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ORIGINAL ARTICLE

Identification of Criteria for Implementing Outdoor Education: A Systematic Review

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ABSTRACT

Outdoor education, as an innovative approach to experiential learning integrated with the natural environment, plays a pivotal role in enhancing students' cognitive, physical, and social skills. However, challenges in implementing this method within educational systems—including a lack of standardized criteria and contextual factors—have hindered its full potential. This systematic review aims to identify key criteria for the effective implementation of outdoor education by examining the existing literature. This research is a qualitative systematic review with a thematic analysis and interpretive qualitative synthesis approach. A comprehensive search was conducted across the Web of Science, Scopus, and ERIC databases up to November 2024, using relevant keywords (e.g., outdoor education, implementation criteria, field-based learning), which initially identified 785 records. Inclusion criteria, framed by the PICOS framework, comprised peer-reviewed English-language articles focusing on the implementation, criteria, or challenges of outdoor education at primary and secondary levels, encompassing any relevant research design. Exclusion criteria encompassed studies involving preschool or higher education, purely opinion-based pieces, grey literature, or those lacking an emphasis on implementation factors. Following the removal of duplicates (n=2) and a two-stage screening process (title/abstract and full-text review) conducted independently by two researchers—with discrepancies resolved through consensus or consultation with a third assessor—62 articles were ultimately included for analysis. Validity was ensured through peer debriefing and adherence to the PRISMA 2020 checklist, while reliability was established using Gibbs' (2007) procedures. The findings highlighted six primary criteria: pedagogical (45 studies; with the strongest emphasis on active learning and curriculum alignment), organizational (35 studies; managerial support and stakeholder collaboration), human resources (29 studies; teacher competence and student engagement), socio-psychological and evaluation (21 studies each), and environmental (16 studies; accessibility and safety). The major challenges identified included financial-logistical barriers (24 studies), institutional-managerial obstacles (23 studies), human-related issues (19 studies), pedagogical difficulties (16 studies), and environmental-safety concerns (16 studies). These results offer a practical framework for educational policymakers: by prioritizing teacher professional development, strengthening institutional support, and fostering local community collaboration, implementation challenges can be overcome, thereby transforming outdoor education into an effective tool for enhancing environmental literacy, learning motivation, and student well-being in Iran.

KEYWORDS

Implementation Criteria, Outdoor Education, Systematic Review.

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Introduction

In the contemporary world, interconnected trends such as population growth, standardized and unproductive education systems, unchecked industrialization, the expansion of virtual spaces and media, climate change, and economic globalization have generated a host of complex challenges-from ecosystem degradation and social inequalities to physical inactivity and mental health issues-that contemporary societies must urgently address. Traditional education systems appear inadequate in responding to these challenges and may even be complicit in causing them. Consequently, outdoor education has emerged as an innovative approach within educational systems to overcome these challenges. This approach transcends a mere educational response, acting as a bridge between society and the environment (Higgins, 2009). Relying on experiential and direct interaction with nature, it facilitates learning and strengthens the human-nature relationship (Priest, 1986, cited in Fägerstam, 2012). Based on an international consensus from a review across 53 countries, outdoor education is a planned process for facilitating learning through instruction or guidance in outdoor settings, encompassing subfields such as nature-based education, place-based education, adventure-based education, environmental education, and learning for sustainability (Lee et al., 2022).

Although outdoor education is recognized as an innovative response to the educational challenges of the 21st century and is institutionalized in leading education systems, a significant knowledge-implementation gap exists regarding its application. International studies indicate that despite relative acceptance, conceptual ambiguity regarding content and methodology (Wolf et al., 2022; Zink & Boyes, 2006), structural barriers such as logistical problems and costs (Polley & Pickett, 2003), and even the absence of a criteria-based framework in leading countries like Denmark (Bentsen & Jensen, 2012) persist. While theoretical and research foundations demonstrate that the idea of outdoor education has a robust and institutionalized history, they simultaneously reveal that it often remains on the periphery of formal systems or is implemented in fragmented forms. This indicates a persistent gap between theory, history, and practice. The present systematic review is designed to directly address this gap and systematize the scattered knowledge in this field. This study's distinction from previous ones is its focus on the "how" of implementation rather than the "why." The main research question is: What are the implementation criteria for this approach, and what challenges hinder its execution?

Methodology

This research is a qualitative systematic review employing a thematic analysis approach and interpretive qualitative synthesis. These approaches enable the extraction, organization, and synthesis of concepts and themes present within the selected body of articles. The research is also applied in terms of its objective, as it seeks to identify and extract the criteria and implementation challenges of outdoor education to provide practical insights for educational planners, teachers, and policymakers. The systematic search was conducted across the Web of Science, Scopus, and ERIC databases using a structured combination of keywords related to outdoor education, educational levels, and implementation criteria. Boolean operators (OR for combining synonyms and AND for intersecting the three domains) were employed. No publication date restrictions were applied, and searches were conducted from the beginning of indexing for each database up to November 2, 2024.

The initial results from each database were Scopus (683), WOS (38), and ERIC (64), totaling 785 articles. EndNote 20 was used for management and duplicate removal, which resulted in the removal of 2 duplicate articles. Subsequently, a two-stage screening protocol (title/abstract and full text) based on the inclusion and exclusion criteria outlined in the PICOS table was performed. In the first stage, title and abstract screening, 718 out of the remaining 783 articles were deemed irrelevant and excluded. Following these steps, 65 full-

text articles remained, were retrieved, and were reviewed based on the research objectives. After thorough review and study, 3 articles were excluded for not aligning with the research objectives during data analysis, leaving 62 articles selected and analyzed for the review stage. The inclusion criteria for articles in this study were as follows: Population (students, teachers, educators, or curriculum planners at the primary or secondary education levels); Intervention (any program, activity, or study addressing the implementation, establishment, challenges, or evaluation of outdoor education); Outcome (focus on identifying criteria, processes, frameworks, or implementation challenges); Study Design (all quantitative, qualitative, and mixed-method research designs, as well as systematic reviews relevant to the research objectives).

To assess the validity of the research, methods introduced by Creswell & Miller (2000) for achieving validity in qualitative research methods were used. This research utilized the peer review and exchange method. Additionally, to increase the validity of the tools, the PRISMA 2020 checklist for systematic review reporting was used. The methodological quality of articles was confirmed through independent review by two evaluators and consensus of the research team. To assess reliability, Gibbs' method (2007, as cited in Creswell, 2014) was also employed. Data analysis and synthesis were conducted by matching the content of retrieved articles with the research objectives and synthesizing the data. The process of deriving main and sub-components in the tables was inspired by the thematic analysis approach of Braun and Clarke (2006) and the qualitative synthesis method of Thomas and Harden (2008).

Results

The findings of this research were extracted through a systematic review of scientific sources and are presented in tables detailing the criteria and implementation challenges. The implementation criteria for outdoor education are categorized into six main components: 1) Environmental Criteria, 2) Educational Criteria, 3) Human Criteria, 4) Organizational Criteria, 5) Evaluation and Feedback Criteria, and 6) Social and Psychological Criteria, each addressing key aspects of this type of education.

The educational criteria, with high frequency (totaling 45 studies across sub-components), are the most prominent, indicating the existing literature's focus on educational aspects. Sub-components such as "Active and Experiential Learning" (17 studies) and "Curriculum Alignment" (16 studies) have the highest recurrence. Experiential learning is considered the core of outdoor education. The organizational component (with a frequency of 35 studies) is the second most addressed area. The sub-component "Institutional and Administrative Support" (15 studies) highlights the vital role of organizational structures and the need for collaboration (e.g., parental involvement). Human criteria (29 studies), focusing on "Teacher Qualifications" (15 studies) and "Active Student Engagement" (14 studies), indicate the pivotal role of teachers and student autonomy. The evaluation and feedback criteria, along with the social and psychological criteria, were each identified in 21 studies, placing them after the human criteria in terms of frequency. Environmental criteria, with a frequency of approximately 16 studies, emphasize access and safety, which are foundational for the success of programs and the implementation of outdoor education.

The challenges of implementing outdoor education are categorized into five main components: 1) Institutional and Managerial Challenges, 2) Pedagogical and Planning Challenges, 3) Human-Related Challenges, 4) Financial and Logistical Challenges, and 5) Environmental and Safety Challenges, each referring to problems associated with the design and implementation of outdoor educational activities. Financial and logistical challenges (24 studies) stand out, with "Time Constraints" (11 studies) and "Resource Limitations" (13 studies) being predominant. Institutional and managerial challenges are also prevalent (approximately 23 studies), indicating systemic barriers. For instance, "Institutional Resistance" (13 studies) has the highest recurrence, where traditional educational culture is identified as the primary barrier. Among human-related challenges (19 studies), "Teacher Preparedness" (11 studies)

has the highest recurrence, pointing to a lack of attention to professional development. In pedagogical and planning challenges (16 studies), "Inappropriate Activity Design" (10 studies) emphasizes monotony and lack of integration with technological activities. While environmental and safety challenges (16 studies) are less frequent, they have high severity.

