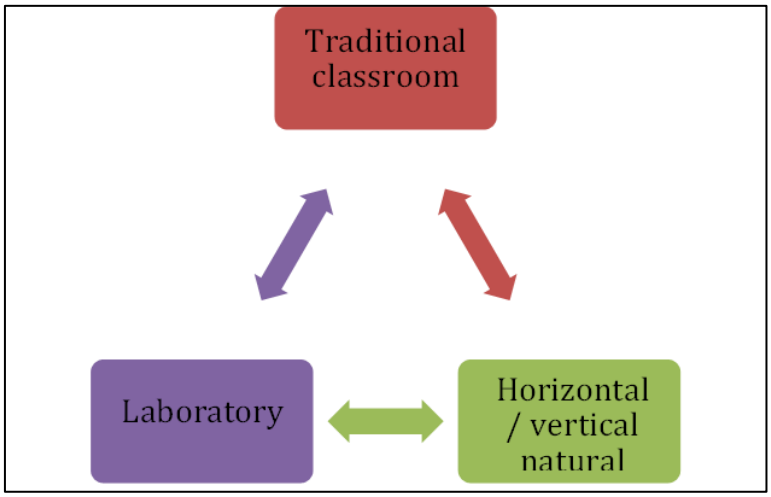

Figure 3. Triphasic LAI model (source: Stefano Dati)

The LAI model can be thought of as synchronous, since its stages do not always follow a sequential order, they can work in parallel on three levels: emotional and psychomotor control, preparation for direct contact with the external environment of the school (outdoor), and the experience of learning in a natural setting at height under unique conditions (tree-classroom).

Learning activities and educational selationships

It is pivotal to emphasise that the LAI methodology requires teaching activities to be planned according to the starting level of participants, in line with the Spectrum Project principles (Chen, 1998), which aims to create a self-directed learning project that stimulates the development of each student's potential (Fontaneda Amo, 2022; González Falcón, 2021). In order to design the learning activities, interviews with the pupils are necessary, as these can uncover their learning needs and preferences, so as to draw up Individual Education Plans (IEPs) in collaboration with the teachers.
In this perspective, as the educational relationship changes, its paradigm does too: what matters is the full development of resources, in terms of potential or zone of proximal development (ZDP) of an individual (Vygotsky, 1978), which the teacher must skilfully contribute to 'unveil'. Recognising diverse modes of learning (Gardner et al., 1998) and establishing a secure bond in the educational relationship are undoubtedly two inseparable aspects of interactive learning processes. The main objectives of the activities work concurrently by complementing each other, although on distinct levels, namely, teaching and motor activity.
From a global perspective, what is being proposed with this methodology is not so much the improvement of academic skills (for instance reading and writing skills), but rather, the assumption of an emotional state that is preparatory for the didactic experience in the traditional horizontal classroom. The journey that the students

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are invited to take in the tree-classroom should be understood as a preparatory training to increase and improve motivation, self-confidence, concentration, space-sensory perception, sense of balance and management of anxiety and fear. These are elements that often hinder the learning process.

The focus on experience as the foundation of learning (Dewey, 1929), seen as a process based on personal discovery and rediscovery, capable of generating knowledge, developing skills, and promoting the maturation of key competences for lifelong learning, as identified by the European Community (Spagnuolo, 2016), is crucial to understanding the situated pedagogical action that gives content to the personalized design of the learning activities.

The educational relationship that LAI promotes supports the commitment to citizen participation (people, entities, neighborhoods, etc.). Indeed, the school becomes a hub in which associations, institutions and citizens circulate, with the aim of making it a truly welcoming place for active participation. In this light, the LAI educational proposal renders an individual response to collective questions, providing the opportunity to establish an open and flexible learning environment, and at the same time paving the way for a holistic education that combines classroom teaching, movement, and contact with the natural environment.

An additional aim the LAI sets, expanding the scope of the educational relationship, is the opportunity to enhance the space surrounding schools, often neglected or used exclusively for recreational purposes, converting it into an innovative learning environment (Byers et al., 2018).

