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# Reviewing two decades of research on the Forest School impact on children: The sequel

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## ABSTRACT

Dabaja ([2021]. "The Forest School Impact on Children: Reviewing Two Decades of Research." *Education* 3-13. doi:10.1080/03004279.2021.1889013) drew on the literature published between 2000 and 2019 to identify seven main impacts of Forest School on children and then outlined two of these impacts which pertained to social and cooperative skills and physical skills. Expanding on the latter work, this article aimed to shed light on the five remaining Forest School impacts: (a) learning performance and cognitive skills, (b) self-confidence and self-esteem, (c) emotional and mental wellbeing, (d) risk management skills, and (e) environmental awareness and sense of belonging. I then tapped into the findings of this review and other resources to advance a set of research suggestions in the Forest School realm.

## ARTICLE HISTORY

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## KEYWORDS

Forest School; literature review; outdoor education; environmental education; impact

## Introduction

Forest School can be considered a form of outdoor and environmental education (Knight 2018; Leather 2018; Dabaja 2020) through which children frequently visit a specific natural place for a prolonged period of time to engage in a multitude of outdoor activities. The Forest School concept was brought from the Scandinavian context into the UK in 1993 by a group of staff from Bridgwater College, Somerset (Maynard 2007). Later it spread across different parts of the world (Knight 2016).

The literature review conducted by Dabaja (2021) revealed that Forest School can help promote the children's (1) social and cooperative skills; (2) physical skills; (3) self-confidence and self-esteem (4) learning performance and cognitive skills; (5) emotional and mental wellbeing; (6) risk management skills; and (7) environmental awareness and sense of belonging. In the latter article, the author drew upon literature to introduce Forest School, including its main distinctive characteristics and underpinning learning theories. He then presented the implemented methodology that aimed to systematically locate and select the relevant resources. Among the seven identified impacts of Forest School, Dabaja (2021) outlined the Forest School impact on the children's *social and cooperative skills* and *physical skills*. As a follow-up, the purpose of this paper is to shed further light on the previous review of literature by introducing (a) the selected journal articles, (b) the methodological approaches underpinning the research studies, and (d) the dispersal of Forest School impacts per resource. I also outline the remaining five Forest School impacts on the children and draw on the review outcomes to suggest a set of recommendations. It is noteworthy that reading Dabaja (2021) is a prerequisite for a better understanding of the present paper as it encompasses detailed description of the methodology that was employed to locate, select, and thematically analyse the literature on Forest School.

## Findings

After implementing the five inclusion/exclusion criteria (i.e. (a) the source, type, and content of the paper, (b) the subject matter, (c) the publication date, (d) the publication language, and (e) the over-representation of the data), a total of 28 articles were selected (Dabaja 2021). Table 1 encompasses the selected articles and the journals that published them.

Before moving forward, there are two points that I would like to highlight. First, the present review of literature showed that the involved children in Forest School programmes came from the early years/preschool stage of education as well as from the primary school level. More specifically, the age of the children ranged from 3 to 12 years old based on the information communicated by the selected resources. The 4 to 8-year-olds represented the largest group. This outcome appears to align, to a great extent, with Knight's (2016) findings pertaining to the age range of children participating in Forest School in the UK context.

Second, I would like to note that several of the selected articles did not refer to the outdoor programme in their studies as Forest School. However, these outdoor programmes reflected the Forest School philosophy of visiting an outdoor natural setting frequently over an extended time. For instance, Mygind (2007) and Mygind (2009) used the term 'nature class' to address their outdoor nature-based sessions without any mention of 'Forest School' in their texts. Yet, I decided to include both resources in the review for two main reasons. First, the description of their educational programme possessed similarities with Forest School in terms of the long term and frequent visits to a natural area (FSA, n.d.) where two educators had relocated their teaching of a group of Danish

**Table 1.** The final collection of articles and their publishing journals.

Resources	Journals
1. Barrable (2020) <sup>1</sup>	Learning Environments Research
2. Boyd (2019)	Education 3-13: International Journal of Primary, Elementary and Early Years Education
3. Button and Wilde (2019)	International Journal of Play
4. Coates and Pimlott-Wilson (2019)	British Educational Research Journal
5. Cumming and Nash (2015)	Journal of Adventure Education and Outdoor Learning
6. Elliot et al. (2014)	Children, Youth and Environments
7. Harris (2017)	Education 3-13
8. Harris (2018)	AREA
9. Harwood and Collier (2017)	Journal of Early Childhood Literacy
10. Kemp and Pagden (2019)	Education 3-13
11. McCree, Cutting, and Sherwin (2018)	Early Child Development and Care
12. Meyer, Müller, and Macoun (2017)	Children, Youth and Environments
13. Murphy (2018)	Journal of Adventure Education and Outdoor Learning
14. Mycock (2019)	Children's Geographies
15. Mycock (2020) <sup>2</sup>	Discourse: Studies in the Cultural Politics of Education
16. Mygind (2007)	Journal of Adventure Education and Outdoor Learning
17. Mygind (2009)	Journal of Adventure Education and Outdoor Learning
18. O'Brien (2009)	Education 3-13
19. O'Brien and Murray (2007)	Urban Forestry & Urban Greening
20. Richardson and Murray (2017)	Early Child Development and Care
21. Ridgers, Knowles, and Sayers (2012)	Children's Geographies
22. Roe and Aspinall (2011)	Urban Forestry & Urban Greening
23. Savery et al. (2017)	Education 3-13
24. Slade, Lowery, and Bland (2013)	Support for Learning
25. Swarbrick, Eastwood, and Tutton (2004)	Support for Learning
26. Trapasso et al. (2018)	Children
27. Turtle, Convery, and Convery (2015)	Cogent Education
28. Waters and Begley (2007)	Education 3-13

<sup>1</sup>This article was originally published online in 2019 before being republished in 2020 under this reference citation: Barrable (2020).