Conclusion

The findings of this research, through the qualitative synthesis of 62 studies, provide a comprehensive and multifaceted framework of six main criteria for implementing outdoor education: environmental, educational, human, organizational, assessment and feedback, and social-psychological. These criteria interact within a dynamic ecological framework, aligning with Bronfenbrenner's ecological model (1979), which conceptualizes education as a system influenced by interconnected levels, from the micro (e.g., student experience) to the macro (e.g., national policies). This framework highlights that successful implementation requires systemic coherence across all levels. Frequency analysis indicates that the educational component is predominant (approximately 45 studies), while assessment and feedback (21 studies) are less frequently addressed, highlighting a research gap. This framework not only elucidates the key success factors for outdoor education but also identifies the existing challenges.

The educational criteria, with high frequency, are the most prominent, indicating the existing literature's focus on educational aspects. Sub-components such as "Active and Experiential Learning" (17 studies) and "Curriculum Alignment" (16 studies) have the highest recurrence. Experiential learning is considered the core of outdoor education. These findings align with Dewey's theory of experiential learning (1938), which views learning as an active process based on direct experience. For example, European studies like Remmen & Iversen (2022) in Nordic countries emphasize integrating fieldwork with national standards (e.g., systems thinking), while Asian studies like Yang et al. (2014) in China highlight cultural challenges in aligning with exam-oriented curricula. Comparing these studies shows that pedagogical flexibility (12 studies) is key to reducing inequalities; Thomas (2020) in Italy reports that this flexibility reduces educational inequality at the secondary level, whereas at the primary level (e.g., Molyneux et al., 2022, in Canada), it focuses more on unstructured play. These criteria suggest that outdoor education can bridge the gap between classroom-centric content and practical experiences, as reported by Remmen & Iversen (2022) in their Nordic study. The educational dimension emphasizes experiential alignment: activities like field studies and citizen science projects connect theoretical curricula with real-world problem-solving, contributing to improved knowledge retention and critical thinking.

The organizational component (with a frequency of 35 studies) is the second most addressed area. The sub-component "Institutional and Administrative Support" (15 studies) highlights the vital role of organizational structures and the need for collaboration (e.g., parental involvement). These criteria, such as institutional support and stakeholder collaboration, align with findings by Wolsink (2016) and Carrier et al. (2014), who emphasize the importance of managerial support and community participation in the sustainability of these programs. Human criteria (29 studies), focusing on "Teacher Qualifications" (15 studies) and "Active Student Engagement" (14 studies), indicate the pivotal role of teachers and student autonomy. These criteria follow the organizational criteria and are connected to Freire's liberatory theory (1970), which views the teacher as a facilitator and the student as an active agent. Western studies, like Finnerty & Murphy (2023) in Ireland, emphasize in-service training to increase teacher confidence (a 2.2-fold increase in the likelihood of field trips). In-service training is essential for enhancing teacher competencies and overcoming teacher resistance, while Middle Eastern studies, like Sedawi et al. (2021) in Israel, focus on student participation in indigenous communities to foster agency.

This comparison shows that human-related challenges are more acute in developing countries (e.g., lack of professional training), which can reduce effectiveness, as reported by Pitiporntapin et al. (2023) in Thailand. Overall, human criteria, including teacher qualifications and active student engagement, have been identified as pivotal factors in the success of this type of education. Studies by Van Dijk-Wesselius et al. (2020) show that professional teacher training and creating space for democratic student participation significantly impact the effectiveness of outdoor education. Teacher training in risk management and informal methods increases the likelihood of implementation, while student agency in designing activities fosters participation and socio-emotional growth (Finnerty & Murphy, 2023; Molyneux et al., 2022).

The evaluation and feedback criteria, along with the social and psychological criteria, were each identified in 21 studies, placing them after the human criteria in terms of frequency. The assessment and feedback criteria, emphasizing continuous and multidimensional assessment, align with research by Cheng & Ho (2011) and Jansson et al. (2024), who stress the necessity of using diverse tools to measure learning and ensure continuous improvement. However, the lower frequency in assessment and feedback criteria may indicate a research gap where continuous assessment (e.g., pre/post-tests) is less explored. On the other hand, social-psychological criteria, such as social and emotional development, align with Wilson's Biophilia theory (1984) and studies like Molyneux et al. (2022), which views connection with nature as a key factor in improving student well-being and motivation. Environmental criteria, with a frequency of approximately 16 studies, emphasize access and safety, which are foundational for the success of programs and the implementation of outdoor education. These findings align with studies by Assaraf & Orion (2009) and Svobodová et al. (2011), which emphasize the necessity of access to diverse and safe ecosystems to enhance experiential learning. Thus, the criteria table indicates a comprehensive approach, suggesting that multidimensional criteria (from environmental to social) lead to sustainable success. Considering the frequency of multiple criteria for implementation, prioritizing the educational and human dimensions, with a focus on teacher training, is essential.

On the other hand, the challenges also reveal systemic tensions. In this regard, financial and logistical challenges (24 studies) stand out, with "Time Constraints" (11 studies) and "Resource Limitations" (13 studies) being predominant. Time and logistical constraints, such as packed curricula and 90-minute class periods, hinder deep environmental immersion (Finnerty & Murphy, 2023). Institutional and managerial challenges are also prevalent (approximately 23 studies), indicating systemic barriers. For instance, "Institutional Resistance" (13 studies) has the highest recurrence, where traditional educational culture is identified as the primary barrier, referencing historically restrictive policies. "Lack of Curricular Alignment" (10 studies) also indicates conflict with standardized testing. Among human-related challenges (19 studies), "Teacher Preparedness" (11 studies) has the highest recurrence, pointing to a lack of attention to professional development. Human-related challenges, like the lack of teacher preparedness, also align with findings from Assaraf & Orion (2009) and Pitiporntapin et al. (2023), who emphasize the need for specialized teacher training. In pedagogical and planning challenges (16 studies), "Inappropriate Activity Design" (10 studies) emphasizes monotony and lack of integration with technological activities. While environmental and safety challenges (16 studies) are less frequent, they have high severity. Codes like "Lack of Financial Resources" (in financial challenges) appear in 13 studies, directly referring to transportation costs. The challenges identified in this study, including institutional resistance, lack of curriculum alignment, and financial and logistical constraints, are consistent with global reports. For example, Svobodová et al. (2021) in the Czech Republic and Kemp (2019) in England refer to similar barriers such as cultural and bureaucratic resistance. Institutional resistance stemming from exam-oriented cultures and bureaucratic barriers

(e.g., permit complexities) limits innovation (Assaraf & Orion, 2009). "Safety and Risk Management" (10 studies) emphasizes natural hazards, highlighting the need for stringent standards in this area. Environmental and safety challenges, such as adverse weather conditions and geomorphological hazards, also align with studies by Pelfini et al. (2016) and Dahl et al. (2018), which stress the importance of risk management in natural environments. Overall, Table 3 illustrates the relationships between challenges; the high frequency of financial and institutional challenges indicates research focus on barriers. To overcome these challenges, prioritizing teacher training and institutional support is essential.

Overall, outdoor education, therefore, is not just an educational innovation but a fundamental reimagining of the learning process itself. With escalating climate crises and digital saturation, schools must transform from "knowledge factories" into ecosystems of experiential growth. This review provides a roadmap for this transformation, emphasizing that successful implementation goes beyond logistical solutions, requiring a paradigm shift toward embodied and place-sensitive learning. Therefore, given Iran's environmental diversity (from the Hyrcanian forests to the central deserts), outdoor education can be introduced as a leading solution in education. The criteria and challenges identified in this study indicate what points should be considered when developing a scientific program. This aligns with the findings of Mahooti Rad & Mousavi (2019), which emphasize the necessity of paying attention to Iran's environmental and cultural capacities. Indeed, the success of this approach requires overcoming structural challenges, such as a lack of infrastructure and institutional resistance, which necessitates coherent policymaking and inter-institutional collaboration. By investing in teacher agency, social partnerships, and policy reform, we will not only foster environmentally literate students but also nurture a generation capable of rethinking humanity's role in the web of life. It seems these challenges are exacerbated in Iran, particularly due to the centralized structure of the education system and infrastructural limitations. This review shows that outdoor education, with its multidimensional criteria, can transform learning from traditional classrooms to authentic experiences.

