

Rediscovering the Potential of Outdoor Learning for Developing 21st Century Competencies



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1 What Are 21st Century Competencies and Why Are They Important Now?

Global changes in technology and demographics are influencing the competencies people need to thrive in their work and community settings in the 21st century. New problems and opportunities are emerging from accelerated developments in: climate change, automation, globalisation, brain and genomic research, mass migration and mental health issues (Lambert, 2017). We can add to this list the widespread economic and social ripples emanating from the global COVID-19 pandemic, which are yet to be fully realised at the time of writing. Technical expertise is becoming progressively more specific as knowledge and technology advances, requiring collaborative skills for different experts to work together to creatively solve new and complex problems (Geisinger, 2016).

Most education jurisdictions around the world recognise that schooling outcomes need to be much broader than subject knowledge, and should also include higher-order thinking skills, attitudinal skills and socio-emotional skills (Lamb et al., 2017). As well as foundational literacy and numeracy skills and job-specific skills, the

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211

Organisation for Economic Cooperation and Development (OECD) Skills Strategy identified that individuals need meta-cognitive and social-emotional skills in order to be competent workers and engaged citizens (OECD, 2019).

Many definitions of 21st century competencies have been proposed, each with their own list of competencies and frameworks. Some examples include:

- Creativity and innovation, critical thinking and problem solving, communication and collaboration (Trilling, 2009);
- Character education, citizenship, communication, critical thinking and problem solving, collaboration, creativity and imagination (Fullan & Langworthy, 2013);
- Creativity, critical thinking/problem solving, communication, collaboration (World Economic Forum, 2015);
- Creativity, critical thinking, communication, collaboration (Fadel, 2016); and
- Creativity, critical thinking, complex problem solving, learning to learn, self-regulation, conscientiousness, responsibility, empathy, self-efficacy, collaboration (OECD, 2019).

These competencies form a dense conceptual web with potential overlaps and complex interactions, and research is yet to confirm whether they are domain-specific or transferable across learning areas (Lamb et al., 2017). Despite these definitional issues, there are four common factors across the various lists of 21st century competencies: the individual cognitive skills of *creativity* and *critical thinking*, and the social skills of *communication* and *collaboration*, i.e. what is often referred to as the 4Cs.

These skills are not new to the 21st century, but rather are newly important (Silva, 2009). In fact, personal and social skills have always been important to flourishing in the workplace and community. However, as the rate of societal change has accelerated this century and artificial intelligence allows the automation of more mechanistic tasks, the need for uniquely human competencies has gained prominence in educational planning (Vincent-Lancrin et al., 2019). Traditional didactic classroom learning is not well suited to develop 21st century competencies, and so new learning contexts need to be explored.

2 Why Learn Outdoors?

Outside learning environments, and the learner-centred pedagogical approaches they allow, provide a rich platform for developing interpersonal and intrapersonal competencies. Whilst outdoor learning can include built-environment locations (such as museums), it is mostly conducted in natural settings. ‘Outdoors’ has been conceived in concentric circles radiating out from school grounds to the local neighbourhood, and further afield on day trips through to multi-day residentials and expeditions (Beames et al., 2012). The drivers for taking learning outside include: enjoyment and engagement of learning, health and wellbeing, and connection to nature (Passy

et al., 2019). These benefits have seen outdoor learning grow from ‘grass roots’ movements to widespread practice in a number of countries (Quay, 2005).

