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OUTDOOR EDUCATION, ARTIFICIAL INTELLIGENCE E HERITAGE EDUCATION

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Abstract: Outdoor Education (OE) is an educational approach that is spreading nationally and internationally in many countries, as a systematic analysis of the sector literature highlights how it brings numerous benefits to the learning and development of literacy skills and transversal (Giunti et al., 2023). Thanks to its characteristics, including the flexibility of spaces and times, the OE offers the possibility of consciously using different technological devices, such as tablets and computers, before, during or after carrying out outdoor school activities, with the aim of planning and systematizing the work carried out and reflecting on the experience achieved. Artificial Intelligence (AI) and Outdoor Education (OE) can adequately interact in profitable and interesting ways to enrich the educational experience at different levels and on different fronts, such as, for example, in terms of technologies for the knowledge of nature, analysis of environmental data, simulations and virtual reality, personalized learning, outdoor educational robotics and the promotion of environmental conservation, in an attempt to create more engaging and personalized educational experiences. This contribution focuses on the relationship between AI, OE and cultural heritage and how it can guarantee meaningful learning within school contexts.

Keywords: Outdoor education; Artificial intelligence; Heritage education

1. Introduction

This contribution aims to analyze the relationship between Artificial Intelligence (AI), Outdoor Education (OE) and Heritage Education (HE) and how it can guarantee meaningful learning within school contexts. It focuses on these connections with the aim of exploring how Outdoor Education can intertwine with the topic of artificial intelligence and the promotion of knowledge and awareness of tangible and intangible cultural heritage. These are three mutually reinforcing components that are intended to enrich individuals' learning by providing them with more engaging experiences, facilitating historical and cultural knowledge, and offering opportunities to personalize training in a more effective and adaptable manner. In this sense, a systematic analysis of the literature was carried out in reference to the link between Outdoor Education and Artificial Intelligence, focusing on the way in which outdoor education can promote Heritage Education through the mediation and support of new technologies.

OE is an educational approach that is spreading not only internationally, but also nationally, it can be conceived as an "organized reaction to the phenomenon of internalisation" (Bortolotti, 2019, p. 19) and is a modality "with which educational

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theories and practices (scholastic and extracurricular) are defined at an international level, characterized by the centrality that is recognized to the external environment as a privileged place of education" (Farné & Agostini, 2014, p. 10). The OE provides for a wide "variety of pedagogical experiences characterized by active teaching that takes place in environments outside the school and which is linked to the characteristics of the territory and the social and cultural context in which the school is located" (Giunti et al. , 2023, p. 5), affirming a different way of «doing school» aimed at "reconciling the times of learning with those of experience and assuming the external environment as a normal (natural) learning environment in connection with the internal environment" (Farné, Bortolotti, & Terrusi, 2018, p. 15). In the OE the environment is understood as an opportunity for socialization and significant learning, which involves the use of various cultural laboratories located throughout the area and conceived as real de-centralized teaching classrooms (museums, libraries, natural environments, etc.) (Frabboni & Zucchini, 1985). It is about "using the space and the environment that characterizes it as an open book to be written, to practice activities and experiments, preferably interdisciplinary, using the physical space and its material and immaterial components to build knowledge in an active, interactive way , creative. An act linked to the exploration, manipulation, understanding, representation and redesign of spaces - based on the different age groups" (Di Gioia, 2023, p. 668).

From the sector literature it emerges that it has numerous benefits for learning and for the development of alphabetic and transversal skills, as well as positive effects on psycho-physical wellbeing, leveraging various dimensions, including the technological one, it helps to prepare "activities of different kinds that favor the integration of new technologies and digital languages, such as coding, robotics, tinkering, etc." (Giunti et al., 2023, p.9) and where digital is also "the place where the OE experience is created" (Giunti et al., 2023, p.9). By virtue of its characteristics, the OE offers the possibility of consciously using various technological devices, such as tablets and computers, before, during or after carrying out outdoor school activities, with the aim of planning and systematizing the work done and to reflect on the experience. Artificial Intelligence (AI) and Outdoor Education (OE) can appropriately interact in interesting ways to enrich the educational experience on several fronts. It is no coincidence that OE has its roots in two pedagogical principles: David Kolb's Experiential learning (1984) and David Sobel's Place-based education (2004), which make this approach fundamental in the educational field. Experiential learning (Kolb, 1984) sees experience as the basis of the student's learning process, who is therefore placed at the center of this process. This model suggests that learning is not a linear path, but a continuous cycle in which people go through phases, which can influence their personal approach to learning; it is widely used in the educational field to design activities and programs that involve practical experiences, reflection, conceptualization and practical application of acquired skills, proving useful in the context of OE as it is able to emphasize direct experience and the importance of reflection and practical application of the skills and knowledge acquired. The model of place-based education or place pedagogy (Sobel, 2004) "recognizes the value of place and territory as a primary source of stimuli for learning and as a privileged space for personalized, authentic, meaningful and engaging learning" (Giunti et al., 2023, p. 10) through a multidisciplinary approach. It is the recognition of places as contexts of everyday life, intricate knots of cultural, social and environmental characteristics and processes which in various ways are at the same time open to the wider world and which requires an