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«مقاله پژوهشی»

شناسایی معیارهای پیاده‌سازی آموزش در فضای باز: مرور نظامند

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چکیده

این پژوهش به شناسایی معیارهای پیاده‌سازی آموزش در فضای باز از طریق مرور نظام‌مند پرداخته است. مسئله اصلی، شکاف دانشی در چگونگی به‌کارگیری این رویکرد آموزشی در نظام‌های آموزشی، به‌ویژه در ایران با توجه به تنوع اکوسیستم‌ها و چالش‌های زیست‌محیطی، است. اهداف پژوهش شامل استخراج معیارهای کلیدی و چالش‌ها بر اساس ادبیات جهانی است. این پژوهش یک مرور نظامند کیفی با رویکرد تحلیل تماتیک و سنتز کیفی تفسیری است. جستجو در پایگاه‌های Web of Science، Scopus و ERIC تا نوامبر ۲۰۲۴ با کلمات کلیدی مرتبط (مانند outdoor education، implementation criteria، field-based learning) انجام شد و ۷۸۵ منبع اولیه شناسایی گردید. معیارهای ورود (بر اساس PICOS) مقالات انگلیسی‌زبان هم‌تراز، تمرکز بر پیاده‌سازی/معیارها/چالش‌ها در سطوح ابتدایی تا متوسطه، هر نوع طرح پژوهشی مرتبط. معیارهای خروج نیز مطالعات پیش‌دبستانی/آموزش عالی، نظرپردازی صرف، ادبیات خاکستری، یا عدم تمرکز بر عوامل اجرایی. پس از حذف تکراری‌ها (۲ مقاله) و غربالگری دومرحله‌ای (عنوان/چکیده و متن کامل) توسط دو پژوهشگر مستقل (با حل اختلاف از طریق اجماع یا ارزیاب سوم)، ۶۲ مقاله نهایی تحلیل شدند. روایی با بررسی همتایان و چک‌لیست PRISMA2020، و پایایی با استفاده از روش Gibbs تأمین شد. نتایج شش معیار اصلی را برجسته کرد: آموزشی (۴۵ مطالعه؛ بیشترین تمرکز بر یادگیری فعال و تطابق با برنامه درسی)، سازمانی (۳۵ مطالعه؛ حمایت مدیریتی و همکاری ذینفعان)، انسانی (۲۹ مطالعه؛ صلاحیت معلمان و مشارکت دانش‌آموزان)، اجتماعی-روان‌شناختی و ارزیابی (هر کدام ۲۱ مطالعه)، و محیطی (۱۶ مطالعه؛ دسترسی و ایمنی). چالش‌های عمده شامل مالی-لجستیکی (۲۴ مطالعه)، نهادی-مدیریتی (۲۳ مطالعه)، انسانی (۱۹ مطالعه)، آموزشی (۱۶ مطالعه) و محیطی-ایمنی (۱۶ مطالعه) بودند. این یافته‌ها چارچوبی عملی برای سیاست‌گذاران آموزشی ارائه می‌دهند: با اولویت‌بندی آموزش حرفه‌ای معلمان، تقویت حمایت نهادی و همکاری جامعه محلی، می‌توان چالش‌های پیاده‌سازی را غلبه کرد و آموزش در فضای باز را به ابزاری مؤثر برای تقویت سواد زیست‌محیطی، انگیزه یادگیری و بهزیستی دانش‌آموزان در ایران تبدیل نمود.

واژه‌های کلیدی

آموزش در فضای باز، مرور نظامند، معیارهای پیاده‌سازی.

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Introduction

In the contemporary world, trends such as population growth, standardized and unproductive education systems, unchecked industrialization, the expansion of virtual spaces and media, climate change, and economic globalization have generated a host of complex challenges -from ecosystem degradation and social inequalities to physical inactivity and mental health issues -that contemporary societies must urgently address. Traditional education systems appear inadequate in responding to these challenges and may even be complicit in causing them. Consequently, outdoor education has emerged as an innovative approach within educational systems to overcome these challenges. This approach transcends a mere educational response, acting as a bridge between society and the environment (Higgins, 2009). Relying on experiential and direct interaction with nature, it facilitates learning and strengthens the human-nature relationship (Priest, 1986, cited in Fägerstam, 2012). Based on an international consensus from a review across 53 countries, outdoor education is a planned process for facilitating learning through instruction or guidance in outdoor settings, encompassing subfields such as nature-based education, place-based education, adventure-based education, environmental education, and learning for sustainability (Lee et al., 2022). With deep theoretical roots and diverse practical applications, this approach holds significant potential for the holistic development of students.

Outdoor education was the norm throughout most of human history. Understanding how to thrive and maintain balance within the natural environment has been the foundation of learning for indigenous cultures worldwide. However, with the advent of mass education in the 19th century, the learning environment shifted indoors, and outdoor education was largely marginalized from mainstream education. Nevertheless, a growing emphasis on reconnecting learning with the natural world has led to a resurgence of 'outdoor education' as a viable alternative to traditional, indoor-centric pedagogy in numerous countries (Mann et al., 2021). Accordingly, the theoretical underpinnings of outdoor education are rooted in diverse traditions, traceable within both philosophical and religious contexts and modern educational theories. As DeVos and Wilkinson (1980) assert, many philosophical and religious systems believe in an inherent connection between humans and nature. In ancient Greece, for instance, cultivating virtues like wisdom, courage, and temperance was believed to depend on direct, purposeful experience; this connection is also reflected in numerous religious teachings, manifested in stories and rites of passage (Hattie et al., 1997; cited in Abdul, 2018). Within modern educational thought, theorists including Comenius, Rousseau, Pestalozzi, Agassiz, Piaget, Vygotsky, Dewey, Gardner, Kolb, Freire, Naess, Louv, Maller, Wilson, and others have each, in their own way, emphasized the importance of the concrete environment and experience in learning. However, to focus and deepen the analysis, the present study concentrates on three key theoretical frameworks that demonstrate the greatest coherence in explaining outdoor education: Wilson's Biophilia Hypothesis (emphasizing the biological-psychological bond between humans and nature), Dewey's Experiential Learning (the primacy of experience and interaction with the environment), and Freire's Liberatory Education (the active role of the learner and the connection of knowledge to social reality). These three frameworks constitute the motivational-emotional, methodological, and socio-critical foundations of the outdoor education approach.

Indeed, three main intellectual currents - experiential learning, environmental learning, and the inherent human-nature relationship - form the theoretical coherence of outdoor education. According to Dewey (1938), education must connect students to real-world experience. For him, authentic learning depends on active, reflective engagement with real, experiential situations. Outdoor education realizes this principle by shifting the focus of learning to concrete natural and social environments. Furthermore, this experiential interaction directly leads to environmental learning, where the environment serves not merely as a backdrop but as the primary source

of content, motivation, and the context for understanding complex biosocial systems. Freire (1970), critiquing the traditional education system, advocated for such an approach as a liberating force, encouraging students to actively participate in learning within their community. Wilson's Biophilia Hypothesis (1984) provides the neurological and evolutionary basis for this connection, confirming the positive impact of interaction with nature on cognitive and emotional well-being. Wilson posits that humans possess an innate biological tendency and need to connect with living organisms. Interaction with natural environments can reduce stress, improve mental health, and enhance human well-being (Kahn, 1997). Kramer (2008), citing this theory, warns that children's disconnection from nature can diminish their motivation for environmental stewardship and weaken their psychological resilience. Essentially, humans have an evolutionary connection to nature. According to Garner (2012), humans have lived and evolved in natural environments throughout history, making nature an inseparable part of their existence. Therefore, outdoor education provides a framework where experiential learning serves as the method, environmental learning as the goal, and the human-nature connection as the foundation, all interwoven.

The validity of these theoretical perspectives is strongly reinforced by a growing body of empirical evidence. For instance, Jordet (2007), in a study in Norway, demonstrated that outdoor education contributed to the cognitive, emotional, and social development of students (Wilhelmsson et al., 2012). Similarly, Johnson and Wattchow (2004), in their longitudinal study of students, reported that this experience led to enhanced social skills, self-concept, and environmental awareness. The reported benefits of learning in natural outdoor environments in the systematic review by Mann et al. (2022) included: increased student engagement and a sense of ownership over their learning, some evidence of academic improvement, the development of social and collaborative skills, and improvements in factors related to self-concept. Due to these benefits, this approach has gained favor in many leading education systems.

