

NEF+ Report

Literature Review of Existing Research on the Use of Digital Tools in Outdoor Learning

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Project Summary

The NEF+ partners have been working together for three years on the project 'From Outdoors to Labour Market (FOLM)' using an innovative outdoor learning (OL) approach to promote employability skills in young people from three countries Spain, Ireland, and Poland. During this time, the success achieved with the participants in raising transversal skills, self-determination, teamwork, etc. was a determinant in securing employment, further education, or training. The Covid pandemic has imposed significant restrictions on the practical implementation of the FOLM project, and digital learning solutions have been sought to mitigate this and have added value in combining OL and digital learning that NEF+ will build on within the Consortium and with practitioners and experts across the VET sector.

TUS Review Report (July 2021) Summary of Existing Research on the Use of Digital Tools in Outdoor Learning

Objectives

NEF+ creates professional development opportunities with Outdoor Learning (OL) for VET, e.g., through a digital open access repository with self-led learning materials and best practice guidelines on OL for Vocational Education and Training (VET) in non-formal education and workplace settings - with a special focus on ways to digitally enhance OL. To achieve this NEF+ provides an open access digital repository for information on OL for VET, including a summary of existing research on OL for VET and ways of digital enhancement of OL and VET. This report collates a summary of available research on augmenting OL for VET through digital means through the means of a systematic literature review.

Key search terms used to search for sources for the report included the combination of either digital technology or digital tools with terms such as: blended learning, games-based learning, augmented reality learning, mobile devices, outdoor experiential learning, outdoor education, environmental education, adventure therapy/education, placed-based learning, adventure sports or fieldwork.

The evidence for this report derives from academic journals, previous projects, EU and international research and other relevant sources. Key journals in the area of outdoor learning were searched most notably:

the Journal of Adventure Education and Outdoor Learning (JAOE), Journal of Outdoor Environmental Education and the Journal of Outdoor Recreation, Education and Outdoor Leadership, Journal of Experiential Education.

The main journals and themes used in the report can be found in Appendix 1.

Structure of the report

The current report provides the outcomes of a comprehensive research carried out to provide an overview of the current practice pertaining to the augmentation of Outdoor Learning and VET education and training provision with an emphasis on digital means. It provides a broad picture of the various uses and integration of digital technology in OL. The research focuses primarily on providing a short review of the main themes associated with augmenting OL for VET through digital means including the advantages and disadvantages of OL through digital means.

Introduction

With the increased availability, affordability and accessibility of digital technology, there is increasing opportunity to integrate digital technology in Outdoor Learning (OL). This, however, raises questions over the type of experience being created, with digital technologies having the potential to be both a distraction and enhancer of outdoor learning depending on how they are applied (Cuthbertson, Socha, & Potter 2004; Thomas & Munge 2017; Hills and Thomas 2020).

Outdoor Learning

Outdoor Learning as defined by the Institute of Outdoor Learning (*IOL, 2021*) states it “involves the transformation of knowledge, skills, attitudes and behaviours through direct engagement with the outdoor environment for the personal and social benefit of individuals, families, society and the planet.” The model below (figure 1) illustrates how outdoor learning can be beneficial on many different levels for all those who engage in outdoor learning.



Figure 1: Model of benefits of OL. <https://www.outdoor-learning.org/Good-Practice/Research-Resources/About-Outdoor-Learning> (Accessed on the 20/07/2021)

The following are some listed benefits for varying sectors of society according to the IOL:

“At a **global** level: fostering a connection that leads to respect and care for the natural world, an **appreciation of biodiversity and sustainability**, and pro-environmental behaviours.

At the **societal** level: developing a sense of place leading to greater **engagement with the community** and an appreciation of the opportunities available to live, learn and work in the local area.

At the **interpersonal** level: providing a safe and supportive setting to enhance social skills, **appreciate and value difference**. Encouraging loving and meaningful relationships across generations that foster tolerance, respect, and kindness.