effort of observation and interpretation to untangle them. A starting point for building language, art, math, science, etc. skills, they offer real-world learning experiences that help students develop stronger connections to their communities, increase appreciation for the natural world, and increase engagement to be an active citizen (Sobel, 2004). This model applied to OE can be particularly powerful as it is based on the active and direct exploration of external environments and the connection between the acquisition process and the real world. By incorporating elements of place-based education, teachers can transform the external environment into a dynamic classroom, aimed at fostering student interest and encouraging deeper and more meaningful acquisition processes.

In the following paragraphs, the results emerging from the systematic analysis of the literature will be analyzed, in order to explore the links between OE, AI and Heritage Education as comprehensively as possible.

2. Materials and Methods

In order to carry out a systematic analysis of the literature, Google scholar and ERIC were used as databases and as keywords: "outdoor education" AND "heritage education" OR "heritage education", obtaining a total of 232 results, and "outdoor education" AND "artificial intelligence" OR "artificial intelligence", resulting in 684 results.

Therefore, those articles that were not in English or Italian, duplicates and texts whose text was not available in its entirety and texts that were not relevant to the topic examined in this contribution were eliminated. Following this screening, a corpus of 46 articles was examined. Below we will give a brief summary of what emerged from the study.

3. Results

From the systematic analysis of the literature it emerges that the IA-OE relationship allows the development of digital and, at the same time, methodological-adaptive skills that help the student to explore and get to know the territory in which he lives, promoting direct contact with the cultural heritage through experiential activities. Methodological-adaptive skills refer to a set of skills that allow students to accommodate different learning methods and educational contexts, broadening opportunities. If combined, the different components of AI and OE, in fact, can interact effectively in interesting ways to enrich the educational experience, as the former could be used in outdoor teaching as a support during the experience or in a second moment in the phase of reflection on the experience carried out (North et al, 2023). Furthermore, artificial intelligence systems could facilitate the enhancement of personalized learning, due to their ability to analyze large quantities of data and adapt the learning experience to students' preferences, abilities and learning level, specific needs of each individual and their individual style. They can also be applied with great versatility to outdoor activities, adapting the experience according to the needs of each individual. Through the integration of various types of technological devices into teaching, such as tablets or computers, it is possible to support the development of digital skills and their conscious use. It is true, in fact, that the way in which the natural and digital environments interact depends on our ability to use technology responsibly, balancing the benefits of digital innovations with the conservation and enhancement of the natural environment for future generations. The use of apps and

mobile technologies would make it possible to improve the outdoor experience in cases where, for example, there was a need to be able to rely on real-time information on natural environments, to identify plants or animals or to help the " navigation" outdoors, allowing students to plan exploratory itineraries more safely and efficiently (Layman et al., 2022). In order to overcome some obstacles related to the lack or remoteness of adequate spaces in which to carry out outdoor school activities, AI could offer new learning contexts through the use of simulation or virtual reality, adopting strategies to allow students to investigate outdoor environments in more controlled forms, allowing them to explore and learn in situations that reproduce and replicate real and natural situations and more, and to raise students' awareness of the importance of environmental conservation (Sneed et al. , 2021) through apps that illustrate the impact of human actions on the environment. AI could also facilitate the collection and analysis of environmental data through the introduction of environmental sensors and IoT technologies in the teaching of science, biology or geography. According to several studies, in fact, although the planet is suffering environmental degradation caused by man, "a gap between individual concern for environmental issues and pro-environmental behavior exists […] and is associated with a general disconnection with nature […] Improving HNC has been proposed as a pathway to better environmental behavior […] In order for HNC to be improved, opportunities for nature experience must increase. Many barriers exist in creating opportunity for nature experiences—some examples include money, access to nature, and lack of previous experience. HMDs have been identified as a possible medium for a nature experience […] It is possible that the use of HMDs may improve nature connection, which is linked to environmental behavior […] and may reduce some of the barriers of access for those who seek nature connection […] Practical uses of HMDs and VR provide benefits like convenience, access, low-consequence practice, and customizability of content" (Sneed et al., 2021).

