Education in nature and learning science in early childhood : a fertile and sustainable symbiosis.

Education in Nature and Learning Science in Early Childhood: A Fertile Symbiosis

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EXECUTIVE SUMMARY

This contribution reflects upon the value of education in nature, its features and particularities and its relationship with learning science early in childhood.
The relationship with the natural environmental is closely linked to learning. In nature there is risk, emotions, challenges, … A storm, going down a hill o crossing a river produce fear, courage, wish to overcome difficulties and joy in achieving it. Additionally, nature creates questions like: Why do the tree leaves falls? How does a beetle breathe? or What is the name of this flower? To answer this inquiries, children instinctively design a research. They do hypothesis, make choices and propose solutions. This a training to learn science in future.
All of that requires the involvement of the educational community, as well as a paradigm change towards a more complex view of the education.

Keywords: Natural World, Environment, Free Play, Child Development, Scientific Knowledge, Skills, Scientific Literacy, Teaching Methods

OUR POINT OF DEPARTURE

The interaction with the natural and social environment that used to be part of the daily life of children is currently almost non-existent since they lack autonomy (Bertolino et al., 2017). Among other reasons, this is because increasing urbanization and the concentration of the population in urban environments which together have made children's vital spaces hostile for them, and because the digitization of these environments is keeping children absorbed in their screens.

To fight this situation, educational currents advocating for the use of open spaces and contact with nature as a key piece in children's development are gaining in strength. Such contact fosters children's ties with their environment (Torres-Porras et al., 2016) and helps to alleviate the disconnection to which they are subjected that provokes physical and emotional problems caused by the "nature deficit" (Louv, 2005).

Outdoor education refers to a complex concept that covers a wide range of educational activities in many different settings (Rickinson et al., 2004). It is an education in (outdoor activities), about (environmental education), and for the environment with a sustainable vision (Donaldson & Donaldson, 1958; Higgins, 1995) in order for children to develop knowledge, skills, and attitudes regarding the world in which they live (Ford, 1986). It involves spending a significant time of the day outdoors in activities that allow them to know and learn while immersed in the environment where different processes and interactions take place that are of interest to them and which foster their ethical relationship with the environment.

Educating outdoors also provides numerous other benefits such as improved cognitive performance (Wells, 2000), health (Taylor & Kuo, 2010) since continued exposure to open spaces makes children fall sick less often (Hervàs, 2015), motor development (Fjortoft, 2001), and positive attitudes towards the environment (Asah et al., 2012). Indeed, contact with nature and open spaces is essential to strengthen the ties children

have with their environment. Early childhood, the focus of the present study, is regarded as a stage that forms the scaffolding for the development of a sustainable lifestyle in adolescence and adulthood (Freire, 2011). Furthermore, natural spaces contribute markedly to science learning (García-González & Schenetti, 2019) since they offer numerous phenomena to explore, a diversity of unsolved questions, and mysteries to discover that have a strong scientific character.

In the present work, we look in depth into the importance for children's development of outdoor play and contact with nature, and its particular relationship with science learning in childhood.

THE SENSE OF PLAYING AND OF EDUCATING IN NATURE

There are multiple theories that deal with playing in childhood. Play is commonly described as an activity oriented from within, where action is more important than objective (Bekoff & Byers, 1981; Pellegrini & Smith, 2005). This action provides children with an optimal experience of activation, excitement, fun, joy, and satisfaction (Sutton-Smith, 1997).

According to Gray: "Play is the system that nature uses to teach children to solve problems, control their impulses, modulate emotions, put themselves in the place of others, negotiate differences, agree and feel equal to those who surround them. Play has no 'substitutes' that can teach these skills instead" (2013, p. 194).

It is no coincidence that in the forest schools in different countries – Germany, Denmark, Sweden, Norway, England – playing freely in nature is one of the central elements. In a research study carried out by Huppertz (2004), 95% of school educators consider playing freely to be very important, and rank it the highest on the scale of pedagogical activities. Likewise, in their educational practice, around 85% use it between 2 and 3 hours a day.