There are many terms and definitions around outdoor learning (Becker et al., 2017), and different forms are often grouped together without appreciation of their distinctive characteristics (Bentsen et al., 2017). Two traditions are described in this chapter: outdoor adventure education (OAE), and learning outside the classroom (LOTC). OAE has typically been distinct from academic learning, and uses challenging experiences to facilitate personal and social development. These often occur in the context of multi-day programs, which could be a series of discrete adventurous activities based at a ‘hard top’ residential centre or a ‘soft top’ tent-based expedition through a natural environment (Beames et al., 2012). LOTC is defined as the teacher-facilitated learning of traditional academic subjects in a natural outdoor setting, during the normal school day (Bentsen et al., 2021). Having made this distinction, there is some overlap between the two traditions. For example, outdoor adventure programs may include a field studies curricular component (Lugg & Quay, 2020; McLeod & Allen-Craig, 2007; Nicol & Waite, 2020), and LOTC is sometimes achieved through a multi-day ‘residential’ experiences (Gray, 1997; Kendall et al., 2015).

3 Theoretical Underpinnings of Experiential Learning

Outdoor learning relies on students actively learning through direct experience, rather than a passive model of absorbing knowledge imparted by teachers. It is certainly slower to facilitate learning through experience when compared to direct instruction, and the specific learning outcomes are less predictable—so why would teachers choose this learning approach either inside or outside the classroom?

Learning through experience is a rich personal and relational undertaking. John Dewey, one of the early theorists of modern education, argued that learners need direct interaction with the world in order to understand it, and that knowledge is more easily memorised when it is linked to a related sensory experience (Dewey, 1938). Subsequent theory explains that all learning is based on sensory inputs, however when various sensory sources do not match each other the quality of learning is shallow and is more likely to be filtered out before it penetrates to long term memory, compared to when sensory inputs complement and reinforce each other (Thorburn & Marshall, 2014). Experiential learning allows students to actively grapple with new concepts by encountering them in lived experience, rather than by passively listening to their teacher explaining a concept as an abstract principle (Quay, 2005).

High quality experiential learning is founded on ‘real-world’ experiences which are relevant to students’ lives outside school (Breunig et al., 2015), and incorporate relational and affective elements (Gray, 2018). Learning experiences which are inherently interesting and relevant to curriculum goals, allow students to understand and internalise their own sense of agency in the learning process (Sibthorp et al., 2015). A novel experience challenges habitual ways of thinking and acting, and

this cognitive dissonance affords the learner an opportunity to consider how they can incorporate new behaviours and attitudes into their normal context (Nicol & Waite, 2020). Learning through experience can be achieved on school grounds, and even within the classroom, however outdoor natural environments provide many of these foundational elements for deeper learning to occur. As with any pedagogy, experiential learning does not produce deep learning without being well designed and facilitated, and students quickly forget irrelevant (indoor or outdoor) learning experiences (Rickinson et al., 2004).

The process of experiential learning is as diverse as the teachers who design and deliver it, but there are some common elements. Kolb's (1984) Experiential Learning Cycle describes an ongoing process of a concrete experience, reflective observation, abstract conceptualisation and active experimentation. Others have since visualised the experiential learning process in three dimensions, as a rising spiral of successive learning cycles (Schenck & Cruickshank, 2015). We all go through experiences of some sort each day, however intentional reflection on the meaning and implications of an experience is pivotal to its learning impact (Nicol & Waite, 2020). Early forms of OAE simply provided an opportunity for personal reflection without guidance, but progressively more sophisticated models of facilitation include: speaking for the experience, debriefing or funnelling, frontloading the experience, isomorphic framing of the experience, and indirect framing (Priest & Gass, 2005).

4 The Value of Connecting with Natural Environments

As well as being a rich platform for experiential learning, outdoor learning results in direct benefits from exposure to natural environments. The link between our connection to nature and human flourishing can be traced in literature, science, poetry, philosophy and indigenous wisdom through the ages (Braus & Milligan-Toffler, 2018). The benefit of contact with nature is not limited to children or education. A review of empirical studies on contact with natural settings indicated improved attention, reduced stress, mental restoration, decreased attention deficit, enhanced self-perceived health and increased longevity (Grinde & Patil, 2009). Even surgical patients who merely have a view of green space from their bed recover faster than those facing a brick wall (Ulrich, 1984).