Quality assessment

As we are seeing, the quality of the educational relationship has many fronts that must be addressed and monitored. The updated training of teachers is another central issue for the continued and effective-relevant-satisfactory development of the LAI project. In this respect, it is essential for teachers to be properly trained in order to fully understand the LAI objectives, so as to implement the project in the schools they work. For this reason, the national sports promotion and third sector organization UISP, recognised by CONI and MIM, has arranged continuous professional development (CPD) courses for teachers of all levels. These nationally recognised courses for every Italian school were held in the academic years 2013/2014, 2014/2015, 2015/2016, 2016/2017, and the most recent one in the 2019/2020 academic year.

Besides CPDs for teachers, for a concrete implementation of the project in schools a requirement is the formation of a qualified team made up of the following subjects: a forestry agronomist, an engineer, a company specialised in the installation of adventure parks and vertical gardens, a sports tree-climbing instructor, teachers, a psychologist and a sport educator.

The continuous evaluation of educational needs, the processes implemented and the results are part of the structure of the LAI project. This incorporates the methodology of systematic observation within the framework of the mixed methods paradigm, which allows it, on the one hand, to use quantitative and qualitative methods in the analysis and interpretation of the results and, on the other, to nest the scientific evaluation process within the organizational framework for inclusive social change that promotes participatory action research.

Currently, the implemented observational research design aims to develop an assessment empirical study on how high-level body movements generate specific kinesthetic and psychological benefits. This objective is shared by all of education agents and this has stemmed because the LAI proposal stems from the synergy between social commitment and scientific research, through the implementation of a new pedagogical strategies (Orefice, 2006).

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In this section we have commented on some of the facets that define the central and governing features of the LAI project: tree-classroom background, learning activities and educational relationship, and evaluation of the quality of the intervention. We have reflected, as far as possible, the considerations that frame the implementation of the conceptual model (Figure 4) that gives life (meaning) to the conscious action that provokes the learning activities according to the personalized triphasic intervention in each space (where ?) and for each level (how?), while pointing out the complexity of the model for action due to the multidimensionality of its components.

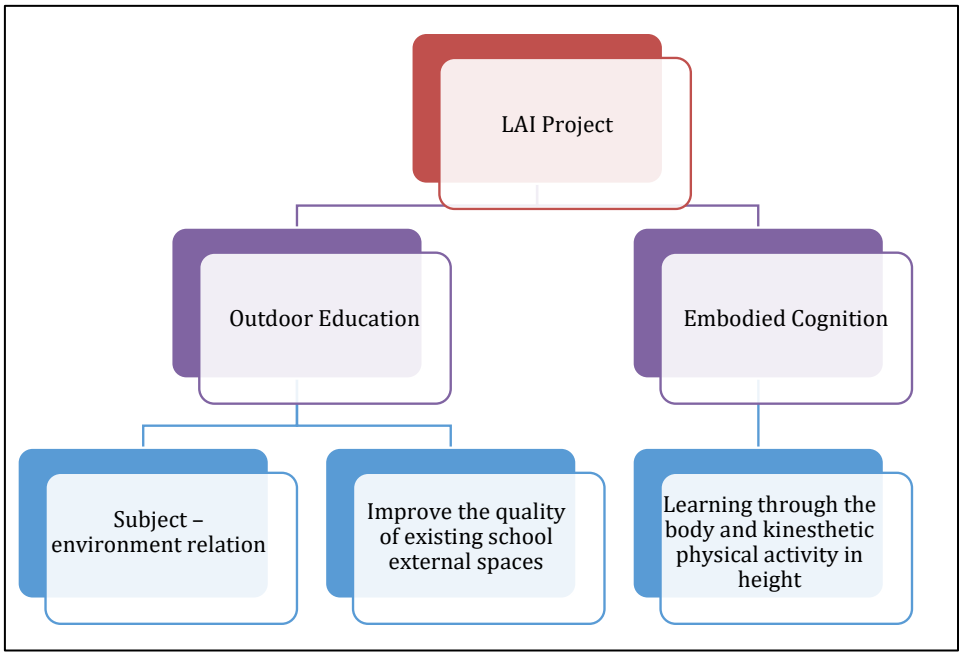

Figure 4. LAI Background (source: Stefano Dati)

5. Afterword: Didactic sustainability commitment

In continuity with all the above we say that the education is of utmost significance in reviewing and addressing the objectives outlined by the 2030 Agenda, as it is a source of knowledge, training, and social reform for sustainability.