Thanks to direct experience with the environment, OE, as well as an interdisciplinary approach, promotes students' knowledge of cultural heritage, material and immaterial, becoming a fundamental source of learning and for placing goods and actions in their spatial and temporal connections. EO also encourages the development of an emotional bond with one's territory, reconnecting to the principles of place-based education, although so far much attention has been paid above all to its link with the natural heritage, underlining the development of pro-environmental behaviors and sustainable (Scalcione, 2021, Litwa, 2012, Kuo et al, 2019). Faced with the local and global challenges of the 21st century, including climate change, the continued degradation of natural environments and persistent inequalities, advocates of EO-based learning have a very positive attitude towards managing them, as they believe that place-based learning can provide the personal connection and interdisciplinary flexibility that equips individuals with the essential tools to address them (Renshaw, 2017; Vander Ark, Liebtag, & McClennen, 2020).

As argued by Panciroli and Luigini, it is therefore necessary to "rethink digital technologies and heritage from a perspective in which each artefact is part of an ecosystem and in which the concept of learning environment expands, acquiring a multimodal nature [...] which encourages different actions from students and teachers and values different ways of achieving knowledge. The digital environment presents itself as a third space […] connector of multiple expressive modes […] a dynamic

intermediate space in which scholastic knowledge meets transversal skills for an authentic knowledge of heritage" (Pancioli & Luigini, 2022, p. 597).

Digital technologies are in turn intertwined not only with OE, but also with heritage education (Pancioli & Luigini, 2022; Abril-López, 2021), thus favoring a profitable interweaving between OE, IA and HE, also if empirical research is still scarce, especially regarding the implication of technologies in Outdoor Education. An important fact emerges from some research which can be summarized as follows: "As a new and emerging area, outdoor educational technology requires more empirical research to validate the inclusion and exclusion of technology in outdoor education. There is little research on categorizing the intended and unintended consequences of technology integration and there are no published studies on the negative effects of technology exclusion in outdoor education. With the emerging applications identified in this chapter, outdoor educators must be cognizant of developments in technology and proactive to ensure that the threats of new technologies are minimized, and the opportunities are optimized" (Hills et al., 2014, p. 286). AI, OE and HE meet and combine on a broader cognitive terrain, where education is understood as learning about the world and places/environments/contexts are conceived as complex territories of meanings and cultural heritages and distinctive social identities. The school identifies, among its aims, that of making young people aware of these heritages and these territories, with their evolution of meanings, where the cultural and environmental heritage interests schools. We have moved from study visits to museums or monuments, which required the student to assimilate knowledge in a passive way, to a stimulating comparison with the heritage, promoting new, interdisciplinary or laboratory teaching approaches, which extend the boundaries of an OE that always appears more expanded and technologically advanced in the natural-artificial relationship, which takes as its horizon of intervention the concept of "widespread education" (Scalcione, 2021, p. 202).

4. Discussion

From the systematic analysis of the literature it is clear that there is a virtuous intertwining between Outdoor Education, Artificial Intelligence and Heritage Education, where the first is configured as a flexible and holistic educational approach, so much so as to become a point of contact capable of promoting both knowledge and respect for cultural heritage and the promotion of conscious use of new technologies for educational purposes. The results show how new technologies, therefore, can be favorably integrated into outdoor school activities in an attempt to provide more engaging and personalized educational experiences of cultural heritage. This integration can broaden learning opportunities and contribute to pursuing equality of opportunities, balancing the use of technology with the aim of maintaining the individual's connection with nature and external environments and developing social and cognitive skills through direct and practical experiences. In the scholastic field, exploration and learning from, for and through real/virtual environments which guarantee the creation of outdoor experiences even in very distant and safe places.

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