Richard Louv's lighthouse publication *The Last Child in the Woods* (Louv, 2005) warned of the myriad of risks to a generation of children who rarely explore natural environments, and coined the term 'nature deficit disorder'. A systematic review of academic research confirmed that spending time in natural settings promotes children's healthy development and wellbeing (Gill, 2014). Having trees and natural spaces in the community is not only important for children's health, but also encourages creative play (Chawla, 2015). For example, a study of two Australian early-childhood centres compared natural outdoor play spaces with an indoor simulated natural space, and found that the outdoor setting resulted in more imaginative play and improved peer relationships (Dowdell et al., 2011). Immersing children in nature has

a number of benefits, including: reduced stress, increased social and emotional skills, higher civic engagement (Hartig et al., 2014), attention restoration, reduced ADHD symptoms and behaviours, and even higher academic performance (McCormick, 2017). Pertinent to the focus of this chapter on 21st century competencies, a systematic review of young people engaging regularly in natural settings indicated that these experiences develop critical and creative thinking skills (Adams & Savahl, 2017), and lack of exposure to natural environments is suggested to be detrimental to creativity and innovation (Malone & Waite, 2016). Another recent review showed that time spent in nature positively influences: perseverance, resilience, critical thinking, problem solving, leadership and teamwork (Kuo et al., 2019, see Kuo, Barnes and Jordan: [Do Experiences with Nature Promote Learning? Converging Evidence of a Cause-And-Effect Relationship](#) in this volume).

5 Outdoor Adventure Education (OAE)—An Established Platform for Developing Personal Competencies

Adventure has been an intrinsic element of human experience since our prehistoric ancestors, with an innate desire to ‘journey into the unknown’. The origin of structured OAE is linked to educationalist Kurt Hahn, who started an experientially-based model of schooling in the early 20th century in the belief that young men needed to develop a sense of adventure in their schooling (Hahn, 1959). Hahn, along with his less acknowledged co-founder Marina Ewald (Gray et al., 2017; Mitten et al., 2018), went on to found the Outward Bound organisation. Both Hahn and Ewald saw the merit of incorporating challenging outdoor activities to facilitate experiences of self-discovery, triumph and defeat, self-effacement in the common cause, periods of silence for reflection, and training of the imagination (Hahn, 1930). By 1994, 40,000 students participated in Outward Bound programs alone (Hattie et al., 1997), not counting many other school-based and independent OAE providers.

OAE can take many forms, but is characterised by an intentionally challenging outdoor experience followed by reflection on personal learning. Traditional OAE programs comprised an extended expedition (Martin & Legg, 2002) through a natural environment, but OAE can also focus on a single activity such as a high ropes challenge course (Gillis & Speelman, 2008). Appropriately managed risk is essential to the paradigm of OAE (Gray & Bailey, 2022), and careful programming aims for the actual risk to be lower than the subjective risk as perceived by the participants (Priest & Gass, 2005). This leads to a peak adventure experience without being overwhelming, and the ensuing cognitive dissonance is a catalyst for new ways of thinking, acting or relating (Cooley et al., 2015).

Anecdotal evidence indicates that proponents of OAE support its effectiveness for personal growth, however by the end of the 20th century a significant meta-analysis of 96 extended adventure education programs (2–4 weeks), showed a moderate effect size on forty outcomes, such as locus of control, self-concept, and leadership (Hattie

et al., 1997). Critical thinking competencies were shown in decision making and problem solving outcomes, which both developed even further in follow-up measurements. Other OAE outcomes aligned to 21st century competencies were communication and cooperation/relating skills (collaboration), which had small to moderate effect sizes immediately after the program and modest additional growth at a six month follow up. Two other meta-analyses (Cason & Gillis, 1994; Hans, 2000) similarly concluded that OAE programs have a small to medium effect on outcomes like self-concept, self-confidence and locus of control.