<sup>2</sup>This article was originally published online in 2019 before being republished in 2020 under this reference citation: Mycock (2020).

primary school children to a forest site every Thursday from 2000 to 2003 (Mygind 2007, 2009). Second, both articles had 'Forest School' in their keywords according to *Taylor & Francis* search engine which indicates that there is a certain similarity between the outdoor nature-based programmes in these articles and Forest School.

### ***The identified positive impact of Forest School***

The deductive and inductive thematic analyses (Braun and Clarke 2006) of the selected articles yielded seven key Forest School – and similar outdoor nature-based programmes, such as the one explored in Mygind (2007, 2009) – positive impacts on the children's (1) social and cooperative skills; (2) physical skills; (3) learning performance and cognitive skills (4) self-confidence and self-esteem; (5) emotional and mental wellbeing; (6) risk management skills; and (7) environmental awareness and sense of belonging (Dabaja 2021). In this paper, the focus will be placed on the last five impacts.

### ***Learning performance and cognitive skills***

To start with, the literature suggests that Forest School can help enhance the children's (a) level of concentration/focus, motivation, interest to learn, and autonomy; (b) curriculum related knowledge; and (c) creativity, imagination, and construction/designing skills. These outcomes appear to be mainly driven by the child-centred, explorative, and hands-on learning approaches underpinning Forest School added to the affordances of the natural environment. I combined the previous three impacts under one major theme that I called *learning performance and cognitive skills*.

*Concentration/Focus, motivation, interest to learn, and autonomy.* O'Brien (2009) proposed that the natural environment added to the child-led pedagogical approach of Forest School can be conducive to promoting the children's motivation for learning which is fuelled by an increased self-directed curiosity and eagerness to explore. In consequence, children can become more 'focus[ed] and concentrate[d] for longer periods of time on tasks and issues that are of interest to them' (52). This was advanced by Richardson and Murray (2017) who compared the utterances of four children in an indoor and outdoor classroom as well as in a Forest School natural environment. They found, among other results, that the children's noun usage in the natural environment was lower than that in the indoor and outdoor classroom which, according to the authors, 'indicated that children remained focused on one activity for extended periods' in the natural setting (466).

On a related note, the literature provided several instances highlighting the children's motivation to attend and engage in activities at Forest School. In a Danish quantitative study, results showed that, on average, participating children 'looked forward to the days in the forest with great pleasure' (Mygind 2009, 157). This corroborates findings from an English study conducted by O'Brien and Murray (2007) and an Irish study by Murphy (2018). The latter author reported the case of '[a] child [who] in the class suffers from anxiety [... which had] a drastic effect on their attendance. This child wanted to attend school because of Forest School, even when that child had an extremely sore tooth abscess' (264–265). A comparable outcome was communicated by Slade, Lowery, and Bland (2013) who underscored 'the motivation shown by some of the older children [at Forest School] who would normally find it hard to focus in class' (68).

In terms of improved autonomy, Forest School was perceived as a setting where children can 'benefit[...] from having some structure [through the presence of adults to facilitate the activities and offer help when the child needs it] alongside the opportunity to make autonomous decisions about how to engage' with these activities (Coates and Pimlott-Wilson 2019, 36).

Similar suggestions were advanced by Barrable (2020) who communicated that, compared to traditional classroom settings, Forest School sessions tend to be more flexible where children are given opportunities to learn autonomously while being motivated by their individual interests and needs in a safe environment.

Before moving to introduce the next impact of Forest School, I would like to briefly highlight McCree, Cutting, and Sherwin's (2018) results that can be linked to the present theme (i.e. *Concentration/Focus, motivation, interest to learn, and autonomy*) as well as to the upcoming one (i.e. *Curriculum related knowledge*). In fact, McCree, Cutting, and Sherwin (2018) employed a mixed-methods methodology to examine the impact of a three-year Forest School and outdoor learning project on a group of disadvantaged 5 – to 7-year-old children in a UK primary school. One relevant aspect of their findings showed a positive impact of the programme on the group's attendance and educational attainment with significant academic improvements in their writing, reading, and mathematics compared to their peers. Still, the authors were cautious to attribute any sole causality of the participants' progress to the project as other factors might have contributed to this outcome.

*Curriculum related knowledge.* The present subtheme alludes to the children's improved knowledge related to the classroom curriculum subjects (e.g. geometry, mathematics, art, and general science) as a result of engaging in Forest School. This topic was tackled by Harris (2017) who explored, among other elements, the perspectives of a group of Forest School leaders vis-à-vis integrating the teaching of curriculum subjects in their outdoor sessions. Some leaders proposed several outdoor activities that could be implemented to teach curricula-related subjects, such as going outside and learn about plants, cultural themes, geography, mathematics and physics. One participant provided her viewpoint vis-à-vis learning about birds from textbooks, by saying, 'yes, you can talk about that stuff in the classroom, but why on earth would you when you can take these children out and they can hear the birds, they can see the birds, and they can recognise them' (282).

In addition to the previous learning outcomes, Forest School was suggested to have helped students improve their language and communication skills. Harris (2017), for instance, advanced that Forest School socially active sessions seemed to assist children, especially those who originally struggled with language in the classroom, to enhance their communication and listening skills. This echoes the statement of an English primary school teacher who advanced that Forest School settings could be helpful in encouraging 'older boys [who] are reluctant writers ... [... to] quite happily write about their experiences in the woods' (Kemp and Pagden 2019, 497).

Similarly, a comparative study by Richardson and Murray (2017) showed that the overall lexical diversity was richer in the natural environment settings (i.e. Forest School) for three out of four children participants compared to indoor and outdoor classroom. More specifically, all four children had higher *verb usage* in Forest School which was attributed to higher activity levels in the natural environment compared to indoor and outdoor classroom settings. Moreover, Forest School settings appeared to promote a higher *adjective usage* for three out of four children. Also, the quality of adjectives used in the natural environment was rather 'onomatopoeic'. The authors associated the latter finding to the children's engagement and the 'enhanced sensory experience' offered by the natural environment (466). Furthermore, Swarbrick, Eastwood, and Tutton (2004) noted the instance of a child who had speech difficulties and rarely spoke in the nursery school, yet, she showed higher confidence during the Forest School activities, as her speech became 'clearer and much louder' when interacting with others (145). Similar benefit was noticed for children whose English was not their first language. These children, who were usually silent in class, appeared to speak 'clearly and confidently' in Forest School settings (145).