Schools, universities and the research sector worldwide have been called upon to integrate sustainability values transversally and develop teaching strategies deemed most relevant for competence-based education. With an obligation to look into the perspective and complexity of the system (Sterling, 2005) as illustrated in the Sustainable Development Goals (SDGs) approved by the United Nations in 2016.

Actions carried out so far by the education sector, aimed to let the youth acquire the necessary skills, are centred on education for sustainable development and lifestyle, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship, as well as a culture of sustainable development (UNESCO). These have allowed for the idea of sustainability and cultural growth across multiple fields.

The concept of sustainability is very intuitive (Parricchi, 2020), the word itself derives from the verb 'to sustain' which means 'to support a weight, to bear'. It is quite deducible that being sustainable means being able to live within the capacity of the system one is part of. Educating to sustainability means activating virtuous processes of overall change in behaviour and lifestyles. Education at large must become sustainable (transformative, not

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only about attitudes, but also worldviews). Educational action "becomes an invaluable requirement for the sustainable development of communities, demanding a holistic approach to problems and encouraging the use of reflection and systemic thinking" (Del Gobbo, 2017, p.273).
In order for teaching and research to head towards an integrated approach, the Italian government has initiated a series of school reforms, among which sustainability-oriented compulsory teaching – as per the UN's keystone view – and a university interdisciplinary course largely modelled on the concept of sustainability (Fioramonti et al., 2021). In fact, in Italy, for over two decades, nature-based projects (NBS Nature-based solutions) have been implemented through the social network of associations in socio-educational, training, didactic, therapeutic and leisure fields, carried out as extracurricular activities. This still constitutes a big gap in Italian legislation, although the practices are recognised and validated, there are no provisions regulating professionals working in the NBS field (Melotti et al., 2020).
When speaking of 'sustainable teaching' we do not mean off-the-shelf environmental education planning a teacher can employ, but a teaching approach which addresses the person as an individual whose spheres of life are covered entirely: mind (1), body (2), emotions (3) and the surrounding environment (4) (Borgogni, 2017). It is therefore essential to always keep in mind the four aspects aforementioned when talking about sustainability, especially when the intention is to apply it to the pedagogical field (Pirchio et al.,2021).

6. Conclusion

LAI project fits within the domain of didactic sustainability, starting from planning educational paths in natural environments, up to transferring skills of integral ecology (Malavasi, 2016). It is pivotal to revaluate the concept of learning in action, considering an enhanced context within which a student lives and interacts (Regni, 2009, p.65), where they are able to listen to themselves, experience the time and space they are in, and create the conditions to reprocess their learning. The realisation of a natural setting as conceived by the LAI, makes use of the space surrounding schools, allows for the creation of a functional and multifaceted educational environment suitable for differentiated, laboratory-based, disciplinary and specialised activities. It transforms the schoolyard into a habitable, integrated, and educational space, an infinite source of learning, taking into consideration the well-being of both students and teachers, who are actively involved in its development. In this regard, the National Commission for Integrated Education and Training system, has approved the Pedagogical Model (Guidelines for the integrated zero-six system), which highlighted the need to reconfirm and relaunch extensive pedagogical beliefs with a positive outlook towards a sustainable and child-friendly future (MIM). Goal 4 of the 2030 Agenda (Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all), and its targets, highlights the crucial role education plays in the path towards an increasingly equitable, inclusive and supportive society, which is capable of caring for the environment (Giovanazzi, 2021).

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