In recent years, an "international renaissance of interest" in outdoor learning has emerged, as the shortcomings of teacher-centered models and the dominance of testing have become apparent, and the importance of children's holistic development has gained recognition. Concurrently, a growing body of research demonstrates how students can benefit from learning outdoors, not only in terms of the curriculum but also regarding social, personal, and physical development (Mann et al., 2022). These are precisely the goals that Kurt Hahn, considered the father of outdoor education and founder of Outward Bound, sought to achieve. Hahn believed that the development of individual character is a vital part of a student's education. For him, character development meant "the ability to pursue and resolve discomforts, hardships, and dangers in a righteous manner." Accordingly, he believed that students should not be shielded from challenges but should confront them to overcome personal weaknesses and cultivate their character. Emphasizing constructive confrontation with adversity, Hahn viewed education as the "moral equivalent of war"—a concept emphasizing the full physical, emotional, and intellectual engagement of learners in the learning process without any incitement to violence. His goal was to inspire students to fully dedicate themselves to shared learning to face difficult situations and achieve personal growth (Cited in Robbins, 2015). Hahn placed physical, moral, and social education on par with the development of cognitive knowledge. Therefore, with the clear objective of saving young Germans from succumbing to moral decay after World War I, he implemented his specific principles at the Schule Schloss Salem. His thoughts gradually expanded and laid the foundation for institutions such as the National Outdoor Leadership School (NOLS) in Wyoming, established by Paul Petzoldt and Ernst Teply. Immediately thereafter, in 1971, Jerry Pieh initiated the Project Adventure and received a three-year grant to introduce adventure learning into the high school curriculum (Priest & Gass, 2005). Gradually, the educational philosophy in outdoor realms attracted broader international attention and continued to expand to over 35 countries worldwide, leading to a significant growth in programs based on outdoor environments during the 1970s and 1980s

(Berman & Davis-Berman, 2006). For instance, in Britain, during the 1960s to 1970s, the use of the term "outdoor education" became more prominent over "outdoor activities." This growing prominence, as Cheesmond and Yates (1979) state, provided the context for the discourse of "outdoor activity" to evolve toward "outdoor education." The formation of the National Association for Outdoor Education in Britain (1970) was a turning point in this shift, aiming to place outdoor education within the core curriculum and thereby move it beyond the framework of purely recreational activities. Accordingly, outdoor education gradually came to be regarded as an innovative educational endeavor. For example, the General Teaching Council for Scotland (1990) reported that in the 1970s, outdoor education represented a "shift from passive learning to active inquiry methods" (Abdul, 2018).

Thus, the starting point for outdoor learning is the belief that experiences are more important for learning than conceptual understanding, and that learners need to have more experiences concerning rational relationships with phenomena. Although phenomenon- and experience-based learning methods vary, most seek to develop critical skills, particularly processing, interaction, and teamwork. As Palmberg and Kuru (2000) stated, educational activities in the outdoors can effectively stimulate environmental education; that is, students can study and experience nature while simultaneously learning practical solutions for its protection. Through experiential learning, outdoor education can develop learners' sensitivity (Ratinen et al., 2023). Indeed, the presence of nature in educational spaces is important for both social and physical development, as well as for aesthetic and emotional reasons, because the environment and natural elements can effectively contribute to students' curiosity through change, stimulation, and flexibility in imagination. Outdoor education, through problem-based learning, horizontal dialogue, and local action, provides the context for overcoming various issues, particularly those of traditional education.

Although outdoor education is recognized as an innovative response to the educational challenges of the 21st century and is institutionalized in leading education systems (from the US and UK to Scandinavian countries), a significant knowledge-implementation gap exists regarding its application. This gap is not exclusive to contexts like Iran—where no official action has been taken yet—but is a pervasive challenge. International studies indicate that despite relative acceptance, conceptual ambiguity regarding content and methodology (Wolf et al., 2022; Zink & Boyes, 2006), structural barriers such as logistical problems and costs (Polley & Pickett, 2003), and even the absence of a criteria-based framework in leading countries like Denmark (Bentsen & Jensen, 2012) persist. In essence, while theoretical and research foundations demonstrate that the idea of outdoor education has a robust and institutionalized history, they simultaneously reveal that it often remains on the periphery of formal systems or is implemented in fragmented forms. Thus, although the roots of this idea extend back decades and numerous institutions have been formed to promote it, the systematic integration into mainstream education and the development of a standard framework have consistently remained a challenge. This indicates a persistent gap between theory, history, and practice. This situation suggests that achieving desired outcomes (such as environmental achievements) and systematically implementing this approach requires moving beyond describing benefits toward formulating specific, operational, and adaptable criteria. The present systematic review is designed to directly address this gap and systematize the scattered knowledge in this field. This study's distinction from previous ones is its focus on the "how" of implementation rather than the "why." Through this systematic review, scattered evidence from the global literature will be collected, analyzed, and integrated to comprehensively extract and categorize outdoor education implementation criteria. The outcome of this process is the provision of a framework that can serve as a basis for designing practical programs and developing implementation guidelines in various contexts. The importance of conducting this study in the

Iranian context is twofold. On the one hand, the country faces increasing challenges such as environmental degradation, shrinking urban green spaces, and sedentary lifestyles among children (Mahooti Rad & Mousavi, 2019); on the other hand, the education system traditionally focuses on theoretical and classroom-based learning. In such a context, identifying outdoor education criteria can initiate academic and practical discourse in this field. Furthermore, as we know, education is the foundation of sustainable development, and the world is in the era of action on Education for Sustainable Development (ESD). Although ESD has been fundamentally accepted, no significant structural changes have taken place in practice. Given the significant benefits of outdoor education in cultivating future sustainable leaders, ESD appears to have substantial potential for expansion in outdoor settings (Hu & Mou, 2025). Therefore, formulating these criteria is a crucial step toward establishing a link between two important paradigms—outdoor education and education for sustainable development. Thus, relying on a systematic review of the global literature, this research seeks to identify the criteria for establishing outdoor education. The main research question is: What are the implementation criteria for this approach, and what challenges hinder its execution?

Research Methodology

This research is a qualitative systematic review employing a thematic analysis approach and interpretive qualitative synthesis. These approaches enable the extraction, organization, and synthesis of concepts and themes present within the selected body of articles. The research is also applied in terms of its objective, as it seeks to identify and extract the criteria and implementation challenges of outdoor education to provide practical insights for educational planners, teachers, and policymakers. The systematic search was conducted across the Web of Science, Scopus, and ERIC databases using a structured combination of keywords related to outdoor education, educational levels, and implementation criteria. Boolean operators (OR for combining synonyms and AND for intersecting the three domains) were employed. No publication date restrictions were applied, and searches were conducted from the beginning of indexing for each database up to November 2, 2024. The search strategy for articles was as follows:

("outdoor education*" OR "outdoor teaching*" OR "outdoor learning*" OR "excursion*" OR "field trip*" OR "fieldtrip*" OR "fieldwork*" OR "field work*" OR "place-based education*" OR "place-based learning" OR "place-based teaching*" OR "out of classroom" OR "learning outside the classroom") AND TITLE-ABS-KEY (primary school*" OR "elementary school*" OR "secondary school*" OR "high school*" OR "upper secondary school*" OR "secondary education" OR "primary education" OR "elementary education" OR "higher education") AND TITLE-ABS-KEY ("Process" OR "Criteria*" OR standard* OR framework)

The initial results from each database were Scopus (683), WOS (38), and ERIC (64), totaling 785 articles. Overall, the search results yielded 785 articles that were imported into EndNote 20 software. EndNote 20 was used for management and duplicate removal, which resulted in the removal of 2 duplicate articles. Subsequently, a two-stage screening protocol (title/abstract and full text) based on the inclusion and exclusion criteria outlined in the PICOS table was performed. In the first stage, title and abstract screening, 718 out of the remaining 783 articles were deemed irrelevant and excluded. It is worth noting that if exclusion was not definitive based on title and abstract, the full text was retrieved, and a final decision was made. Following these steps, 65 full-text articles remained, were retrieved, and were reviewed based on the research objectives. After thorough review and study, 3 articles were excluded for not aligning with the research objectives during data analysis, leaving 62 articles selected and analyzed for the review stage. The title/abstract and full-text screening stages were conducted independently by two research team members; disagreements were resolved through discussion and consensus. In cases where no consensus was reached, the opinion of a third reviewer was sought. The inclusion criteria for articles in this study were as follows:

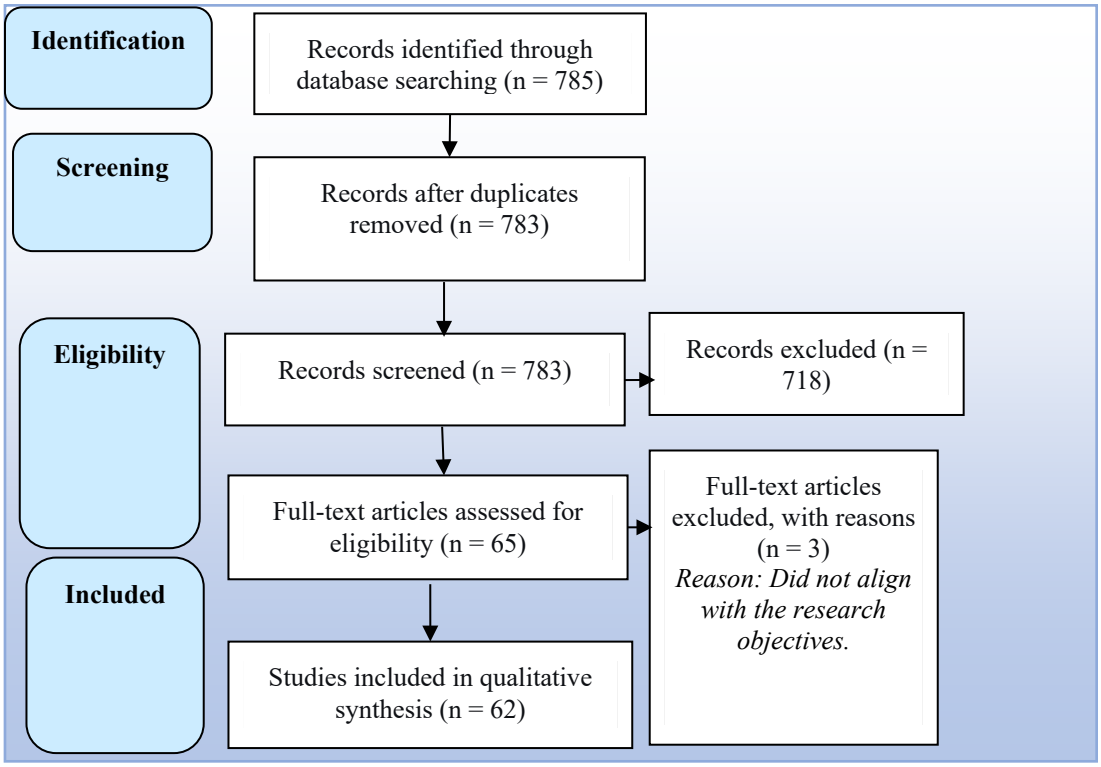

Figure 1. PRISMA Flow Diagram

Table 1. Inclusion and Exclusion Criteria Based on the PICOS Framework

Element	Inclusion Criteria	Exclusion Criteria
Population (P)	Students, teachers, educators, or curriculum planners at the primary or secondary education levels	Studies focusing on preschool education, higher education, adult populations, or specific populations (e.g., patients)
Intervention/Phenomenon of Interest (I)	Any program, activity, or study addressing the implementation, establishment, challenges, or evaluation of outdoor education	Studies addressing only general benefits without specific reference to implementation criteria
Comparison (C)	Not required	—
Outcome (O)	Focus on identifying criteria, processes, frameworks, or implementation challenges	Exclusive focus on academic or health outcomes without analysis of implementation factors and challenges
Study Design (S)	All quantitative, qualitative, and mixed-method research designs, as well as systematic reviews relevant to the research objectives	Purely opinion-based articles, editorials, case reports lacking research methodology, dissertations/theses, and books
Other Criteria	Language: English Accessibility: Full-text available	Full-text unavailable (after contacting authors); clear thematic irrelevance after full-text review; non-English language

To assess the validity of the research, methods introduced by Creswell & Miller (2000) for achieving validity in qualitative research methods were used. This research utilized the peer review and exchange method. Additionally, to increase the validity of the tools (such as the search strategy and screening protocol), the PRISMA 2020 checklist for systematic review reporting was used, which includes meticulous documentation of search, screening, and data extraction stages. The methodological quality of articles was confirmed through independent review by two evaluators and consensus of the research team; only articles with robust and relevant research methods were included in the final analysis. To assess reliability, Gibbs' method (2007, as cited in Creswell, 2014) was also employed, which in this study involved: 1) ensuring no inaccurate transcriptions in the writings; 2) ensuring no shifts in the definition of codes during the coding process (using strategies like comparing data with codes during the research process and writing memos about code definitions); 3) holding regular meetings and sharing analyses to build intercoder agreement. Data analysis and synthesis were conducted by matching the content of retrieved articles with the research objectives and synthesizing the data. The process of deriving main and sub-components in the tables was inspired by the thematic analysis approach of Braun and Clarke (2006) and the qualitative synthesis method of Thomas and Harden (2008). These methods allow qualitative data from diverse sources (e.g., case studies, qualitative and mixed-method studies) to be synthesized structurally. Here, qualitative meta-synthesis was used to extract and categorize common themes. The basic criteria for categorization—conceptual similarity (do codes refer to a common aspect, e.g., environmental or educational?), frequency (sub-components with at least 6-8 studies), and relevance to the literature—were chosen to enhance the credibility of the synthesis. APA references in the tables are organized based on the supporting studies for each code to ensure data traceability. Accordingly, the obtained data were synthesized and grouped, and the grouped elements and findings are presented in tables. The main research tools were: EndNote 20 software for reference management, importing articles from databases, removing duplicates, and organizing references. The PRISMA 2020 checklist for accurately reporting the search, screening, and data extraction stages and increasing the validity of tools (e.g., search strategy, screening protocol). The PICOS table as a framework for inclusion and exclusion criteria (for systematic screening). The structured search strategy for databases. The thematic analysis approach and qualitative synthesis method (along with qualitative meta-synthesis) for data analysis and synthesis and extracting themes; and validity and reliability methods to ensure the credibility of the processes.

Research Findings

The findings of this research were extracted through a systematic review of scientific sources and are presented in tables detailing the criteria and implementation challenges.

Table 2. Outdoor Education Implementation Criteria

Main Component	Sub-Component	Initial Codes	Frequency	APA references
Environmental Criteria	Access to Natural Resources	- Access to diverse natural resources (rivers, springs, forests, wetlands, botanical gardens) -Access to urban and rural natural resources -Access to urban green spaces adjacent to schools (maximum distance of 1 km) -Diversity of ecosystems (ponds, forests, educational gardens) -Easy access to natural resources (soil, water, plants) -Selection of botanical gardens with	8	Assaraf & Orion (2009), Carrier et al. (2014), McCabe et al. (2014), Pelfini et al. (2016), Petrikova (2003), Svobodová et al. (2020), Wolsink (2016), Yilmaz et al. (2022)

Main Component	Sub-Component	Initial Codes	Frequency	APA references
		diverse features -Proximity of forests to schools		
	Environmental Safety and Comfort	-Safety in outdoor environments (uneven and sloped terrains) -Safety and usability of green spaces (lighting, pedestrian pathways) -Selection of sites with minimal geomorphological hazards -Environmental temperature management and appropriate timing to prevent fatigue -Utilization of familiar locations proximate to emergency facilities -Preliminary orientation to the environment and safety protocols -Maintaining a safe distance between animals and students (50 meters) -Use of domesticated and trained animals (farm animals)	8	Assaraf & Orion (2009), Dahl et al. (2018), Finnerty & Murphy (2023), Novotná et al. (2024), Pelfini et al. (2016), Petrikova (2003), Stan & Humberstone (2011), Svobodová et al. (2020), Yilmaz et al. (2022)
Educational Criteria	Curriculum Alignment	-Alignment with national curriculum objectives (systems thinking, environmental analysis) -Connection of outdoor activities with curricular standards (science, geography, biology) -Alignment of exercises with school educational goals -Integration of experiential learning with subject content (science, mathematics, art) - Alignment with sustainable development goals (fostering respect for nature) -Correspondence of lesson content with standardized school curricula -Clear linkage between classroom instruction and field experience	16	Almqvist Nielsen (2023), Assaraf & Orion (2009), Carrier et al. (2014), Goralnik et al. (2020), Novotná et al. (2024), Petrikova (2003), Pignato et al. (2021), Remmen & Frøyland (2015), Remmen & Iversen (2022), Saltzman & Paytan (2007), Scott & Matthews (2011), Svobodová et al. (2020), Thomas (2020), Uçuş (2015), Utaberta et al. (2015), Wolsink (2016)
	Active and Experiential Learning	-Utilization of active learning methods (field research, observation, mapping, interviewing) -Provision of experiential learning opportunities (exploration, discovery, environmental interaction) -Active and kinesthetic learning (walking, specimen collection, field-based problem-solving) -Employment of interactive and active teaching methodologies -Learning through direct experience (touching tree leaves, plant identification) -Application of engineering design processes in authentic environments -Design of open-ended activities (decision-making on real-world issues)	17	Assaraf & Orion (2009), Carrier et al. (2014), Constible et al. (2007), D'Ascenzo (2022), Goralnik et al. (2020), Kwan & Chan (2004), Pelfini et al. (2016), Petrikova (2003), Pignato et al. (2021), Pitiporntapin et al. (2023), Remmen & Frøyland (2015), Rohman et al. (2020), Scott & Matthews (2011), Svobodová et al. (2020), Usher (2023), Winje & Løndal (2021), Yang et al. (2014), Yilmaz et al. (2022)