In terms of other curriculum related subjects, Murphy (2018) tapped into her study's findings to advance that the Irish primary school curriculum visual arts construction strand objectives can be achieved through Forest School. Here, children had the opportunity to engage in, among other activities, the construction of 'imaginative structures from natural and reused objects' (272). This brings us to the following Forest School impact pertaining to promoting the children's creativity, imagination, and construction/designing skills.

*Creativity, imagination, and construction/designing skills.* The reviewed literature proposed that engaging in Forest School activities could offer the involved children greater opportunities to be creative (Trapasso et al. 2018) and imaginative (O'Brien 2009) which represent some forms of human cognition (Pelaprat and Cole 2011).

I would like to start by the statement of an English primary school child who compared the learning experience in the classroom to Forest School,

inside [the classroom] you can just look outside the window and not like touch the real-life stuff and inside you're [...] in like a museum [...]; but you can be creative and make your own stuff outside and out of the stuff in nature. (Coates and Pimlott-Wilson 2019, 30)

Indeed, a group of UK children in Mycock (2019) were portrayed using mud and kitchen utensils to engage in an imaginary cooking scene which includes the preparation of chocolate brownie, dishing up, and serving. In the same manner, Mycock (2020) provided a Forest School encounter that, I believe, is not only imaginative, but also creative, where two young students (9 and 10 years old) used clay to model a face onto a tree while explaining "[w]e think that trees are like hands and it's like a body, so we put a face on it". (12). Besides these previous Forest School encounters with 'mud', Harwood and Collier (2017) highlighted how one Forest School child imaginatively repurposed the use of the 'stick' – another more-than-human material afforded by the natural environment – to become

a magic wand than can do anything, change into anything. It can turn invisible. And it can fly. It can shoot mud balls. It has poison gas. And it can turn into a ball and roll. Maybe it can just roll away from danger. And it can turn into an eagle. (348)

Finally, many accounts suggested that children at Forest School utilised materials from nature and other tools to engage in creative and imaginative activities of designing and constructing several objects (Trapasso et al. 2018), such as shelters (e.g. Coates and Pimlott-Wilson 2019; Cumming and Nash 2015; Murphy 2018) and dens (e.g. Coates and Pimlott-Wilson 2019; Harris 2017; McCree, Cutting, and Sherwin 2018).

### ***Self-confidence and self-esteem***

Anecdotes from the selected studies suggest that engaging in Forest School has the potential to improve the children's *self-confidence* and, to a lower extent, *self-esteem*. This was communicated by Murphy (2018) who provided the example of '[o]ne child, who would demonstrate actions of low self-esteem in the classroom setting, helps another child and sings while he works [at Forest School]' (267). Harris (2017) also proposed that Forest School has the potential to help students, who were originally described as shy, less confident, and introverted in the classroom setting, to start to 'come out of their shell', get involved, and look happy after eight to ten weeks in the programme (280).

Similarly, a nursery practitioner at a UK Forest School portrayed a child who 'went from just hiding in a single shelter at the beginning to playing alone, and then by the end they were playing as a group, [the practitioner] saw his confidence grow in the setting and with the other children' (Button and Wilde 2019, 33).

In fact, the ability to make their own decisions about the when and the how of doing activities was proposed to help children develop confidence through exploring on their own while 'stepping out of [their] own comfort zone' without the restraining comments of adult supervisors, as one child reported (Coates and Pimlott-Wilson 2019, 29)

### ***Emotional and mental wellbeing***

An additional Forest School impact that emerged from the literature review was the promotion of the *emotional and mental wellbeing* of the children which encompasses the improvement of their behavioural conducts as well as their emotional state and overall mental health.

To start with, Roe and Aspinall (2011) drew upon a quantitative study in a Scottish context to advance that Forest School, compared to the conventional school, had an advantageous restorative

effect on the four emotional aspects of a group of 11-year-old children: (1) their energy level, (2) their stress level, (3) their hedonic tone level; which measures the degree of happiness and sadness, and (4) their anger level. In fact, the behavioural conduct of the participating children with poor behaviour seemed to improve the most from the contact with nature. This outcome aligns with the results of a mixed-methods study conducted in England where the majority of the young participants have communicated that the Forest School sessions had improved their mood (Trapasso et al. 2018). One of the children explained, '[Forest School] would make me feel better, because if I was annoyed with a person, it'd make me feel a bit more relaxed, and it'd make me happy' (11).

These findings echo the statements of a group of children in an Australian study who expressed happiness and enjoyment when they were talking about their experiences at Forest School. They reported feeling peaceful and calm due to the serenity of the natural surroundings as opposed to the traditional school where one is constantly hearing loud voices and 'chairs rubbing together' (Cumming and Nash 2015, 302). Comparably, the parent of a child with special educational needs reported that her son's stress and anxiety levels tended to decline once outside. He even was more motivated to go to school when it was the Forest School day. The mother assumed that this might be due to the free space in Forest School compared to the confined space in the traditional school setting (Slade, Lowery, and Bland 2013).

On the same note, McCree, Cutting, and Sherwin (2018) reported the statement of a disadvantaged Forest School child who commented, 'I love my life. I love nature ... It's very peaceful here' (987).

Another child stated,

Coming out ... has helped me manage my anger. I now know that I can just go and sit somewhere for 5 minutes. I now go outside more. I hadn't used to. I go to the park and take my friends. (987).

And I would like to conclude this subsection by presenting a brief, but expressive, conversation between a third child from the same study and a Forest School practitioner:

The child: When we get into the woods, please can I go and sit somewhere by myself for five minutes?

The practitioner: Of course. Why would you like to do that?

The child: Because this is the only time I get some peace and quiet. (987)

### ***Risk management skills***

Developing the children's *risk management skills* emerged from literature as another impact of Forest School. An outcome that represents the controllable risk-taking opportunities that the Forest School settings had offered the children and how engaging in outdoor experiences had affected their behaviours toward assessing and dealing with risky situations.