Natural environments are dynamic, complex, unpredictable, and it is precisely this "wild" aspect, apparently disordered and not predefined, but at the same time harmonious, which encourages exploration, promotes children's curiosity, and maintains their concentration. The imagination of the child who is playing in a natural environment adopts all the elements offered by that environment, and uses them actively and constructively (Tovey, 2007). The attractiveness of nature lies also in the noises, smells, clouds, wind, or rain – a multi-sensory range of stimuli that provides a wide variety of types of play and exciting psychomotor challenges. When children are allowed to immerse themselves in nature, it can be seen immediately how they engage in spontaneous activities and are able to keep their attention on the same task for long periods, without appearing fatigued, bored, or nervous. All of this is essential to generate meaningful histories of learning (Carr, 2001b).

The materials involved have a particular role to play in terms of learning since they provide great richness when children are playing in nature. According to Miklitz (2011), each natural material has a specific smell, a singular weight, its own colour, and many nuances. They are free of cost, irreproducible, related to their environment, 100% biodegradable, not subject to safety regulations, and not always available due to seasonal rhythms. All this makes them very interesting, since they facilitate and stimulate the child's personal interpretation and transformation (Miklitz, 2011). Nicholson (1971) defines them as "loose parts" because they are materials that can be moved, carried, and combined as the child likes by being free, open to the world.

Let us consider, for example, how many play opportunities a simple tree can offer. It can be climbed, serve as a hiding place, become a burrow or a house, provide shelter and protection, offer moments of rest and privacy, be a point of reference. If the trunk or branches fall to the ground they can become obstacles to overcome, they can harbour birds, small animals. It can have leaves, fruits, and flowers that fall, or provide inspiration for imaginary games (Nabhan & Trimble, 1994). The affordances of this versatile, outdoor, natural play space therefore offer multiple opportunities for different types of play for young children (Fjortoft, 2001).

When playing in nature, children often build burrows and shelters, special places that strengthen their bond with the natural world – spaces which have been transformed or raised to escape the control and interference

of adults, secret places known only by those who create them, exceptional, often safe and calm, small worlds organized with their own rules and norms.

Giving space to these experiences means giving children back the possibility of making up games through which to get to know themselves by facing their own fragility, but also their confidence when they are successful. These risky games have the function of gradually bringing children closer to stimuli capable of awakening an innate fear (heights, speed, loud noises) which supports the progressive development of strategies to cope with situations of risk. These games are mainly outdoors and in natural contexts, where the spaces are wider, the environments more varied, and there is a degree of unpredictability that is sufficient to create complex and stimulating settings for play.

By playing, children build a better perception of themselves and their abilities and a positive vision of the world through the opportunities it offers them. Play gives them confidence in their own emotions and feelings, a good relationship with the body, and acknowledgement of their strengths and weaknesses. Dealing with and having success in solving situations contribute fundamentally to the development of a self-sufficient personality (Weber, 2010).

So why not give more encouragement to an education in nature? Is there anything more powerful than a memory? Perhaps a memory linked to games in childhood? A memory remains throughout life, and conditions the relationship with the environment in which it was formed. If we could ask the adults of tomorrow, or our children now in the future, about places and games related to their childhood, what would they answer? Natural spaces? Or ones that are closed and artificial? Building a shelter outdoors with some friends? Or virtual games? It seems that this last hypothesis is the commonest in current times. But although it is the commonest, this does not imply that it is a deep and meaningful experience capable of conditioning the child's relationship with their environment and of generating knowledge. In this society of virtual reality, the relationship with the natural environment should take on more weight and value in children's lives. The rare occasions that they are outdoors in close contact with nature should make us reflect seriously on the quality of the real experiences they are living and that we are offering them from the field of education.