At the **intrapersonal** level: engagement with nature and the environment for health, wellbeing, and nature connection, leading to **lifelong participation and outdoor competence**. Developing character, resilience, positive risk taking." (IOL, 2021)

Digital Technology in Education

Technology is changing job roles and students need to be ready to embrace this change by using technology in their education. In addition, Killen (2015) suggests that the pervasive use of technology in so many aspects of our lives means that students will come to further or higher education with some experience of technology and the expectation that it will feature in their learning journey. Digital technology is increasingly part of mainstream education and used in the classroom to enhance learning opportunities and outcomes in an increasingly interconnected world. Killen has identified several challenges associated with educational and training institutions in enhancing the student digital environment. These include delivering a relevant digital curriculum, empowering the students to develop their digital environment, and preparing and supporting students and staff to study and work successfully with digital technologies. In addition, Killen identified that learners' digital experiences are strongly dependent on the confidence and capabilities of their teachers and reiterates the importance of continued professional development in digital education (Killen 2015). Indeed, Pavlakou and Sharpe (2014) recommend that for learners to improve their experiences, staff need to be capable and confident to introduce and use technology in pedagogically appropriate ways. To address these challenges Killen (2015) argues that digital activities and assessment should be embedded in curriculum with continued support throughout to increase digital literacy and confidence.

As a result of covid there is now an increase in remote teaching and blended learning. For successful technology led teaching access to digital devices and connectivity is essential. Use of interactive platforms and applications can help create a simulated or virtual classroom and help deliver and support effective teaching and communication (Department for Education UK 2021).

Digitisation and technology have also increased in popularity in outdoor education (Wattchow, B., & Brown, M. 2011) For the 21st century learners, the increased use of technology, in education in general including OL, has made digitisation a new standard and has become the common use among educators and learners, similar to the walking boots and compasses that were once non-existent. The impact of Covid 19 restrictions and lockdowns have, in many circumstances, necessitated the implementation of Outdoor Education programmes through digital means. There is, however, a hesitancy among some outdoor education practitioners to embrace augmenting outdoor education with digitisation for a number of reasons including the belief that this will lessen the impact of the results of outdoor

education on the individual. The following themes have been identified in this report on how digitisation is included in outdoor education and the impacts, both positive and negative, of this augmentation.

Digital tools for OL

OL increasingly relies on technology and digital technology specifically in terms of safety equipment, communication methods etc. This increasing reliance can also be seen in the digital tools used in OL such as video/audio recording, digital note-taking, geo location devices, augmented reality, geo caching, drones and tablets and the range of digital devices is set to increase in the future (Poh 2020; Hills and Thomas 2020; Stymne 2020). This is as a result not only of their increase in affordability and accessibility but also because digital technology is becoming more compact and mobile, making it possible to use these tools almost anywhere, even in remote locations (Bolliger & Shepherd, 2017) and outdoor settings.

One of the most widely used digital tools is the mobile phone. The number of articles published examining outdoor learning with mobile technology can be linked to its growing popularity (Stymne 2020). The use of mobile smartphones is divisive among outdoor educators with most disliking their use apart from when traveling to and from a site (Bollinger, et al., 2020). Bollinger et al (2020) states that 50 – 65 % of educators agree that mobile devices were suitable when used in accordance with outdoor activities like weather monitoring and location information. Furthermore 70 – 82 % agree on their use for photography and video recording.

Other popular digital tools include the use of a QR Code Learning system as outlined by Lai et al (2013). This is a system linked with using digital ‘Green Maps’ which can be accessed using the QR code on a student's paper map. This allows the map to be expanded and associated knowledge or learning material made available. The QR code system can help achieve learning outcomes, offers further opportunities for interaction, and enables teaching to be delivered in a diverse range of locations. Lizandra, et al (2020) describes an innovative experience with mobile devices using QR codes to provide gamifying elements in the field of physical education in higher education. The article demonstrates the mutually beneficial effect of the use of technology as a facilitator of the practice of outdoor physical activity. Augmented reality also has benefits in OL and Vocational Education and Training programs. It provides fun activities, improves communication and enhances the learning process. Mobile phones and apps have this technology by which students can find information instantly including access to integrated maps for OL situations (NewschoolVR 2021).

