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ENVIRONMENTAL EDUCATION IN POLISH SCHOOLS: CURRENT CHALLENGES, PRACTICES, AND FUTURE PATHWAYS

Abstract. *This article analyses the state of environmental education in the Polish school system, emphasising its importance and highlighting existing problems and opportunities for development. Although pro-environmental content is included in the core curriculum, mainly within natural science subjects, the article emphasises that environmental education is implemented in a fragmented and unsystematic manner. The main barriers to effective implementation are the absence of a dedicated subject, limited teacher training, underutilisation of available teaching resources, and low ecological awareness among students and teachers.*

The analysis concludes that environmental education should be interdisciplinary and practice-oriented, incorporating field projects, outdoor activities, collaboration with local communities, and family-oriented initiatives. Non-governmental organisations play an important role by offering valuable initiatives, but their reach remains limited. At the same time, environmental education needs to be integrated with broader sustainability agendas, such as the United Nations Sustainable Development Goals (SDGs), to ensure coherence between national practices and global priorities. Improving the situation requires coherent educational policies, teacher training and support, the integration of teaching materials into the curriculum, and strengthened partnerships between schools, institutions, and NGOs.

An analysis of international practices, such as the Slovak model, indicates that introducing additional subjects or educational pathways in ecology can significantly improve teaching effectiveness. In conclusion, the article argues that improving the effectiveness of environmental education requires a holistic, systemic approach that combines coherent educational policy, adequate funding, professional support for teaching staff, and close cooperation between schools, institutions, and the local community.

Keywords: *environmental education, education for sustainable development, environmental awareness, teachers, educational policy.*

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Introduction. In an era of environmental challenges and opportunities, education plays a fundamental role. The idea that environmental education should be integrated into the formal education system at all levels first emerged at the International Conference on Environmental Education (ICEE) in Tbilisi in 1977. Since then, this concept has been reflected in international

strategies such as the Decade of Education for Sustainable Development (2005-2014) and the UNESCO Education for Sustainable Development (ESD) programme. As a UNESCO member state, Poland has been obliged to implement systemic measures for environmental education and to nurture citizens who are capable of critical thinking and responsible, pro-environmental decision-making. It is worth noting that these commitments have been incorporated into national strategic documents such as the *'Polish Strategy for Education for Sustainable Development 2030'*, which emphasise the role of environmental education in shaping social attitudes and public policies.

The education system is widely regarded as the most effective means of fostering an environmentally conscious society. Given that individuals spend around 3% of their lives in education, integrating environmental education into curricula is intended to equip a generation with the critical thinking and decision-making skills to solve local environmental problems. Consequently, environmental education – also referred to as environmental studies or ecological education – can be defined as the concept and process of educating society to respect the natural environment [8, p. 421].

The modern world is facing an array of unprecedented environmental challenges, including climate change, environmental degradation, biodiversity loss, and the pollution of air, water, and soil, as well as the depletion of natural resources [10; 17, pp. 11-12]. In this context, international strategies such as UNESCO's 'Education for Sustainable Development' (ESD) programme highlight the need to integrate environmental education into curricula as a key driver of societal transformation towards sustainable development [33]. At the same time, the importance of non-formal and informal education has increased, as it engages local communities, non-governmental organisations, and the private sector in spreading ecological knowledge.

In this context, schools play a vital role in fostering positive attitudes towards nature and addressing issues related to its protection. This paper analyses the current state of environmental education in schools, identifies existing challenges, and explores effective implementation methods to strengthen the role of pro-environmental education.

Objectives and Tasks. This publication aims to analyse the current state of environmental education within the Polish education system, identify related challenges, and propose effective solutions to support the integration of pro-environmental content at all educational levels. It also explores opportunities for development through the support of educational institutions and non-governmental organisations.

Methodology. This article employed a methodology involving the analysis of relevant literature and policy documents related to environmental education. The analysis focused on four areas: the position of environmental education within the education system; teachers' preparedness

to deliver pro-environmental lessons; the availability of teaching materials and institutional support; and the role of non-governmental organisations in the educational process.

The research addressed questions about the implementation of pro-environmental content in schools, teacher preparedness, available support, and examples of good practice both nationally and internationally. Data sources included academic publications by Polish and foreign authors, reports from international organisations such as the OECD and UNESCO, and policy documents including the national core curriculum. The analysis also took into account the experiences of Slovak schools that have introduced an ecological pathway as an elective subject.

The methods employed included a content analysis of literature and documents, a comparison of practices used in Poland and other countries, and qualitative identification of problems and barriers. The conclusions were developed by synthesising the collected data, which guided how to improve environmental education. The study also emphasises the importance of teacher training programmes and digital resources in modernising ecological education and making it more accessible.