Main Component	Sub-Component	Initial Codes	Frequency	APA references
		-Multisensory engagement (visual, tactile, auditory) - Learning by doing		
	Pedagogical Flexibility	-Flexibility in adapting methods to individual student differences -Capacity to tailor curricula to local needs and student interests -Spatial and temporal flexibility (departing from traditional classroom structures) -Adaptation of programs to local conditions (e.g., pristine rivers) -Balance between free exploration and structured guidelines -Provision of motivational options (timers, progress tracking) -Utilization of diverse environments (natural, cultural, urban)	12	Jansson et al. (2024), Kwan & Chan (2004), Neville et al. (2021), Pignato et al. (2021), Puhek et al. (2012), Sahrakhiz et al. (2017), Scott & Matthews (2011), Sedawi et al. (2021), Svobodová et al. (2020), Thomas (2020), Uçuş (2015), Utaberta et al. (2015), Whincup et al. (2021), Wolsink (2016)
Human Criteria	Teacher Qualifications and Training	-Teacher competency in facilitating outdoor activities - Teacher training in informal teaching methodologies -Professional development opportunities (workshops, in-service training) -Specialized training in risk management and outdoor pedagogical methods Teacher self-efficacy (2.2-fold increase in likelihood of conducting field trips) -Training of instructors with strong subject knowledge and classroom management skills -Development of teacher competencies in interactive and non-coercive methods -Ability to balance lesson engagement with distraction prevention	15	Assaraf & Orion (2009), Beauchamp et al. (2022), Constible et al. (2007), Finnerty & Murphy (2023), McCabe et al. (2014), Novotná et al. (2024), Nundy et al. (2009), Petrikova (2003), Pitiporntapin et al. (2023), Rahmawati & Koul (2016), Saltzman & Paytan (2007), Stan & Humberstone (2011), Svobodová et al. (2020), van Dijk-Wesselius et al. (2020), Whincup et al. (2021)
	Active Student Engagement	-Active student participation in decision-making and research design -Encouragement of topic selection, problem-solving, and expression of personal viewpoints -Creation of an environment fostering student autonomy and agency -Provision of hands-on learning opportunities -Democratic participation (activity selection, decision-making processes) -Enhancement of teamwork and communication skills -Establishment of a safe environment for children to express opinions -Employment of scientific methods (sampling, quantitative analysis)	14	Almqvist Nielsen (2023), Cenić et al. (2023), D'Ascenzo (2022), Humberstone & Stan (2011), Jackson et al. (1997), Kwan & Chan (2004), Molyneux et al. (2022), Oyovwi (2020), Petrikova (2003), Rahmawati & Koul (2016), Sedawi et al. (2021), Svobodová et al. (2020), Winje & Løndal (2021), Wiratman et al. (2019), Yang et al. (2014)
Organizational	Institutional	-School support for field trips and	15	Assaraf & Orion

Main Component	Sub-Component	Initial Codes	Frequency	APA references
Criteria	and Administrative Support	scientific excursions -Support from school administration and parents -Pivotal role of school leadership in allocating time and resources -Institutional backing (school management, financial resources, community engagement) -Collaboration among schools, outdoor centers, and families -Reduction of administrative barriers (securing necessary permits) - Existence of a formal framework with clearly defined objectives -Procurement of informed consent from parents and administrators		(2009), Beauchamp et al. (2022), Carrier et al. (2014), Finnerty & Murphy (2023), Jansson et al. (2024), Novotná et al. (2024), Nundy et al. (2009), Petrikova (2003), Remmen & Iversen (2022), Saltzman & Paytan (2007), Svobodová et al. (2020), Utaberta et al. (2015), van Dijk-Wesselius et al. (2020), Whincup et al. (2021), Yang et al. (2014), Wolsink (2016)
	Stakeholder Collaboration	-Collaboration with local institutions (universities, municipalities, scientific centers) -Engagement of the local community in preserving green spaces and supporting programs -Partnerships among schools, universities, and subject-matter experts -Securing support from landowners and web/platform designers -Cooperation with local and national organizations (e.g., Ministry of Environment) -Establishment of educational partnerships between schools and local entities -Involvement of parents and volunteers	12	Almqvist Nielsen (2023), Beauchamp et al. (2022), Calhoun et al. (2003), Carrier et al. (2014), Jackson et al. (1997), Jansson et al. (2024), Marques et al. (2002), Petrikova (2003), Pitiporntapin et al. (2023), Saltzman & Paytan (2007), Sedawi et al. (2021), Svobodová et al. (2020), Wolsink (2016)
	Resource Provision and Infrastructure	-Provision of financial resources (governmental grants, school budgets) -Access to safety and educational equipment -Availability of essential supplies (first aid kits, extra clothing) -Appropriate storage of equipment -Existence of green spaces with basic amenities (shaded areas, portable tables) -Access to reliable communication technologies (high-speed internet) -Allocation of budget for transportation and equipment	8	Beauchamp et al. (2022), Calhoun et al. (2003), Rivera et al. (2011), Saltzman & Paytan (2007), van Dijk-Wesselius et al. (2020), Whincup et al. (2021), Wolsink (2016), Yang et al. (2014)
Evaluation and Feedback Criteria	Ongoing and Comprehensive Assessment	-Regular assessment of students - Administration of pre- and post-program tests -Performance-based evaluation (oral presentations, written reports) -Utilization of diverse assessment tools (reports, photographs, interviews, drawings)	14	Calhoun et al. (2003), Cheng & Ho (2011), Constible et al. (2007), Jackson et al. (1997), Jansson et al. (2024), Marques et al. (2002), Neville et al. (2021), Novotná et al.

Main Component	Sub-Component	Initial Codes	Frequency	APA references
		-Content validation by subject-matter experts -Assessment of self-efficacy and group belonging -Measurement of long-term memory retention (one-month follow-up tests) -Evaluation of scientific process skills		(2024), Oyovwi (2020), Pitiporntapin et al. (2023), Rohman et al. (2020), Winje & Løndal (2021), Wiratman et al. (2019), Yilmaz et al. (2022)
	Feedback and Improvement	-Collection of feedback from teachers and students for continuous improvement - Provision of feedback from program planners to children regarding the impact of their input -International monitoring of program implementation - Use of feedback questionnaires and focus groups -Revision of protocols based on received feedback - Regular student reflection on their experiences	7	Almqvist Nielsen (2023), Calhoun et al. (2003), Cheng & Ho (2011), Jansson et al. (2024), Marques et al. (2002), Neville et al. (2021), Nundy et al. (2009), Usher (2023)
Social and Psychological Criteria	Social and Emotional Development	-Development of positive social relationships among students -Enhancement of social and interpersonal skills -Improvement of motivation and interest in learning -Stress reduction and creation of an enjoyable learning environment -Attention to students' emotional and physical well-being -Fostering emotional connection to place and nature -Cultivation of a sense of agency and responsibility -Enhancement of self-awareness, self-management, and responsible decision-making	13	Armstrong (2005), Cenić et al. (2023), D'Ascenzo (2022), Goralnik et al. (2020), Humberstone & Stan (2011), Kelly et al. (2022), Liu (2017), Marchant et al. (2019), Molyneux et al. (2022), Sedawi et al. (2021), Shume (2016), Slee & Allan (2019), Velempini & Martin (2019)
	Emotional and Cultural Engagement	-Generating interest through student-relevant topics -Strengthening emotional connection to the past through imagination and role-playing -Preservation of cultural traditions (e.g., skiing in Norway) -Cultural sustainability through education - Integration of culture and science (utilizing indigenous folklore) -Use of multiple media formats (visual maps, auditory instructions) Simplification of language and symbols to enhance comprehension	8	Almqvist Nielsen (2023), Constible et al. (2007), Dahl et al. (2018), D'Ascenzo (2022), Goralnik et al. (2020), Kelly et al. (2022), Sedawi et al. (2021), Velempini & Martin (2019)

Table 2 categorizes the implementation criteria for outdoor education into six main components: 1) Environmental Criteria, 2) Educational Criteria, 3) Human Criteria, 4) Organizational Criteria, 5) Evaluation and Feedback Criteria, and 6) Social and Psychological Criteria, each addressing key aspects of this type of education. These are fully analyzed in the conclusion section.