Digital technology in OL can also be used as a reflection tool. Reflections and analysis are recognized as core components of education. Hills and Thomas (2020) when critiquing Puentedura (2006) SMAR ladder suggest that a decision not to use technology can have unforeseen effects that are not beneficial either for the learners or facilitators such as limiting a learners' opportunities to document or reflect on their experiences. It is important to be

aware of how participants can also reflect, engage and learn before and after their outdoor experience through digital means. How did they find out about the course? Was it on social media? Did you send their kit list via email?

In terms of the inclusion of digital tools for OL there are two differing camps. The first camp accepts digital tools as an accepted everyday occurrence such as GPS mapping and mobile phone technology and can be used for learning orientated purposes (Kacoroski, Liddicoat, Kerlin 2016). The second camp considers them a diversion from the practical OL experience and learning outdoors (Smith, C. A. et al 2016; Wattchow, B., & Brown, M. 2011) and are concerned that digital technology puts a barrier between the learners and the outdoor environment (Cuthbertson, B., Socha, T. L., & Potter, T. G. 2004). Philip and Razali (2020) suggest that the differing points of view on the use of technology leaves the decision with the educator to make a reasonable choice as to when, what and how to use digital tools.

Digital learning styles for OL

There is as much debate about the effectiveness of digital technology inside the classroom as there is in the outdoors (Hills and Thomas 2020; Fauville et al. 2014). The augmentation of OL and digitisation will improve and generate additional opportunities for experiential outdoor learning and learning outcomes (Wattchow, & Brown, 2011; Thomas, & Munge, 2017; Bolliger & Shepherd, 2017; Kacoroski, Liddicoat, Kerlin 2016); Fauville et al (2014) outlines that digital technology can expand the range of pedagogical resources available, and in contrast with other forms of learning methods, certain emerging technologies may be better adapted for use in outdoor experience learning.

Primary learners are gradually spending less time outdoors. Paulsen & Andrews (2019) suggest the use of a specific programme, Plum Landing (PBS Learning Media, 2021) which was successful in getting children interested in learning outdoors. They recommend the use of convenient research driven resources to provide urban children with active outdoor science learning opportunities as they are proven and effective at expanding science learning in outdoor settings. Thus, young learners are inspired to engage with and go outdoors, providing them with much needed 'green time'.

According to Walter (2013) adult learners, aged approximately 18 to 35 years have always had the 'Internet' present and subsequently the digital world is a natural or typical part of daily life. These adults can be known as the 'Net Generation'. Walter (2013) states that this group of adults have a strong learning ability in visual, multimedia, and digitally mediated environments but they are also increasingly suffering from debilitating physical, emotional and mental health issues. Digital technology in OL, however, can also counteract this as it also presents the opportunity for increased connectivity and examples of this can be seen in interactive blogs and worldwide collaborative mapping. Integrating digitisation with OL can have a positive impact on aspects of wellbeing including confidence, problem-solving and general happiness and connection with others.

Hills and Thomas (2020) in their Digital Technology and Outdoor Experiential Learning Framework consider pedagogy in their evaluation of digitisation in OL. They suggest that the decision to use digital technology in the teaching and learning process is determined using six factors. These factors include overall context and that if the outdoor learning is used to develop skills and information, the use of digital technologies will be more applicable to learning and evaluating in a more formalized environment. Other indicators that Hills and Thomas (2020) argue are factors in digitisation and OL framework are the facilitators and learners' attributes. If they have competence with technology, then the experience is more likely to be positive. If, however, they are digitally inexperienced this will have a negative effect both in terms of the educators or facilitators not understanding the learning outcomes but also barriers being created to teaching and learning if the learners are unable to complete a digital task (Medzini et al 2015).