OAE research continued to demonstrate developmental outcomes such as character development, personal growth, enhanced interpersonal skills, and leadership development (Ewert & Garvey, 2007). A meta-analysis of 44 studies (Gillis & Speelman, 2008) focusing only on challenge ropes courses (i.e. navigating through an obstacle course of ropes/cables at height) reported a medium effect size on self-concept, personality factors and group dynamics (including 21st century collaborative categories of interpersonal skills, group cohesion and group effectiveness), when compared with groups on a wait list or experiencing alternate programming. A final meta-analysis of 11 studies examined the benefits of OAE on group work skills, specifically in higher education students, showing that transferable 21st century competencies (specifically communication, cooperation, team cohesion, role allocation, working well with others) are developed during OAE programs and retained on their return to the higher education environment (Cooley et al., 2015). OAE research has also shown outcomes in emotional intelligence (Oppen et al., 2014) and life-effectiveness skills, which relate to the 21st century competencies of collaboration (social competence) and creativity (intellectual flexibility) (Gray, 1997; McLeod & Allen-Craig, 2007). UK residential adventure programs have reported benefits a year onwards in self-confidence, independence and 21st century competencies of communication and collaboration (cooperation and teamwork) (Prince, 2020). These meta-analyses and other research studies broadly demonstrate that OAE is effective, but are not fine grained enough to look into the black box of *how* these outcomes are achieved. Key process factors still need to be identified, which could include: participant age and background, voluntary or compulsory participation, length of program, type of activities, intensity of subjective challenge, quality of facilitation, frontloading before the program and guided reflection afterward.

Extended OAE programs understandably achieve the most significant outcomes, however many young people's experience of OAE is through attending shorter annual school camps where they participate in a range of bite-sized outdoor activities (Lugg & Quay, 2020). For example, an Australian survey of outdoor youth programs indicated a typical OEP experience comprised a group of 40 students aged 10–16 years attending a 3–5 day camp (Williams & Allen, 2012). Over 80% of outdoor youth program providers in this survey believed that their participants gained personal and social skills, however most relied on informal and anecdotal evidence and less than 7% conducted robust research. On the other hand, there has been criticism of the learning value of short packaged adventure experiences (Brown & Beames, 2017). Summer camps are an established part of American youth culture, although have explicitly recreational aims rather than an educational focus. Notwithstanding this

recreational emphasis, a study of over 3,000 children and their parents across 80 US summer camps showed significant perceived increases in positive identity, social skills, physical and thinking skills and positive identity, both immediately after camp and 6 months later (Thurber et al., 2007).

In conclusion, there is an established base of evidence for the small to moderate efficacy of OAE to develop a range of interpersonal and intrapersonal competencies. These could be described as life-effectiveness skills, incorporating personal attitudes and abilities (for instance self-confidence, perseverance, emotional intelligence, self-regulation) and interpersonal 21st century competencies of communication and collaboration. Evidence for creative and critical thinking competencies in OAE is minimal, however most research studies have not been focused on these specific outcomes. While most educators would endorse the value of developing these ‘non-academic’ competencies in their students, OAE has only been able to gain compulsory inclusion in the national curricula of a few countries like Singapore (Passy et al., 2019), and a marginal place in others such as the UK (Brown et al., 2016) and Australia (Passy et al., 2019).

6 Learning Outside the Classroom (LOtC)—Emerging Pedagogies for Holistic Learning

Outdoor ‘in-situ’ learning was the norm for human cultures through most of history (Nicol & Waite, 2020), and on-the-job learning through trade apprenticeships occurred commonly in European countries and their colonies from at least the 13th century (Perrot et al., 2014). It wasn’t until the advent of mass-schooling in the 19th century that the place of learning was moved inside to a schoolroom (Joyce, 2012). In recent decades, however, curriculum-based learning in settings other than the classroom have received more interest in many industrialised countries (Barfod & Bentsen, 2018).