To begin with, Harris (2017) advanced that one of the tasks of Forest School practitioners is assisting children to identify outdoor hazards and learn how to cope with potential risky situations. This resonates with Barrable (2020) who communicated that, at participating Scottish Forest School nurseries, 'risks were fully explained to the children [by the practitioner] and ways to manage them were arrived at through interaction [between both parties]' giving the children ownership in regard to managing the potential risky situations and setting up the rules (9). The previous statement provides a clear indication of how Forest School settings could be conducive to improving the children's risk management skills.

One instance of the promoted risk assessment skills and the ability to act safely was provided by a child who advanced, 'I knew as I was walking through the woods [at Forest School] that I have to be more careful, that I don't want to get stung by nettles or trip over a twig' (Coates and Pimlott-Wilson 2019, 31). By the same token, a group of interviewed Forest School children communicated that they



don't approach the fire except when cooking and some of them mentioned avoiding any tree climbing unless it is not slippery and, in some cases, under the supervision of an adult (Savery et al. 2017).

Moreover, Waters and Begley (2007) underscored the significance of providing children the opportunities to take and manage risks in a controlled environment. The research study, that was conducted in South Wales, aimed to explore how two different play environments (i.e. a natural environment in a Forest School site and a school outdoor play-space) would influence the risk-taking behaviours of two four-year-old children. One of them is a physical risk-taker boy while the other is a reticent risk-taker girl. Findings demonstrate that both children, despite their initial risk-taking conduct, 'were displaying a wide variety of risk-taking behaviours in the Forest School environment but not in the school play-space' (372). More specifically, Forest School offered the opportunities for the risk-seeking child to 'satisfy his strong drive for physical challenge' without being reprimanded and the other reticent risk-taker child to 'develop a positive disposition towards physical risk-taking that may not otherwise have developed' (373).

The latter authors concluded that 'the Forest School environment was better able to support the development of positive risk-taking behaviours' (365). They suggested that these behaviours can be attributed to (a) the more tolerant and more flexible rules of the Forest School compared to the school play-space and (b) the natural environment that provided more opportunities for the children to take varied forms of risks. This aligns with Barrable (2020) who made the connection between the adequately supervised children's autonomy at Forest School and their enhanced ability to regulate their activities safely. The author stated, '[t]he support and promotion of [the children's] autonomy with respect to risk and risky activities were believed to lead to greater self-regulation and a safer environment by practitioners' (9).

### ***Environmental awareness and sense of belonging***

The reviewed literature showed that engaging in Forest School can help children develop an *environmental awareness and sense of belonging*. This was shown through their better understanding of the natural site and nature in general as well as through their improved sense of belonging, pride, and positive attitude towards the natural surroundings.

To start with, a group of Forest School practitioners suggested that engaging in hands-on outdoor activities as a part of the Forest School experience could encourage children to become more enthusiastic to learn about the environment and its fauna and flora (Harris 2017). This was also reported by Boyd (2019) who proposed that the combination of natural settings and knowledgeable practitioners had enabled children at nurseries – that follow the Forest School philosophy of frequent regular visits to the same natural setting – to understand the world around them. The author noted how children, after attending a beach kindy outdoor programme, became ecologically knowledgeable 'to identify different wading birds by the shapes of their beaks' (993).

On a related note, a group of UK Forest School practitioners communicated the familiarity and the special connection that the students had built with the natural site through developing a mental map of the area and giving names to places (Harris 2017). This outcome echoes findings from McCree, Cutting, and Sherwin (2018) and Barrable (2020). The latter study revealed that imaginative names, such as "'Lion's Den'" and "'Crane's Nest'" (7), were picked by a group of Scottish children to refer to specific Forest School site areas. One Forest School practitioner from a different study even reported that some of the students kept visiting the site during the weekends while others, who were not attending the Forest School programme anymore, 'still come over and say hello [...] and leave a little message somewhere in a den' (Harris 2017, 283). Another practitioner highlighted the account of a boy who returned after four years to the Forest School site and stated, 'this place has changed my life' (284). This corroborates the narrative of a parent who used the term 'lasting experience' when reporting how her/his children always talk about their experiences at Forest School and still visit the woods (Savery et al. 2017, 527).



Finally, the Forest School philosophy appears to have helped fostering the children's appreciation and respect towards their natural surroundings (Kemp and Pagden 2019) and environmental advocacy (Turtle, Convery, and Convery 2015). For instance, a child's parent highlighted her son's awareness towards protecting the environment against littering after attending a Forest School programme (Savery et al. 2017). Similar findings pertaining to respect and empathy toward nature were showcased in Boyd (2019) who reported how a group of children at a beach kindly became highly upset when they realised that papers were made by cutting trees. In response, they were able to understand that to conserve the 'nice' trees, one can use less paper, write on both sides of the paper, and encourage 'adults, parents and the community to "plant more trees"' (1994). Another group of children, from the same study, who attended a different natural setting were eager to help bees – because 'we need them as much as they need us' – through planting wildflowers and even thinking about making 'banners to highlight to their parents the value and importance of bees environmentally' (1994). All these examples underscore the way engaging in Forest School – or similar programmes – can prepare environmentally responsible individuals who can adopt and encourage others to adopt an environmentally sustainable way of life.

In fact, this pro-environmental impact of Forest School was endorsed by the results of a quantitative study conducted in the UK which aimed to compare the level of environmental attitudes of a group of 8 to 11-year-old children who came from six different schools (Turtle, Convery, and Convery 2015). Three of the six schools had participated in Forest School programmes and three had not. All participant children had to complete a questionnaire of 25 items 'to give an impression of [their] awareness about different environmental issues and their attitudes relating to recycling, conservation, animal rights/protection, nature appreciation and pollution' (6). In total, 195 questionnaires were returned (some were incomplete or were incorrectly completed): 59 were those of the children who had taken part in Forest Schools and 136 questionnaires came from those who had no experience with Forest School. The results showed a statistically significant difference in the environmental attitude between the two groups of children. More specifically, children who had participated in Forest School demonstrated a higher pro-environmental attitude when compared to those who had no previous experience in Forest School programmes. Still, the latter authors were cautious to solely attribute this outcome to engaging in Forest School.