In children's reality nowadays, and especially the realities of Italian and Spanish children, the spaces dedicated to play are increasingly artificial. Normally, everyday open spaces are restricted to small house gardens, when they exist, and public parks – places where adults have full control, that are limited, sometimes neglected, and offer children little stimulation. Children are rarely allowed to freely explore forests or parks since adults consider them to be unknown and dangerous places. We transform as educational spaces into places of exploration full of standard structures (slides, castles, swings, …), and any spontaneous approach to the surrounding reality is rarely favoured. This causes children to have ever less confidence in their own motor skills outdoors, and to fear unfamiliar and unexplored landscapes (Bertolino et al., 2017).

The most serious problem that this panorama generates, at least from an educational point of view, is the loss it represents in terms of children's freedom and autonomy. Are virtual and artificial experiences, which in many cases are structured by current educational processes, capable of compensating for these losses?

Piero Bertolini, a prestigious pedagogue who has promoted phenomenological pedagogy in Italy since the 1970s (Caronia, 2018), maintains that, in order to be defined as pedagogically grounded, an educational intervention must be carried out through the "language of concrete things", stressing that in the relationship with the pupil it is essential to interact through things or experiences that the educator and pupil experience together. In a natural environment, the language of the educational relationship includes emotions, events, and materials – a reality starting from a universe that induces constant curiosity which cannot be simplified down to just the cognitive. We are talking about objects and materials that do not break easily, that die or transform, are born, grow, and dry, or that are blown away from us by the wind. A child can play with them with no worries since they are part of their life. This fact leads them to experience not only themselves through play but also the inherent secrets of the world.

CHILDHOOD AND SCIENCE LEARNING

In this study, we reflect on the need to provide children enriching and meaningful experiences during their first years of life, and that children's responding to questions of a scientific nature about daily life can without doubt become quite an adventure.

From a global perspective, we could say that one of the purposes of science is to understand the functioning of natural systems through scientific research. Scientific knowledge helps us to understand and explain the world in which we live, and guides us to act in accordance with this understanding. Science is not only what is done in the laboratory behind the microscope. There are scientists studying climate change, coastal risks, the resistance of materials, or the behaviour of new viruses – issues that affect our daily life and which we should be informed about.

The current social context is largely made up of science, its benefits, controversies, and problems. Science is part of the culture of our time. It is crucial for society to be informed and empowered to participate democratically in the decision-making concerning those scientific issues that affect everyday life (Sanmartí & García, 1999), without having to delegate it to specialist technicians. Likewise, this decision-making must be based on what consequences the actions of humans have for their environment (Strieder et al., 2017), since it would be naive to ignore the interrelationships and interactions of science and society with the environment in which they are both developed.

Given all this context, citizens' scientific literacy is fundamental, and this scientific education must be part of general education and begin during the first stages of schooling.

Traditionally, pre-primary education has paid more attention to mathematics or reading and writing than to science education (Gómez-Motilla & Ruiz-Gallardo, 2016; Worth, 2010). Indeed, there is a notable lack of research in this field (Cantó Doménech et al., 2016).

Nonetheless, there are many voices which support the idea that science education should begin during the first years of schooling (Claxton, 1994; COSCE, 2011). Indeed, the knowledge used in science is developed in childhood (Lind, 1998). There are authors who consider it to be a necessity for children's adequate development (Trundle, 2010), and even an essential component for high quality pre-primary education programs (Brenneman et al., 2009). The early ages are essential to motivate scientific thinking by taking advantage of children's curiosity and innate interest in the world that surrounds them (Amaro et al., 2015; Cañal, 2006) and of their natural tendency to enjoy observing nature (Trundle, 2010). These characteristics must be taken into consideration to encourage and promote these first approaches to science, especially in view of research data that indicate a trend of less positive attitudes towards school science (Braund & Reiss, 2004) and the consequent gradual decrease in interest in studying science at later stages of education (COSCE, 2011; Solbes et al., 2007).