LOtC can be broadly described as taking curriculum learning outdoors, and making academic learning experiential and practical. Whilst LOtC can be conducted in indoor (e.g. a museum) or built (e.g. a city streetscape) environments, most proponents place value on learning in natural outdoor settings (Waite, 2020; see Waite: [International Views on School-based Outdoor Learning](#) in this volume). Locations for LOtC can be described in terms of their radiating proximity and time away from the classroom: an outdoor lesson within the school grounds, a short trip into the local neighbourhood, day excursions into natural spaces, and overnight/residential expeditions into wilderness areas (Beames et al., 2012; Lloyd et al., 2018a).

Scandinavian countries are considered by many to be leaders in LOtC (Barfod & Bentsen, 2018; Gray, 2018). The educational philosophy of ‘udeskole’ (outdoor school) fits well with the broader Scandinavian culture of ‘friluftsliv’ (outdoor living), where enjoying natural environments is encouraged irrespective of the weather (Bentsen et al., 2009). Denmark’s TEACHOUT research project of LOtC

has shown benefits for primary student physical activity (Schneller et al., 2017, see also Mygind: *Udeskole—Pupils’ Physical Activity and Gender Perspectives* in this volume), wellbeing (Bølling et al., 2019, see Mygind & Bølling: *Pupils’ Well-Being, Mental and Social Health* in this volume), and school engagement (Bølling et al., 2018), however 21st century competencies were not assessed (see also Dettweiler, Lauterbach, Mall & Kermish-Allen: *Fostering 21st Century Skills through Autonomy Supportive Science Education Outside the Classroom* in this volume). Danish teachers have a large degree of autonomy in both curriculum content and pedagogical approach, however ‘udeskole’ has been encouraged through government funding and mandated daily physical activity (Passy et al., 2019). Despite this ‘grass roots’ momentum towards LOTC and supportive government policies, only one fifth of Danish schools actually choose to implement regular sessions of LOTC (Barfod & Bentsen, 2018; Bentsen et al., 2010).

The UK Forest School movement has also been influential in advocating the value of learning outside and connecting with nature, and traces its roots to Scandinavian practice (Kemp, 2019). Forest schools prioritise regular sessions of child-centred learning in natural woodland settings, and have been run mainly for early childhood and primary aged children (Harris, 2015). As well as the UK, forest schools (or their cousins beach and bush schools) have been founded in the US, Germany, Switzerland, Asian countries, Australia and New Zealand (Blackwell, 2019). Forest School practitioners tend to focus on social and emotional learning outcomes, such as intrapersonal and interpersonal relationships, risk taking and connection with nature. Student growth specifically in the 21st century competencies of communication and collaboration (cooperation and teamwork) has been observed in Forest School programs (Harris, 2015). In contrast, ‘udeskole’ is seen by Danish teachers as an alternate pedagogical setting from which they can deliver the academic curriculum (Waite et al., 2016a).

Also in the UK, the Natural Connections Demonstration Project (Waite, 2016b; see Passy & Blackwell: *Natural Connections: Learning About Outdoor-Based Learning* in this volume) aimed to stimulate demand for curriculum-based LOTC, and recruited 125 English schools involving over 40,000 students. As well as an enjoyment and connection to nature, LOTC improved students’ social skills (including communication and teamwork), engagement with lessons, positive behaviour, opportunity to be physically active, and space to reflect. Teachers reported benefits to their teaching practice, health and wellbeing, and professional development; however LOTC competes with many other priorities in a crowded and highly regulated UK curriculum (Christie et al., 2016; Passy et al., 2019).

LOTC was recently recognised in the Australian national curriculum from 2017, albeit only as one of six ‘curriculum connections’ which can be utilised by teachers to trace conceptual themes across the curriculum (Gray, 2018). There is a wide variety in the level of implementation of outdoor learning between Australian states, which each have their own distinct curricula and pre-service teacher training priorities (Passy et al., 2019). As examples, urban NSW primary schools have seen positive socio-emotional (including collaboration, communication and critical thinking) and academic impacts from pilot studies of LOTC (Lloyd et al., 2018b; Tracey et al.,

2018; Truong et al., 2016), but this occurs at the discretion of individual schools and teachers (Gray & Pigott, 2018).