I would like to report that the dispersal of the seven identified impacts of Forest School – and similar programmes – on the involved children across the 28 articles is showcased in Table 2. Please, note that only articles that included a clear indication of the impact on the children were counted. Also, I would like to mention that although O'Brien (2009) and O'Brien and Murray (2007), which disseminated the findings of the same research study, advanced that gaining *confidence* represented one impact of Forest School on the children, I checked the *self-confidence and self-esteem* impact for both articles. The reason underpinning my decision is that the former resource proposed that Forest School helped some children to increase in confidence to work and play with others, while the latter mainly emphasised the physical confidence that children appeared to gain through engaging in various activities.

A comparable situation occurred with Mycock (2019, 2020) that highlighted the findings of the same research study where Forest School settings appeared to improve aspects related to the sub-theme of *creativity, imagination, and construction/designing skills*. More specifically, accounts from the two articles showed that children were engaging in various imaginative and creative activities. As a result, I checked the *learning performance and cognitive skills* impact for both articles.

### **The research methodology of the included studies**

A total of 18 out of the 28 research articles reported the implementation of qualitative methodology, four adopted a quantitative methodology, and the remaining six articles encompassed both methodologies (Dabaja 2021). The qualitative data collection relied on a plethora of methods including, individual and focus-group interviews, informal conversations, questionnaires, field notes,

**Table 2.** The dispersal of the forest school – and similar programmes – impact on children across the selected articles.

Resources	Forest school impact on children						
	Social & cooperative skills	Physical skills	Self-confidence & self-esteem	Learning performance & cognitive skills	Emotional & mental wellbeing	Risk management skills	Environmental awareness & sense of belonging
Barrable (2020)						✓	✓
Boyd (2019)							✓
Button and Wilde (2019)	✓			✓			
Coates and Pimlott-Wilson (2019)	✓	✓	✓	✓	✓	✓	
Cumming and Nash (2015)	✓			✓	✓		✓
Elliot et al. (2014)	✓			✓			✓
Harris (2017)	✓	✓	✓	✓		✓	✓
Harris (2018)					✓		
Harwood and Collier (2017)				✓			
Kemp and Pagden (2019)	✓			✓	✓	✓	✓
McCree, Cutting, and Sherwin (2018)	✓	✓	✓	✓	✓		✓
Meyer, Müller, and Macoun (2017)		✓					
Murphy (2018)	✓			✓	✓		✓
Mycock (2019)				✓			
Mycock (2020)				✓			✓
Mygind (2007)		✓					
Mygind (2009)	✓						
O'Brien (2009)	✓		✓	✓			
O'Brien and Murray (2007)		✓	✓			✓	✓
Richardson and Murray (2017)				✓	✓		
Ridgers, Knowles, and Sayers (2012)	✓	✓				✓	✓
Roe and Aspinall (2011)					✓		
Savery et al. (2017)						✓	✓
Slade, Lowery, and Bland (2013)	✓		✓	✓	✓		✓
Swarbrick, Eastwood, and Tutton (2004)			✓	✓			
Trapasso et al. (2018)	✓	✓		✓	✓		
Turtle, Convery, and Convery (2015)				✓			✓
Waters and Begley (2007)						✓	

observations, and photographs. The quantitative data collection instruments encompassed the Observational System for Recording Physical Activity in Children OSRAC-P (Meyer, Müller, and Macoun 2017), the CSA (Computer Science & Applications) accelerometer (Mygind 2007), and ‘uni-axial accelerometers (ActiGraph GT1M, MT1 Health Services, Pensacola, FL, USA)’ (Trapasso et al. 2018, 4) to measure the physical activity of the children.

Furthermore, Mygind (2009) quantitatively examined the children’s social relations, experience with teaching, and self-perceived physical activity using a ‘questionnaire [that] included [...] 10 statements related to the category “social relations”, 14 statements were about “teaching” and two concerned “perceived physical activity”.’ (154).

To examine the nature relatedness of the children and their environmental behaviours, Elliot et al. (2014) ‘used a game-like assessment, adapted from previous research with elementary school children (Evans et al. 2007)’ (as cited in Elliot et al. 2014, 107). Relatedly, Turtle, Convery, and Convery (2015) measured the environmental attitude of children through a questionnaire that was ‘adapted from a previous study concerning the environmental attitudes of children aged between eight and eleven years by Musser and Malkus (1994)’ (as cited in Turtle, Convery, and Convery 2015, 6). In turn, McCree, Cutting, and Sherwin (2018) used the validated 16-point closed questionnaire of Connection to Nature Index by Cheng and Monroe (2012; as cited in McCree, Cutting, and Sherwin 2018, 984). The latter author also examined the children’s project perceptions and experiences at entry and exit of the study using ‘a child-appropriate six question “smiley” questionnaire’ (983) and their wellbeing and involvement using Leuven scales.

Roe and Aspinall (2011) quantitatively examined different behaviour and mental aspects of a group of children. More specifically,

Mood was measured using a shortened 14-item version of the University of Wales Institute of Science and Technology (UWIST) Mood Adjective Checklist (MACL) (Mathews et al., 1990; Schultheiss and Brunstein, 1999) to measure participants’ hedonic tone (HT) (hedonic tone measures a person’s affective state (or degree of happiness and sadness)), energy (EA), stress (TA) and anger levels. Reflection on personal development was measured using a 6-item personal project scale outlined in the introduction and measuring four core cognitive dimensions of project planning (efficacy, control, support and self-identity) and two core affective dimensions (enjoyment and stress). (as cited in Roe and Aspinall 2011, 208)

Finally, Richardson and Murray (2017) measured the utterances of the participant children ‘using “language reasoning” elements of Early Childhood Environment Rating Scale (ECERS)’ (Harms et al. 2005, 34–38; as cited in Richardson and Murray 2017, 461). Also, ‘five-minute vignettes of each episode of the children’s recorded speech were randomly selected for Type/Token Ratios (TTR) analysis’ to explore the speech quality (461).