Table 3. Challenges of Implementing Outdoor Education

Main Component	Sub-Component	Initial Codes	Frequency	APA References
Institutional and Managerial Challenges	Institutional and Cultural Resistance	- Resistance of the traditional education system to non-traditional and informal methods -Exam-centric educational culture focused on rote memorization - Lack of official recognition for outdoor education within legal and regulatory frameworks - Resistance to changing traditional teaching methods -Insufficient administrative support and a lack of appreciation for the value of outdoor education - Tension between compact city policies and the preservation of educational green spaces - Bureaucratic obstacles (e.g., securing official permits) - Restrictive policies	13	Assaraf & Orion (2009), D'Ascenzo (2022), Kemp (2019), Petrikova (2003), Pignato et al. (2021), Sahrakhiz et al. (2017), Stan & Humberstone (2011), Svobodová et al. (2020), Uçuş (2015), Utaberta et al. (2015), Whincup et al. (2021), Wolsink (2016), Yang et al. (2013)
	Lack of Curricular Alignment	- Absence of a cohesive conceptual framework within schools - Pressure from standardized testing, reducing time allocated to science and experiential activities - Mismatch between outdoor education and formal curricular goals - Difficulty integrating informal learning with the traditional curriculum - Prioritization of core subjects (e.g., mathematics, language) due to educational policies - Disconnect between traditional instruction and real-world community issues - Difficulty in establishing continuity between informal experiences and curricular objectives	10	Carrier et al. (2013), Carrier et al. (2014), Kemp (2019), Kwan & Chan (2004), Pignato et al. (2021), Shume (2016), Svobodová et al. (2020), Thomas (2020), Uçuş (2015), Winje & Løndal (2021), Yang et al. (2013)
Pedagogical and Planning Challenges	Activity Design and Implementation	- Need for more meticulous consideration in the design of outdoor learning activities - Suboptimal activity design (e.g., using closed-ended questions on worksheets) - Monotony of activities (e.g., over-reliance on worksheets) - Challenges in integrating technology with fieldwork - Difficulty in balancing free exploration with structured learning - Complexity of managing group activities in an outdoor setting - Time-intensive nature of planning	10	D'Ascenzo (2022), Kwan & Chan (2004), Novotná et al. (2024), Pelfini et al. (2016), Remmen & Frøyland (2015), Remmen & Iversen (2022), Rohman et al. (2020), Scott & Matthews (2011), Winje & Løndal (2021), Yang et al.

Main Component	Sub-Component	Initial Codes	Frequency	APA References
		and preparing activities (e.g., 90 minutes per session) - Difficulty in adapting activities for complex concepts (e.g., geology, physics)		(2013)
	Assessment and Reflection	- Lack of clarity on how to document and assess learning during educational trips - Insufficient research on integrating outdoor education with core academic subjects - Potential for bias in student responses due to a desire to provide socially desirable answers - Difficulty in formally evaluating program effectiveness - Limited generalizability of findings due to small or heterogeneous sample sizes - Difficulty in fostering deep post-visit reflection due to time constraints	6	Almqvist Nielsen (2023), Cheng & Ho (2011), Goralnik et al. (2020), Neville et al. (2021), Saltzman & Paytan (2007), Wiratman et al. (2019)
Human-Related Challenges	Teacher Preparedness and Confidence	- Teacher resistance stemming from a lack of specialized training and experience - Gaps in teachers' scientific knowledge regarding complex concepts (e.g., rock cycle, forestry) - Low teacher confidence in managing a classroom in an outdoor environment - Need for professional development focused on informal pedagogical methods - Reliance on authoritarian and coercive control methods by teachers - Lack of practical, applied knowledge among teachers for solving real-world problems - Teacher apprehension regarding the complexity of scientific concepts	11	Assaraf & Orion (2009), Constible et al. (2007), Finnerty & Murphy (2023), Humberstone & Stan (2011), McCabe et al. (2014), Neve & Keith-Marsoun (2017), Nundy et al. (2009), Petrikova (2003), Pitiporntapin et al. (2023), Uçuş (2015), van Dijk-Wesselius et al. (2020), Whincup et al. (2021)
	Student Engagement and Readiness	- Initial student resistance to accepting outdoor activities as legitimate formal learning - Lack of student preparedness to adapt to novel environments - Students' limited understanding of how outdoor education connects to classroom learning - Variation in students' cognitive abilities to grasp concepts - Lack of focus in some students and a tendency to rely on imitating peers - Fear of insects or natural elements among some students - Gender differences in participation (higher engagement among boys	8	Almqvist Nielsen (2023), Carrier et al. (2014), Cenić et al. (2023), Kervinen et al. (2018), Oyovwi (2020), Rahmawati & Koul (2016), Shume (2016), Wiratman et al. (2019)

Main Component	Sub-Component	Initial Codes	Frequency	APA References
		compared to girls) - Difficulty for students in connecting with distant historical periods		
Financial and Logistical Challenges	Resource and Infrastructure Limitations	- Insufficient funding for equipment, transportation, and animal care - High costs associated with conducting field trips and obtaining necessary permits - Lack of robust legal and financial infrastructure to support projects - Inadequate storage for materials and equipment - Absence of basic amenities (e.g., shade structures) in green spaces - Logistical complexity in organizing field trips and coordinating with external centers - Vandalism or destruction of infrastructure (e.g., monitoring wells) - Unequal access to diverse natural environments (e.g., coastal areas, forests)	13	Beauchamp et al. (2022), Calhoun et al. (2003), Constible et al. (2007), Marques et al. (2002), Novotná et al. (2024), Pignato et al. (2021), Puhek et al. (2012), Rivera et al. (2011), Saltzman & Paytan (2007), Sedawi et al. (2021), Shume (2016), Uçuş (2015), Whincup et al. (2021), Yang et al. (2013), Yang et al. (2014)
	Time Constraints	- Time pressure for planning and executing activities within a crowded curriculum - Limitations of 45-50 minute class periods for conducting field visits - Time-consuming nature of activity preparation (e.g., 90 minutes per session) - Short duration of research implementation (e.g., limited to 4 sessions or a single day) - Interference of field trips with scheduled curricular time - Insufficient time for deep reflection following a visit	11	Almqvist Nielsen (2023), Armstrong (2005), Calhoun et al. (2003), Carrier et al. (2013), Finnerty & Murphy (2023), Jackson et al. (1997), Kwan & Chan (2004), Marques et al. (2002), Neville et al. (2021), Novotná et al. (2024), Sahrakhiz et al. (2017), Uçuş (2015), Wiratman et al. (2019)
Environmental and Safety Challenges	Safety and Risk Management	- Safety concerns (e.g., student supervision, geomorphological hazards, winter incidents) - Adverse weather conditions and students' inappropriate attire - Adherence to stringent safety standards in natural environments - Perceived risks (both physical and legal) associated with outdoor activities - Managing hazards at geomorphological or coastal sites - Fear of litigation within certain	10	Beauchamp et al. (2022), Dahl et al. (2018), Finnerty & Murphy (2023), Jackson et al. (1997), Kervinen et al. (2018), Marques et al. (2002), Pelfini et al. (2016), Pignato et al. (2021), Rivera et al. (2011), Stan &

Main Component	Sub-Component	Initial Codes	Frequency	APA References
		educational systems (e.g., the UK)		Humberstone (2011), Whincup et al. (2021)
	Environmental Conditions	- Low temperatures (e.g., -2°C) impacting student focus and well-being - Harsh environmental conditions (e.g., temperatures exceeding 90°F in coastal settings) - Environmental distractions (e.g., farm noises, animal movements) - Damage to ecosystems (e.g., wetlands polluted by sewage or litter) - Hazardous access to polluted environments (e.g., contaminated rivers)	6	Jackson et al. (1997), Liu (2017), Novotná et al. (2024), Pelfini et al. (2016), Sedawi et al. (2021), Yilmaz et al. (2022)

The challenges of implementing outdoor education are categorized into five main components: 1) Institutional and Managerial Challenges, 2) Pedagogical and Planning Challenges, 3) Human-Related Challenges, 4) Financial and Logistical Challenges, and 5) Environmental and Safety Challenges, each referring to problems associated with the design and implementation of outdoor educational activities.