An audit of LOTC and OAE research in 15 systematic reviews looked at the range of outcomes being measured, and reported 13 of 57 unique studies in the UK included teamwork (collaboration) or communication in their outcomes (Fiennes et al., 2015, see Jucker “[How to Raise the Standards of Outdoor Learning and Its Research](#)” in this volume). Other studies assessed outcomes related to 21st century competencies (such as creativity, social skills, critical thinking, and problem solving), however the number of studies covering each outcome was not detailed. The authors were critical of methodological quality across the entire audit, yet nevertheless concluded that almost all outdoor learning activities have some positive effect on the outcomes they are trying to achieve, that overnight programs are more effective than shorter ones, but that effects tend to diminish 6 months after the intervention. A more tightly defined systematic review of 13 curriculum-based LOTC studies, involving at least 4 h per week for 2 months or more, indicated benefits to self-confidence, sense of belonging, self-esteem and social relations (including cooperation, teamwork and communication) in eight studies (Becker et al., 2017). A review of 61 studies on forest schools found improvements in self-confidence, social skills and communication (Gill, 2011). The Learning Away program focused on the residential component of LOTC in 60 primary and secondary schools across the UK, and benefits were reported to peer and staff-student relationships, self-confidence, engagement with learning (especially for secondary students) and the 21st century competency of creativity (Kendall et al., 2015). An earlier study of sixth grade Californian students attending a week-long outdoor science school in one of three locations, found significantly higher levels of cooperation and conflict resolution collaborative competencies 6–10 weeks later than a waitlist comparison group. Teacher ratings of each student similarly showed significantly higher gains in self-esteem, peer relationships, conflict resolution, problem solving, motivation to learn and positive behaviour, compared to the waitlist group (Parrish et al., 2005).

Are the personal and social benefits of LOTC at the expense of academic progress? Nature-based instruction has been shown in some instances to actually outperform traditional classroom learning, in terms of boosting foundational academic learning skills, such as improved attention, self-discipline and enjoyment of learning (Kuo et al., 2019, see Kuo, Barnes and Jordan: [Do Experiences with Nature Promote Learning? Converging Evidence of a Cause-And-Effect Relationship](#) in this volume). Participation in environmental education programs in California resulted in higher scores on standardised state tests in motivation and the 21st century competency of critical thinking (Athman & Monroe, 2004). A systematic review of 42 studies investigating exposure to natural environments found improvements in cognitive abilities like working memory, cognitive flexibility and attentional control, which are underlying skills for academic learning (Stevenson et al., 2018).

There is also some evidence that LOTC can directly benefit academic performance. For example, middle school students in Washington who attended an environmental education program out-performed their peers in standardised maths, reading

and writing tests (Bartosh et al., 2009). It should be noted that the quality of environmental education research has not always been high. A review of 100 studies identified only eight which provided strong evidence of a correlation with academic achievement (Norman et al., 2006). A small but significant effect of regular LOTC on reading performance was established in 500 Danish primary students across 15 schools (Otte et al., 2019). Quantitative data gathered from UK residential programs support that students achieved higher than their predicted grade on matriculation tests, and some studies showed statistically higher academic achievement than comparison groups (Kendall et al., 2015). Week long ‘outdoor science school’ programs for at-risk primary students in California improved their science scores and they maintained this increase for months (Parrish et al., 2005). Finally, in a rigorous systematic review of curriculum-based outdoor learning, seven of thirteen studies reported learning impacts of LOTC, including improved academic performance across several subjects, and improved ability to apply knowledge to real-world situations (Becker et al., 2017).