This secondary research covered sources published between 2007 and 2025. While the analysis primarily referred to the conditions of the Polish educational system, it also considered international practices and recommendations. As educational and environmental policies evolve, however, the conclusions may be subject to change.

Results. One of the key barriers to the effective implementation of ecological education is the lack of systemic integration and consistent political support across the education system. This leads to fragmented action and limited long-term impact [32].

In Poland, environmental issues are mainly addressed in science subjects such as nature, biology, geography, chemistry, and physics. There is no subject dedicated exclusively to 'environmental education'. Although topics related to environmental protection and sustainable development education are included in the national curriculum, they remain scattered and do not form a coherent whole [21]. Consequently, these topics are often overshadowed by issues that teachers deem to be more important [4].

An analysis of school curricula has shown that environmental education is almost exclusively the remit of the natural sciences. Topics such as the ecological crisis, climate change, the treatment of farm animals by humans, and environmental policies implemented by local and national authorities are not incorporated into humanities subjects [21]. This fragmentation of content reduces opportunities for interdisciplinary learning and impairs students' ability to connect ecological issues with social, cultural, and ethical dimensions.

Based on the experience of Slovak schools, an effective solution would be to introduce an additional elective subject, particularly in Years 5 and 6, where the ecological pathway could be

covered in more detail [30]. However, teachers highlight several issues: age-inappropriate content, a lack of holistic approaches and cross-curricular links, outdated textbooks, and insufficient ecological content in the national curriculum [19].

Despite ongoing initiatives to educate society, environmental awareness among university students remains unsatisfactory. Some students remain unaware of issues such as ecology and the greenhouse effect [18; 23]. This highlights the need to strengthen environmental education not only in primary and secondary schools but also at the university level, with a focus on developing competencies aligned with the requirements of a green economy and sustainable development.

Based on long-term studies conducted by the Institute for Sustainable Development, several key problems concerning ecological awareness can be identified, as illustrated in Figure 1 [18].

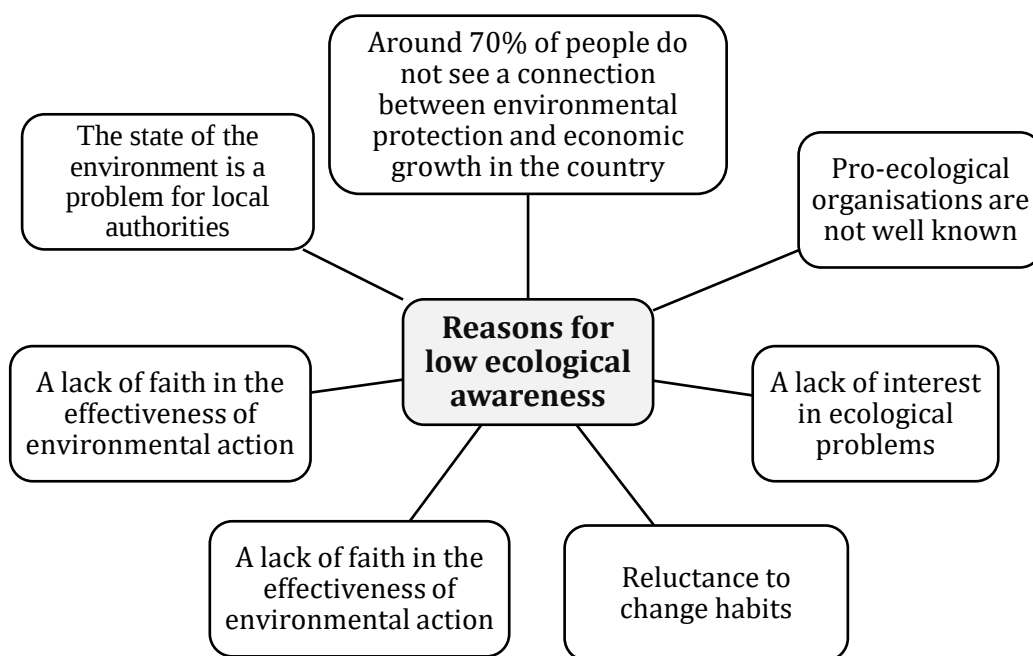


Figure 1. Reasons for low environmental awareness among Poles.

Based on Kondracki and Udała's (2022) research [18].

Research conducted among teachers specialising in education for sustainable development has shown that their knowledge is insufficient. Interestingly, humanities teachers were found to be more engaged with the principles of sustainable development than science teachers [24]. Furthermore, inadequate preparation in contemporary ecological issues and methodologies poses a significant obstacle [25].