Contrary to what had long been thought, it has been found that pre-school and early primary children do know things about the natural environment (McClure et al., 2017) and can count on scientific skills (Brenneman et al., 2009). In fact, the first responses children give to questions that arise in their interaction with the world are similar to those of the scientific method. Their construction of knowledge begins as an activity of inquiry (Greenfield, 2017). Thus, they develop explanatory theories, question themselves about phenomena, formulate hypotheses, and make inferences (Furman, 2016; Gopnik, 2012; Kohlhauf et al., 2011; Metz, 2011). They are able to process their experiences in a complex manner, and create representations (French, 2004). They are prepared to learn from the environment in which they live. Their experiences in their environment form the basis of their development (Canedo et al., 2005) and of the learning that will take place in successive stages (French et al., 2000).

At these ages, knowledge is constructed through the interaction of concepts, scientific reasoning, and doing science. Through this interaction, children begin to develop an understanding of phenomena, and connect this knowledge with the world in which they live (Worth, 2010). This understanding and the connections they build will provide the foundations for the formalization of more complex knowledge, much of it closely linked to the natural sciences (Hidalgo et al., 2012). Scientific thinking will help them resolve the daily questions that these interactions generate (Fernández-Oliveras et al., 2016), so it is essential to sow in them the idea of the importance of science for their everyday lives (Guzmán-Cruz et al., 2017).

Science education is responsible for beginning to stimulate this scientific thinking, using different strategies to enhance children's curiosity, flexibility, persistence, imagination, and inventiveness (Brenneman et al.,

2009). These are characteristics necessary for the cultivation of scientific thinking. At these ages children begin to grow aware of natural phenomena, of the changing seasons, getting to know about animals and the parts of plants, recognize changes, etc. All of these characteristics can be captured by the senses. In this line, attention should be paid to and emphasis placed on the knowledge that the child can perceive and for which they feel some curiosity or attraction (Guzmán-Cruz et al., 2017). Furthermore, when taking into account the child's level of maturation, we consider that the focus should be more on creating habits, procedures, and positive attitudes towards knowledge about the environment (and science) than towards a conceptual perspective. In these first stages, knowledge has an eminently pragmatic character.

In this sense, one must work on observation, formulation of questions, predictions, planning and carrying out inquiries, analysis, mathematical skills, data collection and interpretation, construction of explanations, communication of information, etc. (Greenfield, 2017). It is also important to foster the feeling of belonging to a global ecosystem that we have to value, care for, and respect, so that the children get the perspective of sustainability as a way of relating to the world in which they live.

In all of this, the context in which learning takes place plays a fundamental role, since, as noted above, children at these stages build their own interpretations of the world largely from sensory experiences, play, and manipulation. Therefore, the context where these experiences take place and how they are experienced are questions that will to a certain extent determine those interpretations. We consider nature and outdoor spaces to be suitable contexts for these purposes. Indeed, working on science in contexts outside the school leads to positive changes in the pupils' attitudes towards science since their greater enthusiasm increases their desire to discover and understand. Pupils give more value to the processes and forms of learning that occur in new contexts (Braund & Reiss, 2004). However, young children have few opportunities to learn science outside the school during school hours (Rios & Brewer, 2014) since the occasions are rare when they are in direct contact with nature or the outdoors (Schenetti & Guerra, 2018a).

It is the task of teachers and researchers in the field of education to unite efforts to transform educational processes towards views that integrate methods of teaching science that are more innovative and integrative. In the next section, we shall address some issues related to how outdoor spaces, and especially nature, contribute to this challenge.

WHEN LEARNING SCIENCE AND OUTDOOR EDUCATION MEET

The dimensions that come into play in the science teaching-learning processes are diverse. Without wishing to downplay any of them, in this section we shall focus on those that we consider fundamental to the subject at hand: the context, and the methods and knowledge involved.

The first years of life are a critical period in which children develop basic skills that subsequently influence their development. Therefore, it is important that they receive quality education, an education that offers a rich context for experimentation, facilitates opportunities for their development, and motivates their autonomous resolution of complex situations (Sánchez & González, 2016). In pre-primary, the experiences that the children live are decisive for their cognitive, operational, and social development (Tonucci, 2001).