The capacity of LOTC for developing personal competencies, whilst maintaining or even boosting academic performance, reflects a broader philosophy of education as a process for holistic development of young people to flourish as future citizens (Mann, 2018), rather than a narrow economic view of education as a means of assessing competitiveness in national and international employment markets (Passy et al., 2019). Not all LOTC programs effectively realise these outcomes, however. The quality of LOTC is undergirded by participant, program, and place factors (Rickinson et al., 2004). For example, LOTC programs need to avoid a formulaic ‘drag and drop’ approach to new locations (Lloyd et al., 2018a), but instead should be tailored to the local environment and the unique learning opportunities it provides (Nicol & Waite, 2020).

To conclude, LOTC describes a burgeoning movement of learning approaches centred around using natural environments as a learning platform. LOTC is effective in engaging students, improving health and wellbeing, and developing personal competencies, all without compromising academic performance (or even enhancing it in some cases). The evidence-base for LOTC promoting socially oriented 21st century competencies of communication and collaboration is much stronger than for the cognitive competencies of creativity and critical thinking, however there are some examples of the latter outcomes. Despite this evidence of effectiveness across a range of outcomes, however, LOTC still seems to occur only at the discretion of individual teachers, rather than being supported and resourced at a state or national level.

7 Challenges for Bringing Outdoor Learning into Schools

The evidence base presented in this chapter demonstrates that outdoor learning (OAE and LOTC) engages students and facilitates their holistic growth, so one may question

why it is not standard practice in schools across the globe? There are a range of barriers which have limited the integration of learning outdoors.

Access for all students to outdoor learning is the clearest challenge, particularly for OAE (Ewert & Garvey, 2007). Increased safety standards require more highly trained staff at larger ratios, which, along with the need for 24-h supervision for multi-day programs, results in high program costs. Every educational program has a cost, so the question is not whether OAE is too expensive, but rather if the required financial investment is cost-effective for achieving evidence-based outcomes that are deemed important. The UK-based Education Endowment Fund attempts to do just this for various initiatives, and rates OAE as having a moderate effect of 4 months of additional academic progress, for a moderate cost (Education Endowment Foundation, 2018). LOTC is more accessible for most schools as it does not require specialist facilities and equipment or large blocks of time, however the time and cost to travel to green spaces can still be prohibitive in some schools (Waite et al., 2016). Planning an outdoor lesson also involves an additional administrative burden for teachers, similarly to organising any other off-campus excursion (Passy et al., 2019; Waite, 2020).

Aversion to risk can be a cultural barrier to outdoor learning. A general societal trend away from risk-taking over the last few decades (Dillon et al., 2006; Rickinson et al., 2004), has resulted in a 'cotton wool culture' (Hyndman & Telford, 2015) where risk is to be minimised wherever possible. Parents who would like their children to be fearless can themselves be fearful about exposing their children to risky play, and thereby inhibit opportunities for them to develop resilience and courage (Niehues et al., 2013). Schools and youth organisations have also become more risk-averse (Harper, 2017), which has resulted in an increased administrative burden of risk management for teachers planning outdoor learning experiences for their students.

A significant barrier for student participation in both OAE and LOTC is their inclusion in an often-crowded state or national curriculum. While adventurous 'school camp' experiences are permitted or recommended in some national curriculums (Lugg & Quay, 2020), it is rare that OAE is systematically integrated into the mandated curricular offering for all students. There has been some confusion of identity even within the outdoor education community, as to whether it should be a stand-alone subject with discrete content, or an effective method to achieve other academic or socio-emotional curricular objectives (Quay, 2016). Crowded curriculum is similarly a challenge for teachers wanting to utilise LOTC (Passy et al., 2019). LOTC is typically scheduled within regular school hours, however fitting extended lessons into a busy school timetable can be difficult (Barfod & Bentsen, 2018). Scandinavian countries with a broadly defined curriculum allow more autonomy for teachers to adopt LOTC (Bentsen et al., 2009), however the curriculum is tightly defined in many countries which leaves teachers feeling that they have no time for creative pedagogies like LOTC (Becker et al., 2017; Waite et al., 2016).