Some teachers lack the skills to deliver environmental education independently, which poses a challenge for modern schools tasked with pro-environmental education. Teachers' ecological knowledge is often inadequate and fragmented, a phenomenon observed in both urban and rural

schools [20]. Many teachers do not always feel adequately prepared to fulfil the role of educators in environmental education [19; 22]. This skills gap indicates the need for systematic teacher training programmes supported by national policies, in line with UNESCO's recommendations on Education for Sustainable Development.

Most teachers engage in various forms of professional development to convey ecological knowledge more effectively. However, this primarily applies to those who are already motivated to share environmental content [4, 38]. The most desirable forms of professional development include online training led by experts, conferences, lectures, practical workshops, and on-site training [19]. Teacher training centres, ecological education centres, and universities play an important role in increasing teachers' ecological knowledge. Nevertheless, only around 1.2 % of teachers receive support from universities, despite their ability to develop research-based teaching materials and provide substantial expertise [6].

In cooperation with institutions and organisations, universities, and methodological centres, training sessions, seminars, lectures, and research projects are organised. They also prepare teaching aids for environmental education [37]. Educational resource databases support ecological education by providing lesson plans, worksheets, field applications, multimedia materials, GIS tools, interactive games, and digital whiteboards [2; 6]. A wide range of teaching materials is available on the Educational Development Centre's website [9].

Despite the availability of such resources, studies show that many teachers are unaware of national and international repositories. This results in the underutilisation of valuable tools that could enhance the quality and appeal of environmental education [25; 35]. Therefore, it is crucial to increase information campaigns, improve accessibility to resources, and integrate them with national curricula. A coordinated national digital platform could significantly improve teachers' access to up-to-date, innovative materials.

The skills acquired by teachers can be applied not only in ecology classes, but also during activities with other social groups [2]. Well-prepared teaching materials, such as those developed by the Ecological Education Centre, are essential for effective ecological education [19]. Environmental education is implemented in 59 % of Polish schools, often through participation in campaigns such as 'Clean Up the World – Poland' [6].

German scholars have demonstrated that well-organised field trips help students to understand the world around them and foster positive attitudes and values towards nature [5]. Polish students are encouraged to participate in initiatives such as maintaining a school garden (where possible), monitoring air quality and local ecosystems, collaborating with municipalities on waste management, and taking part in community projects, such as collecting electronic waste and used

batteries, or engaging in clean-up campaigns [6; 31; 40]. It is also good practice to involve parents and grandparents in pro-environmental initiatives, such as ecological fairs [15].

Protected areas such as nature reserves, landscape parks, and national parks are being established across the country to preserve nature in its natural state. These areas have great educational potential, enabling schools to implement a variety of teaching strategies. Activities in protected areas that facilitate knowledge transfer and engage students and teachers in nature and environmental protection issues include field classes, guided nature trips, ecological workshops, expert lectures, educational gardens, competitions and exhibitions, and photography and art classes, as well as meteorological stations [26].

The most commonly used forms of environmental education in Polish primary and secondary schools are classroom lessons (82-94 %), outdoor learning in gardens, parks, or forests (49-86 %), and ecological clubs (18-38 %). Environmental websites are the least popular form of environmental education [4].

Another factor influencing the implementation of environmental education in schools is the greater reliance on non-governmental rather than systemic support. Many NGOs deliver non-formal education and play a significant role in educating society [27]. Stronger collaboration between the public education system and NGOs could help to bridge this gap and ensure more consistent, long-term educational outcomes.

Table 1.

Methods of ecological education in Poland, illustrated by the city of Wrocław [27]

<i>Type of education</i>	<i>Examples of Implementation</i>
Formal education	Inclusion of ecological topics in natural science curricula
	Activities organised within schools
Non-formal education	Ecological excursions
	Workshops and lectures, training courses: <i>‘Dual and Selective Waste Collection’</i> , <i>‘Rational Waste Management as an Opportunity for the Environment’</i> , <i>‘Say No to Thoughtless Shopping – Building a Recycling Society’</i>
	Events organised by non-governmental organisations, national parks, and etc.
Informal education	Community projects: <i>‘Live Long Time’</i> , <i>‘Active Wrocław Residents Together for Health and Nature’</i> , program <i>‘Ecosurvival – Ecological Education in Recreation and Tourism’</i>
	Volunteering programs
	Local community initiatives
Campaigns and media	Internet
	Television, radio
	Press, social media

However, these activities cover only a portion of schools, so they do not reach all students. This highlights the need for stronger partnerships among government institutions, NGOs, and

educational institutions to ensure equal opportunities for all schools, including those in rural and disadvantaged areas [25; 34]. It is also essential to assess whether such initiatives are systematically evaluated for their long-term effectiveness, since a lack of monitoring could reduce their impact.