Digital technology can also aid in increasing student-centered learning and away from teacher led pedagogy. It can, for example, be used for transmitting and analysing data and for remote supervision and thereby negating the need for physical presence of the facilitator (Hills and Thomas 2020; Philip, Razali 2020). It can also be used to improve learner engagement and highlight the value of outdoor experiential learning (Beames 2017).

FOLM CASE-STUDY

The From Outdoors to Labour Market (FOLM) project is focused on an innovative education approach addressing the youth who are not in employment, education or training. The concept behind the FOLM learning experience is to motivate and encourage the young people into engaging in education or employment. The programme engages 990 of the target market in Warmia-Masuria (Poland), Cantabria (Spain) and Mid-West Region (Ireland) by transferring the experience from the University of Edinburgh's "Model for social and personal growth through Outdoor Learning".

The FOLM Project uses Outdoor Learning to engage youth with the community and develop a sustainable framework for the model to be applied by stakeholders across Europe. Through the programme participants recognize strengths/talents, strengthen soft skills, build self-esteem/self-awareness, and fortify attitudes for employment. The Project Consortium provides job matching through outreach to employers' organizations, promotion, mentoring and trail employment.

There is the benefit of digital technology in the recruitment and evaluation stages of OL programmes such as FOLM. The FOLM project used technology such as social media campaigns to attract young people, software such as Microsoft packages for administration and project evaluation purposes. During the OL experience digital tools such as GPS equipment for locational purposes, digital cameras for recording the experience and mobile phones for use in case of emergency. FOLM also included coaching of the young people.

Again, digital tools were used during this stage including for keeping in contact with the young people and for delivery of aspects of the coaching programme. The mentoring stage was where the groups were mentored on an individual basis for 6 months after the coaching stage ceased. Digital tools were used to maintain contact including mobile phones and digital platforms.

Benefits of integrated OL

There are numerous articles outlining various benefits of augmenting OL with digital technology. Hills and Thomas (2020) identify two key arguments in its support. Firstly, that digital technology can enhance and create additional opportunities in outdoor experiential learning (Wattchow, 2001; Miner, 2012; Thomas & Munge, 2017). They present the example of how a GPS device can provide excellent feedback to a student learning to navigate with a map and compass by confirming their location and showing how accurately they followed a bearing. Secondly, that digital technology can more fully engage and connect learners with both the outdoors and each other (Bolliger & Shepherd, 2017; Veletsianos & Doering, 2010). They demonstrate this with the example of learners finding and taking pictures of specific plants and then reflecting upon and sharing these images after the experience with their peers.

Other benefits highlighted in the literature include how digital technology provides the opportunity to include all types of learners and to presents the opportunity to link learners with each other and with the outside world (Philip, Razali 2020). The study conducted by Munge et al., (2018) suggests that participation from students who suffer from mobility issues is increased with the suitable use of technology. Using remote technology students are now able to access and experience areas that were previously too difficult or posed significant risks. Through Augmented Reality those with mobility issues that cannot physically access locations now have the opportunity to see and experience these sites. In general, such digital technology allows previously inaccessible locations across the globe to become accessible through Augmented Reality.

Munge, et al., (2018) observes that student safety concerns are of great importance to facilitators of outdoor field work which is accompanied with arduous risk reports to satisfy health and safety measures. These are hugely important measures, and the concerns are very real for students, health and safety experts, insurance agencies, and land management departments. Thomas & Munge (2017) highlight the need to keep these administrative tasks more sustainable to allow more research productivity. Munge, et al., (2018) states that the introduction of new technologies can improve Outdoor Fieldwork safety in remote locations. These improvements are seen where the use of new technology like GPS, mobile weather apps, and video communication are used to allow for health and safety monitoring. This utilisation of technology allows for outdoor learning to take place with high effectiveness and reduced costs for the institution involved (Thomas & Munge, 2017).