It is worth noting that Savery et al. (2017) employed a quantitative methodology to examine the risk perception associated with the outdoors of Forest School practitioners, parents, and children; a variable that does not represent a Forest School impact on the children.

To summarise, the quantitative methodology – implemented in ten out of the 28 articles – examined the children’s (1) physical activity; (2) social relations and experience with teaching; (3) nature relatedness and environmental attitude; (4) academic attainment; (5) wellbeing and level of involvement; (6) behaviour and emotional state; (7) language utterances. This outcome showcases that many of the Forest School impacts on the children that emerged from the literature were explored qualitatively, including the Forest School impact on their self-confidence and self-esteem.

## Discussion and conclusion

The review of literature proposed that Forest School, and similar outdoor nature-based programmes that follow its philosophy, can improve the children’s (1) social and cooperative skills; (2) physical skills; (3) self-confidence and self-esteem (4) learning performance and cognitive skills; (5) emotional and mental wellbeing; (6) risk management skills; and (7) environmental awareness and sense of belonging (Dabaja 2021). These Forest School positive outcomes appear to align with the findings

of other relevant literature reviews. For instance, Gill (2011) drew on existing research to suggest that, among the well supported effects, spending time in nature can promote the children's mental health and emotional regulation. The author adds that experience of green environments was associated with an improved environmental knowledge of the children. Furthermore, '[l]iving near to green spaces is associated with greater physical activity' and '[p]lay in natural environments leads to improvements in motor fitness for pre-school children' (8). In turn, Rickinson et al.'s (2004) extensive review of literature on outdoor learning proposes that fieldwork – a type of outdoor learning – could, among other impacts, improve the students' social skills, attitudes towards the environment, and academic attainment. Moreover, outdoor adventure activities, a second type of outdoor learning, was suggested to have a positive impact on young people's independence, confidence, self-esteem, self-efficacy, and interpersonal/social skills, to name a few. Also, Rickinson et al. (2004) proposed that school grounds and community projects 'have the capacity to link with most curriculum areas', especially those pertaining to science process skills and technology-related issues (6). According to the same review of literature, the latter type of outdoor learning could also improve the students' (a) confidence, (b) motivation toward learning, (c) relationship with peers, teachers, and the wider community, and (d) sense of belonging and responsibility.

Despite this alignment between the proposed positive effects of Forest School on children and those of outdoor learning and nature experiences, additional research could be done to further inform the Forest School practice. Indeed, I propose, similar to Knight (2018), that more research on Forest School is needed. For instance, Dabaja (2021) suggested the implementation of Caprara et al.'s (2000) data collection instrument to examine the prosocial and aggressive behaviours as predictors of academic achievement and peer relations of the children before, during, and after engaging in Forest School programmes. The same author also proposed the examination of the children's physical fitness by, for instance, using Fjørtoft et al. (2011) or Latorre Román et al. (2015) before, during, and after attending Forest School. Outcomes of these measurements could be compared with control groups to explore whether any changes in the social or physical skills can be certainly associated to engaging in Forest School.

On the same note, Leather (2013) questioned the reliability of observational methods for assessing the child's self-esteem as it was the case in several Forest School studies included in this review. Thus, the latter author suggested the implementation of, among other instruments, the freely available Rosenberg self-esteem scale which 'asks 10 questions and produces a single number to indicate general self-esteem' (Leather 2013, 161). Similarly, I propose that the children's self-confidence can be measured using tailored self-efficacy scales based on Bandura's (2006) guide for constructing self-efficacy scales. According to Bandura (1997), the perceived self-efficacy which is a judgement of capability – different from self-esteem which is a judgment of selfworth (Bandura 2006) – can be defined as the one's own perception of ability to perform a particular task in a specific domain or situation, whereas the 'colloquial term "confidence" [...] is a nondescript term that refers to strength of belief but does not necessarily specify what the certainty is about' (382). Thus, researchers and outdoor educators could develop a self-efficacy assessment scale to measure the perceived self-efficacy of the children vis-à-vis certain activities or tasks, such as climbing a tree, jumping over a creek, building a fire, and recognising different types of plants and animals, before, during, and after engaging in Forest School.

Furthermore, many resources included in this review advanced that Forest School can be integrated in the teaching of curriculum-related subjects, such as language skills (Harris 2017; Harwood and Collier 2017; Kemp and Pagden 2019; McCree, Cutting, and Sherwin 2018); Mathematics (Harris 2017; McCree, Cutting, and Sherwin 2018) in addition to geography, science (e.g. plants and animals), and physics (Harris 2017). Yet, two articles specifically explored this Forest School potential: Murphy (2018) and Richardson and Murray (2017). Outcomes from the former research suggested that the Irish primary school curriculum visual arts construction strand objectives can be achieved through Forest School. The latter study's findings showed that the participating 'children's lexical diversity was richer in a natural environment [i.e. Forest School] than in indoor and

outdoor classrooms' (Richardson and Murray 2017, 457). Further studies that aim to explore the potential of Forest School to help address similar or other curriculum subjects, such as Mathematics and sciences, are encouraged to support the claims that emerged from the reviewed literature. In fact, Hawxwell et al. (2019) drew on their comprehensive literature review on learning outside the classroom (LOtC) to report a lack in 'exploring the possibilities for LOtC to support, enrich, or enhance the broader formal curriculum studies of children and young-adults' (327). Therefore, the authors suggested to further 'investigate how efficient LOtC might be in the facilitation of formal curriculum teaching and learning' (327).

Moreover, I would recommend conducting research studies – whether cross-sectional or longitudinal – that explore the long-term effect of Forest School on children. This recommendation is comparable to the one advanced by Lovell, O'Brien, and Owen (2010) who, based on their literature review, stressed the importance of conducting longitudinal or semi-experimental studies 'to investigate the particular impacts and outcomes (especially those relating to education achievement) of [education and learning] which takes place in woods or forests' (26). In fact, it proves informative to examine how individuals who have experienced Forest School five, ten, or fifteen years ago were affected by this experience in terms of their environmental attitude, attachment to the natural place, physical and emotional health, and educational attainment, to name a few.