As stated above, context is understood as being a fundamental pillar for learning. Children learn basically through participating actively with their environment. Interaction with the natural world activates the use of all their senses, which favours their understanding of the world (Rivkin, 1997), and hence the importance of leaving the classroom to learn in general (Beames et al., 2012) and to learn science in particular (Ramey-Gassert, 1996).

As small children explore their environment, they actively build their own knowledge (Lind, 1998). In this sense, outdoor spaces, and nature in particular, are scenarios where knowledge related to science is contextualized and its learning is facilitated, where the curriculum comes alive and makes sense. These areas are living laboratories open to experimentation since they are full of stimuli and provide real experiences that are difficult to present or recreate in a classroom. They generate more uncertainty, and therefore more challenges and problems to solve since, among other aspects, they are changing and not static as the classrooms in a school are.

These are environments with a high educational potential (O'Brien, 2009). A simple storm, a windy day, leaves falling, the blossoming of the first flowers, or the transition of colours in the landscape that announces the changing of the seasons can all transform the scenario sometimes from one day to the next, or even during the same day. This generates new possibilities for learning, new questions, and new challenges. In sum, new situations in which the children can bring their science related skills and knowledge into play, and try to understand what is happening around them, how their world works, and the natural systems that make it work.

Indeed, outdoor spaces help children develop skills related to the process of scientific inquiry (Yildirim & Akamca, 2017). They favour doing science, promote the learning of concepts related to science and stimulate positive attitudes towards it, and generate a strong sensitivity and attachment to the environment. Therefore, children who grow and are educated in these spaces will be citizens capable of making decisions based on scientific knowledge, who will shape and coexist in sustainable societies.

With regard to the first aspect, doing science, according to Braund & Reiss (2004) for many children science comes to life when they experience phenomena, observe and touch animal and plant species, and use tools and instruments in natural environments. These aspects occur naturally in open spaces, as the context itself produces a change in the methods involved.

During childhood, children acquire fundamental knowledge through their relationship with their environment (Yildirim & Akamca, 2017). In this sense, science knowledge can be introduced spontaneously, informally, or through structured activities (Lind, 1998).

Activities outdoors and in nature elicit stronger and more lasting memories in pupils than other teaching methods (Reinoso, 2009) since they are characterized by being part of action-centred learning processes. Some of the types of activity to carry out in nature are those proposed by Agostini, Minelli & Mandolesi (2018, p. 4):

- Free play: The children freely choose the games they want to play and the materials they want in order to do so.
- Free exploration: The teacher gives some simple directions and the children decide how to go on from there.
- Guided exploration: The teacher guides the exploration towards the object of interest, and establishes the guidelines for the children to follow.
- Guided outing: This consists of a school outing with a specific objective that is shared with the children.

We consider that, while the combination of all these activities is necessary, it is free and therefore spontaneous play which has, as noted above, particular relevance in the pre-primary stage because of what it means for the child's development and learning. This is so much so that it occupies most of the time in those schools which have integrated the perspective of outdoor work into their educational principles. The description of a scene recorded in the observation diary of a research study carried out in the *Scuola nel Bosco Villa Ghigi*[1] makes it clear how beneficial free play can be and what this type of learning contributes.

> "Day 5. The children put an ant into one of the transparent bottles they have to drink water. Once back inside, they begin to question and conjecture about the ant's breathing. In the dialogue, some children say that it cannot breathe because there is no air. Another boy intervenes saying that it can breathe since it is moving. Finally, a girl adds that the bottle is not closed and therefore air can enter. After this they release the ant and begin another activity."

[1] Extract from a research study carried out in 2017 at the Scuola nel Bosco Villa Ghigi, and reported in García-González & Schenetti, 2019.

The dialogue that was established gives an idea of the children's ability to argue and reason within a situation that they themselves have generated. At these ages, children ask questions and make conjectures to try to answer the issues that emerge immediately after those questions. Formulating diverse hypotheses involves considering different solutions when they find a problem. Also, the elaboration of explanations involves exercising cognitive skills.