Conclusion

The findings of this research, through the qualitative synthesis of 62 studies, provide a comprehensive and multifaceted framework of six main criteria for implementing outdoor education: environmental, educational, human, organizational, assessment and feedback, and social-psychological. These criteria interact within a dynamic ecological framework, aligning with Bronfenbrenner's ecological model (1979), which conceptualizes education as a system influenced by interconnected levels, from the micro (e.g., student experience) to the macro (e.g., national policies). This framework highlights that successful implementation requires systemic coherence across all levels. Frequency analysis indicates that the educational component is predominant (approximately 45 studies), while assessment and feedback (21 studies) are less frequently addressed, highlighting a research gap. This framework not only elucidates the key success factors for outdoor education but also identifies the existing challenges.

The educational criteria, with high frequency (totaling 45 studies across sub-components), are the most prominent, indicating the existing literature's focus on educational aspects. Sub-components such as "Active and Experiential Learning" (17 studies) and "Curriculum Alignment" (16 studies) have the highest recurrence. Experiential learning is considered the core of outdoor education. These findings align with Dewey's theory of experiential learning (1938), which views learning as an active process based on direct experience. For example, European studies like Remmen & Iversen (2022) in Nordic countries emphasize integrating fieldwork with national standards (e.g., systems thinking), while Asian studies like Yang et al. (2014) in China highlight cultural challenges in aligning with exam-oriented curricula. Comparing these studies shows that pedagogical flexibility (12 studies) is key to reducing inequalities; Thomas (2020) in Italy reports that this flexibility reduces educational inequality at the secondary level, whereas at the primary level (e.g., Molyneux et al., 2022, in Canada), it focuses more on unstructured play. These criteria suggest that outdoor education can bridge the gap between classroom-centric content and practical experiences, as reported by Remmen & Iversen (2022) in their Nordic study. The educational dimension emphasizes experiential alignment: activities like field studies and citizen science projects connect theoretical curricula with real-world problem-solving, contributing to improved knowledge retention

and critical thinking.

The organizational component (with a frequency of 35 studies) is the second most addressed area. The sub-component "Institutional and Administrative Support" (15 studies) highlights the vital role of organizational structures and the need for collaboration (e.g., parental involvement). These criteria, such as institutional support and stakeholder collaboration, align with findings by Wolsink (2016) and Carrier et al. (2014), who emphasize the importance of managerial support and community participation in the sustainability of these programs.

Human criteria (29 studies), focusing on "Teacher Qualifications" (15 studies) and "Active Student Engagement" (14 studies), indicate the pivotal role of teachers and student autonomy. These criteria follow the organizational criteria and are connected to Freire's liberatory theory (1970), which views the teacher as a facilitator and the student as an active agent. Western studies, like Finnerty & Murphy (2023) in Ireland, emphasize in-service training to increase teacher confidence (a 2.2-fold increase in the likelihood of field trips). In-service training is essential for enhancing teacher competencies and overcoming teacher resistance, while Middle Eastern studies, like Sedawi et al. (2021) in Israel, focus on student participation in indigenous communities to foster agency. This comparison shows that human-related challenges are more acute in developing countries (e.g., lack of professional training), which can reduce effectiveness, as reported by Pitiporntapin et al. (2023) in Thailand. Overall, human criteria, including teacher qualifications and active student engagement, have been identified as pivotal factors in the success of this type of education. Studies by Van Dijk-Wesselius et al. (2020) show that professional teacher training and creating space for democratic student participation significantly impact the effectiveness of outdoor education. Teacher training in risk management and informal methods increases the likelihood of implementation, while student agency in designing activities fosters participation and socio-emotional growth (Finnerty & Murphy, 2023; Molyneux et al., 2022).

The evaluation and feedback criteria, along with the social and psychological criteria, were each identified in 21 studies, placing them after the human criteria in terms of frequency. The assessment and feedback criteria, emphasizing continuous and multidimensional assessment, align with research by Cheng & Ho (2011) and Jansson et al. (2024), who stress the necessity of using diverse tools to measure learning and ensure continuous improvement. However, the lower frequency in assessment and feedback criteria may indicate a research gap where continuous assessment (e.g., pre/post-tests) is less explored. On the other hand, social-psychological criteria, such as social and emotional development, align with Wilson's Biophilia theory (1984) and studies like Molyneux et al. (2022), which view connection with nature as a key factor in improving student well-being and motivation.

Environmental criteria, with a frequency of approximately 16 studies, emphasize access and safety, which are foundational for the success of programs and the implementation of outdoor education. These findings align with studies by Assaraf & Orion (2009) and Svobodová et al. (2011), which emphasize the necessity of access to diverse and safe ecosystems to enhance experiential learning.

Thus, the criteria table indicates a comprehensive approach, suggesting that multidimensional criteria (from environmental to social) lead to sustainable success. Considering the frequency of multiple criteria for implementation, prioritizing the educational and human dimensions, with a focus on teacher training, is essential.

On the other hand, the challenges also reveal systemic tensions. In this regard, financial and logistical challenges (24 studies) stand out, with "Time Constraints" (11 studies) and "Resource Limitations" (13 studies) being predominant. Time and logistical constraints, such as packed curricula and 90-minute class periods, hinder deep environmental immersion (Finnerty & Murphy, 2023). Institutional and managerial challenges are also prevalent (approximately 23 studies), indicating systemic barriers. For instance, "Institutional Resistance" (13 studies) has the highest recurrence, where traditional educational

culture is identified as the primary barrier, referencing historically restrictive policies. "Lack of Curricular Alignment" (10 studies) also indicates conflict with standardized testing. Among human-related challenges (19 studies), "Teacher Preparedness" (11 studies) has the highest recurrence, pointing to a lack of attention to professional development. Human-related challenges, like the lack of teacher preparedness, also align with findings from Assaraf & Orion (2009) and Pitiporntapin et al. (2023), who emphasize the need for specialized teacher training.

In pedagogical and planning challenges (16 studies), "Inappropriate Activity Design" (10 studies) emphasizes monotony and lack of integration with technological activities. While environmental and safety challenges (16 studies) are less frequent, they have high severity. Codes like "Lack of Financial Resources" (in financial challenges) appear in 13 studies, directly referring to transportation costs. The challenges identified in this study, including institutional resistance, lack of curriculum alignment, and financial and logistical constraints, are consistent with global reports. For example, Svobodová et al. (2021) in the Czech Republic and Kemp (2019) in England refer to similar barriers such as cultural and bureaucratic resistance. Institutional resistance stemming from exam-oriented cultures and bureaucratic barriers (e.g., permit complexities) limits innovation (Assaraf & Orion, 2009). "Safety and Risk Management" (10 studies) emphasizes natural hazards, highlighting the need for stringent standards in this area. Environmental and safety challenges, such as adverse weather conditions and geomorphological hazards, also align with studies by Pelfini et al. (2016) and Dahl et al. (2018), which stress the importance of risk management in natural environments. Overall, Table 3 illustrates the relationships between challenges; the high frequency of financial and institutional challenges indicates research focus on barriers. To overcome these challenges, prioritizing teacher training and institutional support is essential.

Overall, outdoor education, therefore, is not just an educational innovation but a fundamental reimagining of the learning process itself. With escalating climate crises and digital saturation, schools must transform from "knowledge factories" into ecosystems of experiential growth. This review provides a roadmap for this transformation, emphasizing that successful implementation goes beyond logistical solutions, requiring a paradigm shift toward embodied and place-sensitive learning. Therefore, given Iran's environmental diversity (from the Hyrcanian forests to the central deserts), outdoor education can be introduced as a leading solution in education. The criteria and challenges identified in this study indicate what points should be considered when developing a scientific program. This aligns with the findings of Mahooti Rad & Mousavi (2019), which emphasize the necessity of paying attention to Iran's environmental and cultural capacities. Indeed, the success of this approach requires overcoming structural challenges, such as a lack of infrastructure and institutional resistance, which necessitates coherent policymaking and inter-institutional collaboration. By investing in teacher agency, social partnerships, and policy reform, we will not only foster environmentally literate students but also nurture a generation capable of rethinking humanity's role in the web of life. It seems these challenges are exacerbated in Iran, particularly due to the centralized structure of the education system and infrastructural limitations. This review shows that outdoor education, with its multidimensional criteria, can transform learning from traditional classrooms to authentic experiences.

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