In addition, due to word limit restrictions, no association was explored between specific Forest School impacts and the children's age in this paper. Since children participating in Forest School appear to come from different age ranges, it would be significant to explore, through literature reviews or other types of research, whether specific Forest School impacts are associated with certain age ranges of the involved children.

To conclude, Dabaja (2021) drew on literature to identify seven main impacts of Forest School on children. He then outlined two of these impacts that pertained to social and cooperative skills and physical skills. Expanding on the latter work, this article aimed to shed light on the remaining five impacts: (a) learning performance and cognitive skills, (b) self-confidence and self-esteem, (c) emotional and mental wellbeing, (d) risk management skills, and (e) environmental awareness and sense of belonging. I then tapped into the findings of this review as well as on other recommendations found in the literature to propose conducting a set of research studies. I aspire through this work to further contribute to the ongoing discussion on Forest School (e.g. Knight 2018; Leather 2015, 2018; Waite and Goodenough 2018) because I contend that this form of outdoor education has the potential to, among other positive impacts on the children, help prepare knowledgeable individuals who are willing to counteract the disastrous consequences of the climate change phenomenon that the globe has been witnessing.

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## References

- Bandura, A. 1997. *Self-Efficacy: The Exercise of Control*. <http://www.uky.edu/~eushe2/Bandura/banconfidence.html>.
- Bandura, A. 2006. "Guide for Constructing Self-Efficacy Scales." In *Self-efficacy Beliefs of Adolescents*. Vol. 5, edited by F. Pajares and T. Urdan, 307–337. Greenwich, CT: Information Age Publishing.
- Barrable, A. 2020. "Shaping Space and Practice to Support Autonomy: Lessons from Natural Settings in Scotland." *Learning Environments Research* 23: 291–305. doi:10.1007/s10984-019-09305-x.
- Boyd, D. 2019. "Utilising Place-Based Learning Through Local Contexts to Develop Agents of Change in Early Childhood Education for Sustainability." *Education* 3-13 47 (8): 983–997.
- Braun, V., and V. Clarke. 2006. "Using Thematic Analysis in Psychology." *Qualitative Research in Psychology* 3 (2): 77–101.
- Button, J., and A. Wilde. 2019. "Exploring Practitioners' Perceptions of Risk When Delivering Forest School for 3- to 5-Year-old Children." *International Journal of Play* 8 (1): 25–38.
- Caprara, G. V., C. Barbaranelli, C. Pastorelli, A. Bandura, and P. G. Zimbardo. 2000. "Prosocial Foundations of Children's Academic Achievement." *Psychological Science* 11 (4): 302–306.