A benefit of digital technology in the field is the opportunity to access information and limitless digital data. This can result in more independent learning with less dependence on the educator and improved student-centered learning (Hills and Thomas 2020; Philip, Razali 2020). Digital technology can intensify and personalise the learning experience as well as being used to monitor and evaluate the user's progress (Hildmann and Hildmann 2012). Fauville et al., (2020) suggest a number of benefits of incorporating digital technology including how it can increase communication between learners and teachers, increase student motivation, expand the range of pedagogical resources available, help facilitators become experts in actively searching for information rather than passively receiving facts, deepen the understanding of principles and concepts and reduce learner dependency on the teacher (Fauville et al., 2014).

Disadvantages of integrated OL

One of the primary reasons emanating from the literature against the use of digital technology in outdoor learning is that it distracts and diminishes the learners' ability to learn at first hand in the outdoors (Smith et al., 2016; Wattchow & Brown, 2011; Shultis, 2012). This reduced direct experience creates a barrier to experiencing the outdoors. Hills and Thomas (2020) suggest that modern innovations (such as augmented and virtual reality and digitally stimulated environments) used in educational settings may limit or diminish the need for learners to be brought outdoors into the field and therefore presents as a direct challenge to learning outdoors in an experiential way. It also poses the question as to whether digital camping is a beneficial experience. Hills and Thomas (2020) synopsis that even when facilitators use digital technology to achieve specific learning goals (such as using a tablet for a reflective journal), learners can easily become distracted by the device and thereby lose their connection with the environment or task (Dyment, O'Connell, & Boyle, 2011; Smith, Dyment et al., 2016; Bolliger, et al., 2020) and hence further distance themselves from their environment.

Hills and Thomas (2020) also highlight a disadvantage expressed in the literature regarding the concern that digital technology places a barrier between the learner and the outdoor environment (Cuthbertson et al., 2004) and thereby limiting or indeed negating an otherwise direct experience with the natural world (Wattchow & Brown, 2011).

Conclusion

This report set out to provide an overview of the current situation pertaining to the inclusion of digital technology in Outdoor Learning and VET. To that end the report presents a broad picture of the scenarios where digital technology can be integrated in OL and VET and outlines the positive and negative impacts of it in terms of the learner, educator, pedagogy and learning outcomes.

In agreement with Hills and Thomas (2020) this report concludes that digital technology can both be a problem and an opportunity. It can be a disruption to the OL experience and undermine the aim of being outdoors, but it can also provide opportunities for improved learning and enhance outdoor learning experiences. For some OL educators and enthusiasts outdoors should remain one of the few remaining refuges from digital technology (Shultis, 2012). In this way by exploring intimately their natural world around them learners are empowered and given the tools to explore the beauty and complexity of nature and society in an ever increasingly technically focused world. Indeed, it could be argued that participating in OL can be seen as a reaction to the current digital trends and practices and increased digital consumption and that by seeking the anthesis of this it is found in OL and in a return to the natural world.

This report also found that while there may be a tension among some regarding the role of digital technology, it can complement OL and that educators can work with technology to enhance OL and understanding. An appropriate balance is needed for its proper use and integration into OL. In this way it can be used to enhance rather than replace a learner's experience in the outdoors.

Digitisation is everywhere and the generations now are growing up with it as an accepted norm and with increased integration in education generally. In the aftermath of the global pandemic of Covid 19 and the restrictions and lockdowns that were implemented as a result there has been increased use of digital and blended learning. Currently there is little evidence to show the impact of COVID on the realms of outdoor learning and the augmentation of digital learning in VET, so there is a gap in this knowledge which this project hopes to address. However, new articles written in the last year will help promote the new opportunities in digital learning with most formal educational institutions having to adapt their taught programmes in a virtual world. The question to ask, is blended teaching the way forward? In terms of outdoor learning this needs to be questioned and understood in terms of the purpose of the lessons that the students want to learn when outdoors and the balance to be sought between engaging with digital technology and engaging with the natural world.

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