In addition to free play, the different routines or strategies that are often used in schools that work outdoors at this stage can be used to include science. An example is the assembly or the morning or farewell circle in forest schools, which can become a moment to talk and discuss science, analysing things that happened during the day. Discussion is key to learning science, and is an important part of the process of inquiry and the development of scientific reasoning. Hearing about their own experiences and those of others encourages children to think and reflect on their ideas (Worth, 2010). Reflection on what they have done is what turns the experience they have lived into learning.

What we have described so far puts to rest the idea that usually arises a priori that only animals or plants are learnt about when we are outdoors. Quite to the contrary, the educational processes developed outdoors are based on a holistic combination of the interrelationships of human beings and all of nature (Ford, 1986). They therefore stimulate comprehensive learning in competencies.

To specify a little more, we can analyse the research carried out by García-González & Schenetti (2019). This study describes the range of knowledge that comes into play during an experience conducted in a forest school, and which can serve as an example of the enriching potential of these contexts as well as being applicable to other outdoor spaces. Table 1 summarizes this knowledge complemented by other studies.

Table 1. Knowledge related to learning the science present in outdoor spaces (taken and adapted from: García-González & Schenetti, 2019; Lind, 1998; Worth, 2010; Yildirim & Akamca, 2017)

Concepts related to scientific activity and the natural environment	**Procedures related to scientific activity and the natural environment**	**Asynchronous E-Learning**
• Common names of animals, plants, and fruit • Scientific names of animals • Inert natural beings and natural materials • Natural phenomena • Life cycle • Types of landscape • Scientific vocabulary	• Observe • Plan • Experience • Compare • Classify • Take data • Make decisions • Formulate conjectures • Infer • Interpret data • Draw conclusions • Define and monitor variables • Identify • Relate • Reflect • Use scientific resources • Make arguments • Solve problems • Predict • Recognize odours • Recognize changes • Explore • Collect •Estimate	• Curiosity • Creativity • Cooperation • Respect for living and inert beings and towards peers • Pro-environmental and sustainable attitudes • Accountability

The information presented in Table 1 shows that the content worked on while in contact with nature is connected in a substantial way with that proposed in the official curricula for the first stages of schooling. Likewise, most of this content, although in tune with the scientific field, is not exclusive to it. This reflects the transdisciplinary nature of the real world, and how learning directly in it helps understand its complexity. Learning outdoors allows the barriers between disciplines to be broken down, integrating knowledge that is normally taught in separate subjects. It also includes other knowledge that is not normally worked on in traditional schools (Beames et al., 2012).

THE ROLE OF TEACHERS AND EDUCATORS IN OUTDOOR LEARNING PROCESSES

Transforming schools to include the outdoors as another space for learning and teaching requires dialogue with all the agents involved: headteachers, staff, families, politicians,… . But of all of these, the teaching staff have to play the fundamental role in the process. It is a process that must start from their self-reflection and transformation to be rid of acquired habits and methods, not only during their teacher training and subsequent professional development, but also above all during their own experience as pupils in traditional schools.

To a large degree, this is quite a complex process. It requires adults to become aware of their own relationship with open spaces outside school, and to ask themselves about the emotions generated when they are alone in them (Schenetti & Guerra, 2016) as well as when they are with children. According to Miklitz (2011) , teachers must let themselves be carried along emotionally by their encounter with nature, develop empathy for this relationship, observe nature through contemplation, immerse themselves in it, take their time, stop and stay outdoors. Recent research in this field shows that teachers' emotions that are elicited by their being outdoors affect their use of these spaces and their teaching design (Schenetti & Guerra, 2018b).

When learning takes place in a natural environment, multi-sensory perception expands and stimuli are not controlled, so the outdoor educational experience also stimulates the adult, the teacher, and orients him or her towards a complex approach:

- It leads to experimenting with a different idea of time in learning – a reflective time of doubtfulness that is more typical of children. For this, it is necessary to ask teachers to resist their common tendency of rushing their explanations, of giving the children directions, or of showing the things to them (Schenetti, 2014).