The skillset for effective outdoor learning combines familiarity with the academic curriculum and facilitating experiential learning in natural settings, and OAE and LOTC educators are often confident in only one of these domains (Nicol & Waite, 2020). Pre-service teachers need to be trained in student-centred pedagogies and how

to link the curriculum with outdoor learning experiences, and these courses also need to be available for in-service teachers across all subjects (Barfod & Bentsen, 2018).

Individual student factors are not necessarily barriers, but need to be taken into account when designing LOTC experiences. These factors include age (younger students tend to be more enthusiastic about being outdoors), prior experiences with LOTC, phobias around dangerous fauna or simply being away from built environments, preference for didactic rather than student-led learning styles, physical and learning disabilities, and ethnic and cultural identity (Dillon et al., 2006).

8 Conclusion and Recommendations

Learning in the outdoors has great potential for developing personal and social competencies, which are increasingly recognised in the 21st century as being critical skills across most areas of professional and community life. Communication and collaboration outcomes have seen much more research focus to date than creative and critical thinking, and future research needs to investigate the effect of outdoor learning on the latter intrapersonal competencies. Recent reviews of outdoor learning research have been critical of methodological quality, and recommend repeated findings, quasi-experimental study design, randomised controlled trials and longitudinal studies (Becker et al., 2017; Fiennes et al., 2015). Whilst the effective practice of OAE and LOTC can be seen in many countries, it is rare that they are part of the normal educational experience of most students. Numerous challenges to the widespread implementation of learning in natural settings include: financial cost, a crowded curriculum, cultural bias towards risk aversion, and the lack of teacher training in student-centred pedagogies and utilising outdoor environments for learning.

The lynchpin for the mainstream adoption of outdoor learning is the formal inclusion of socio-emotional competencies in the curriculum. Most teachers recognise the importance of developing personal competencies, however academic performance metrics, by which both students and teachers are currently assessed, inhibit prioritisation of these broader educational goals. If state and national curriculum structures are expanded to include socio-emotional development, then OAE and LOTC would be core pedagogical platforms to achieve formal curricular outcomes. This top-down catalyst of curricular change would influence educational budgeting for outdoor learning opportunities, and cascade to bottom-up initiatives in teacher pre-service training and in-service upskilling in outdoor pedagogies.

Research to date has provided a general evidence base of OAE and LOTC programs promoting the growth of 21st century competencies, and future research can build on this foundation by finessing the conditions under which outdoor learning is most effective for achieving these outcomes (Mann et al., 2021). The following specific questions are worthy of further exploration:

- What are the political and cultural drivers which would motivate a jurisdiction to de-clutter its educational curriculum in order to integrate outdoor learning?

- How can 21st century competencies be rigorously and pragmatically assessed in (indoor and outdoor) school settings?
- What elements (e.g. participant factors, facilitation style and quality, program duration and frequency) of outdoor learning programs are necessary to achieve significant gains in 21st century competencies?
- Under what conditions does outdoor learning enhance academic learning?
- What are the elements of effective pre-service and in-service teacher training which would result in teachers feeling confident to design and facilitate learning in natural spaces?

Converging evidence has provided a clear picture of the benefits of outdoor learning for the development of 21st century competencies. As Kuo and colleagues conclude, “it is time to take nature seriously as a resource for learning and development—to expand existing, isolated efforts into mainstream practices” (Kuo et al., 2019, 6; see Kuo, Barnes and Jordan: [Do Experiences with Nature Promote Learning? Converging Evidence of a Cause-And-Effect Relationship](#) in this volume). OAE and LOTC have an integral part to play in equipping young people to flourish in a world where critical and complex thinking and effective communication and collaboration are essential.

Recommended Further Reading

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