- Coates, J. K., and H. Pimlott-Wilson. 2019. "Learning While Playing: Children's Forest School Experiences in the UK." *British Educational Research Journal* 45 (1): 21–40.
- Cumming, F., and M. Nash. 2015. "An Australian Perspective of a Forest School: Shaping a Sense of Place to Support Learning." *Journal of Adventure Education & Outdoor Learning* 15 (4): 296–309.
- Dabaja, Z. F. 2020. "An Explorative Case Study of the Perceptions and Attitudes of Lebanese School Educators toward the Integration of Outdoor Education in the Teaching of School Curricula." Doctoral diss., University of Windsor. <https://scholar.uwindsor.ca/etd/8442/>.
- Dabaja, Z. F. (2021). "The Forest School Impact on Children: Reviewing Two Decades of Research." *Education 3-13*. doi:10.1080/03004279.2021.1889013.
- Elliot, E., K. T. Eycke, S. Chan, and U. Müller. 2014. "Taking Kindergartners Outdoors: Documenting Their Explorations and Assessing the Impact on Their Ecological Awareness." *Children, Youth and Environments* 24 (2): 102–122.
- Fjørtoft, I., A. V. Pedersen, H. Sigmundsson, and B. Vereijken. 2011. "Measuring Physical Fitness in Children who are 5 to 12 Years old with a Test Battery That is Functional and Easy to Administer." *Physical Therapy* 91 (7): 1087–1095.
- Forest School Association, (FSA). n.d. *What is Forest School?* <https://forestschoolassociation.org/what-is-forest-school/>.
- Gill, T. 2011. *Children and Nature: A Quasi-Systematic Review of the Empirical Evidence. A Report for the London Sustainable Development Commission*. London: Greater London Authority. [https://www.london.gov.uk/sites/default/files/lscd\\_-\\_sowing\\_the\\_seeds\\_-\\_literature\\_review\\_2011.pdf](https://www.london.gov.uk/sites/default/files/lscd_-_sowing_the_seeds_-_literature_review_2011.pdf).
- Harris, F. 2017. "The Nature of Learning at Forest School: Practitioners' Perspectives." *Education 3-13: International Journal of Primary, Elementary and Early Years Education* 45 (2): 272–291.
- Harris, F. 2018. "Outdoor Learning Spaces: The Case of Forest School." *Area* 50 (2): 222–231.
- Harwood, D., and D. R. Collier. 2017. "The Matter of the Stick: Storying/(re)Storying Children's Literacies in the Forest." *Journal of Early Childhood Literacy* 17 (3): 336–352.
- Hawxwell, L., M. O'Shaughnessy, C. Russell, and D. Shortt. 2019. "'Do you Need a Kayak to Learn Outside?': A Literature Review Into Learning Outside the Classroom." *Education 3-13* 47 (3): 322–332.
- Kemp, N., and A. Pagden. 2019. "The Place of Forest School Within English Primary Schools: Senior Leader Perspectives." *Education 3-13* 47 (4): 490–502.
- Knight, S. 2016. *Forest School in Practice*. London: Sage.
- Knight, S. 2018. "Translating Forest School: A Response to Leather." *Journal of Outdoor and Environmental Education* 21 (1): 19–23.
- Latorre Román, PÁ, D. M. López, M. F. Sánchez, J. S. Sánchez, F. M. Coronas, and F. García-Pinillos. 2015. "Test-retest Reliability of a Field-Based Physical Fitness Assessment for Children Aged 3-6 Years." *Nutricion Hospitalaria* 32 (4): 1683–1688.
- Leather, M. 2013. "'It's Good for Their Self-Esteem': The Substance Beneath the Label." *Journal of Adventure Education & Outdoor Learning* 13 (2): 158–179.
- Leather, M. 2015. "Lost in Translation: A Critique of "Forest School" from a UK Perspective." *Pathways: The Ontario Journal of Outdoor Education* 27 (2): 11–14.
- Leather, M. 2018. "A Critique of Forest School: Something Lost in Translation." *Journal of Outdoor and Environmental Education* 21 (1): 5–18.
- Lovell, R., L. O'Brien, and R. Owen. 2010. *Review of the research evidence in relation to the role of trees, woods and forest in formal education and learning*. <https://www.forestresearch.gov.uk/research/review-the-role-of-trees-and-woods-in-formal-education-and-learning/>.
- Maynard, T. 2007. "Encounters with Forest School and Foucault: a Risky Business?" *Education 3-13: International Journal of Primary, Elementary and Early Years Education* 35 (4): 379–391.
- McCree, M., R. Cutting, and D. Sherwin. 2018. "The Hare and the Tortoise go to Forest School: Taking the Scenic Route to Academic Attainment via Emotional Wellbeing Outdoors." *Early Child Development and Care* 188 (7): 980–996.
- Meyer, J., U. Müller, and S. Macoun. 2017. "Comparing Classroom Context and Physical Activity in Nature and Traditional Kindergartens." *Children, Youth and Environments* 27 (3): 56–77.
- Murphy, M. C. 2018. "Exploring the "Construction" Strand in the Irish Primary School Visual Arts Curriculum Through the Forest School Approach." *Journal of Adventure Education and Outdoor Learning* 18 (3): 257–274.
- Mycok, K. 2019. "Playing with mud- Becoming Stuck, Becoming Free? ... The Negotiation of Gendered/Class Identities When Learning Outdoors." *Children's Geographies* 17 (4): 454–466.
- Mycok, K. 2020. "Forest Schools: Moving Towards an Alternative Pedagogical Response to the Anthropocene?" *Discourse: Studies in the Cultural Politics of Education* 41 (3): 427–440. doi:10.1080/01596306.2019.1670446.
- Mygind, E. 2007. "A Comparison Between Children's Physical Activity Levels at School and Learning in an Outdoor Environment." *Journal of Adventure Education and Outdoor Learning* 7 (2): 161–176.
- Mygind, E. 2009. "A Comparison of Children's Statements About Social Relations and Teaching in the Classroom and in the Outdoor Environment." *Journal of Adventure Education and Outdoor Learning* 9 (2): 151–169.
- O'Brien, L. 2009. "Learning Outdoors: The Forest School Approach." *Education 3-13: International Journal of Primary, Elementary and Early Years Education* 37 (1): 45–60.
- O'Brien, L., and R. Murray. 2007. "Forest School and its Impacts on Young Children: Case Studies in Britain." *Urban Forestry & Urban Greening* 6 (4): 249–265.

- Pelaprat, E., and M. Cole. 2011. "'Minding the gap': Imagination, Creativity and Human Cognition." *Integrative Psychological and Behavioral Science* 45 (4): 397–418.
- Richardson, T., and J. Murray. 2017. "Are Young Children's Utterances Affected by Characteristics of Their Learning Environments? A Multiple Case Study." *Early Child Development and Care* 187 (3–4): 457–468.
- Rickinson, M., J. Dillon, K. Teamey, M. Morris, M. Y. Choi, D. Sanders, and P. Benefield. 2004. *A Review of Research on Outdoor Learning*. Shropshire: Field Studies Council.
- Ridgers, N. D., Z. R. Knowles, and J. Sayers. 2012. "Encouraging Play in the Natural Environment: A Child-Focused Case Study of Forest School." *Children's Geographies* 10 (1): 49–65.
- Roe, J., and P. Aspinall. 2011. "The Restorative Outcomes of Forest School and Conventional School in Young People with Good and Poor Behaviour." *Urban Forestry & Urban Greening* 10 (3): 205–212.
- Savery, A., T. Cain, J. Garner, T. Jones, E. Kynaston, K. Mould, L. Nicholson, et al. 2017. "Does Engagement in Forest School Influence Perceptions of Risk, Held by Children, Their Parents, and Their School Staff?" *Education 3-13: International Journal of Primary, Elementary and Early Years Education* 45 (5): 519–531.
- Slade, M., C. Lowery, and K. Bland. 2013. "Evaluating the Impact of Forest Schools: A Collaboration Between a University and a Primary School." *Support for Learning* 28 (2): 66–72.
- Swarbrick, N., G. Eastwood, and K. Tutton. 2004. "Self-esteem and Successful Interaction as Part of the Forest School Project." *Support for Learning* 19 (3): 142–146.
- Trapasso, E., Z. Knowles, L. Boddy, L. Newson, J. Sayers, and C. Austin. 2018. "Exploring Gender Differences Within Forest Schools as a Physical Activity Intervention." *Children* 5 (10): 1–18.
- Turtle, C., I. Convery, and K. Convery. 2015. "Forest Schools and Environmental Attitudes: A Case Study of Children Aged 8–11 Years." *Cogent Education* 2 (1): 1–14.
- Waite, S., and A. Goodenough. 2018. "What is Different About Forest School? Creating a Space for an Alternative Pedagogy in England." *Journal of Outdoor and Environmental Education* 21 (1): 25–44.
- Waters, J., and S. Begley. 2007. "Supporting the Development of Risk-Taking Behaviours in the Early Years: An Exploratory Study." *Education 3-13: International Journal of Primary, Elementary and Early Years Education* 35 (4): 365–377.