- It requires the teacher to have a sensitivity towards and a sincere interest in the children's vision, of what the world is like for them. As Waters & Maynard say: "Such effective interactions between teacher and child may be supported by a rich outdoor environment in which teachers respond to children's interests as expressed in the initiations they bring to the teacher for consideration" (2010, p. 481). The loose parts inherent in a wild, natural space afford a rich 'curriculum of offer' (Carr, 2001a, p. 540) from which children can select or 'edit' their experience.

- It forces a constant rethinking of the meaning of learning, of the experiences that are offered, since these must be understood as complex, contextualized, and shared, as is proposed by the indications of the education ministries of Spain and Italy (MEC, 2008; MIUR, 2012). As suggested by different experts, the whole curriculum needs to be designed to be available outdoors, placing the focus of provision on the potential for a wide variety of inclusive play rather than on learning specific content (Bilton, 2002; Casey, 2007; Robertson, 2014; Tovey, 2007; Waller et al., 2017; White, 2008).

The teacher who takes on the challenge of teaching in nature does not stop thinking over and over again about the educational sense of what they are doing. They know that organizing and managing moments of knowledge and exploration outdoors involves a whole series of preventive measures: a good capacity for group management and the construction of shared rules. This teacher is a meticulous and scrupulous

director who intervenes without anxiety or fear before any action may get dangerous, not inhibiting it but instead redirecting it. They rule the scene with finesse and attention to every detail. They stimulate the paths for inquiry, accompanying the children who show fear, encouraging them without forcing them. "Likewise, they project and value outdoor spaces as learning environments, privilege the children's direct experiences and natural exploration, and value the connection between socio-emotional competencies and learning" (Schenetti, 2018, p. 180).

In addition to all this and linked to learning science, if teachers understand the potential of learning in nature then they will be able to take advantage of opportunities in the open spaces as a means to increase their pupils' knowledge of scientific content and educate them in environmental awareness (Liefländer et al., 2013).

FINAL REFLECTIONS

If small children do not spend more time in nature they will become more and more separated from the world, they will forget how to explore their neighbourhood, their parks, and how to have fun outdoors, and, what is worse, they will probably spend more time exposed to screens (Rios & Brewer, 2014). In addition, there is a risk that if they do not frequent these places, do not become familiar with them, then they perhaps neither will they do so when they are older, thus perpetuating their disconnection with the natural world.

The ideas presented in this communication, supported by the existing literature, show the importance for children's proper development and learning of the creation of more opportunities for play in contact with nature and in open spaces (Heather, 2015). There they can play freely, explore and discuss, getting the same value out of it as they would in the classroom, but with the freedom of learning given by less adult supervision and a much richer real context. Nature allows them to start out from considering authentic problems in real contexts, many of a scientific nature, and this implies learning in a natural way, giving meaning to what is learnt. This is an approach that lends depth to learning and contextualizes it (Beames et al., 2012).

Learning, therefore, cannot be limited to a single place, but needs to explore diverse contexts that will enrich it. To construct knowledge, it is necessary to open the doors of the classroom and provide a sense of belonging to the world in which we live. When connections are established between the classroom and what happens outside it, in such a way that the children's everyday reality is involved in the learning processes, this stimulates their autonomy, their spirit of initiative, their responsibility, and their capacity for commitment with their environment.

Educating in nature implies changes in the relationships between teachers and their pupils which are brought about by the environment itself in a different way from the classroom context. It opens up an infinity of opportunities for learning and relationships that would be unlikely to arise in the traditional classroom. Furthermore, outdoor spaces are inspiring for teachers, and bring about innovative methodological changes. This leads the teachers to discard (especially when faced with the challenge of teaching science) the structured, closed, and traditional textbook activities which are far too limited for the complex processes we have been talking about.

Being outdoors favours approaching the natural sciences in the early stages, promotes positive attitudes towards the environment, and enhances scientific skills (García-González & Schenetti, 2019; Rios & Brewer, 2014).

All children are scientists! Let us accompany them in the challenge of understanding our world.

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