The non-governmental organisation database (<https://spis.ngo.pl/>) contains numerous entities that raise awareness and change habits towards the natural environment through modern environmental education. These include international organisations such as WWF, Greenpeace International, Friends of the Earth International, BirdLife International, the Foundation for Environmental Education (FEE), and the Global Ecovillage Network (GEN). Prominent national organisations include the League for Nature Conservation, the Polish Ecological Club, the Sendzimir Foundation, the Ecodevelopment Foundation, the Foundation for Poland, the UNEP/GRID-Warsaw Centre, and the Gaja Club. These organisations implement a wide range of initiatives and events to raise environmental awareness, including practical educational activities such as workshops, campaigns, and collection drives.

The National Fund for Environmental Protection and Water Management is the largest institution in Poland financing ecological projects. It supports environmental campaigns, participant-led observations, education in national parks and botanical gardens, 'green schools' in natural settings, and nationwide actions and events [36]. This demonstrates that, to be effective, environmental education must also be implemented outside the classroom. Many schools lead by example, engaging in activities such as paper and battery collection, waste segregation, and energy and water conservation. They also participate in campaigns such as '*Clean Up the World – Poland*', '*Tree Day*', and '*Earth Day*', as well as organising excursions to wastewater treatment plants and maintaining green areas around schools [6].

Daily practices are the most effective way of shaping students' awareness. One proven method of engaging students and their families is the 3R method (reduce, reuse, recycle), which reduces waste in the immediate environment while fostering family integration [12]. Educational activities organised by schools in cooperation with the local community often include planting vegetation, cleaning public spaces, participating in Earth Day events, separating waste, collecting resources, and fundraising for animal shelters [39]. Expanding such initiatives to include citizen science projects, such as biodiversity monitoring, water quality assessment, or urban greening, could further strengthen students' practical skills and foster more durable school–community partnerships [35].

Discussion. Analysis of literature and programme documents indicates that environmental education is present in the Polish school system, albeit in a fragmented manner. Although core content on environmental protection, sustainable development, and climate change has been incorporated into natural science curricula, such as biology, geography, and chemistry, the lack of a

separate subject or teaching pathway means that environmental education often gives way to other content that teachers consider more important. However, the lack of a dedicated subject or teaching pathway means environmental education is frequently overlooked in favour of content deemed more important by teachers. These findings are consistent with earlier research highlighting the lack of systemic integration of environmental education [4; 21].

An interdisciplinary approach aligns with the global trend of integrating environmental issues across different subject areas. This is considered crucial for developing systems thinking and equipping students with the ability to make sustainable decisions [33]. Particular attention should be paid to teacher training. Studies show that teaching staff often lack the ecological knowledge and methodological tools necessary for the full implementation of pro-environmental content [20; 22]. While some teachers pursue professional development, participants tend to be already motivated and interested in environmental issues. This creates an imbalance between schools that actively develop environmental education and those that limit themselves to the minimum required by the core curriculum. Therefore, establishing nationwide teacher training programmes dedicated to environmental education could help reduce disparities and improve overall teaching quality.

Analysis of international practices indicates that effective environmental education should be interdisciplinary, linking natural science content with social, ethical, and economic issues [33]. In this context, the Slovak model is of particular interest as it introduces an additional elective subject in Years 5 and 6 [30]. This allows for a deeper exploration of ecological topics and better adjustment to students' developmental levels. Similar systemic initiatives are lacking in Poland, although the activities of non-governmental organisations partly fill this gap.

Another challenge lies in the limited awareness of, and access to, available teaching materials. Despite the existence of extensive resources, such as the Centre for Education Development's databases or UNESCO's repositories, many teachers are either unaware of these resources or do not have easy access to them [25]. This highlights the need to increase awareness of these resources and integrate ready-to-use educational tools directly into the national curriculum.

It is important to emphasise that environmental education should not be confined to classroom activities. The most effective forms involve practical initiatives, such as field projects, environmental monitoring, participation in local campaigns, and cooperation with parents and the local community [5; 6; 31]. These experiences enhance knowledge and skills, and foster attitudes of responsibility and cooperation. Furthermore, aligning these activities with broader educational policies, such as climate adaptation strategies or the European Green Deal framework, could give students a greater sense of relevance and demonstrate their real-world application.

Discussions on the role of NGOs in environmental education show that they are significant partners of schools. However, their activities are selective and do not reach all institutions [27].

Integrating NGO programmes into the formal education system could strengthen their impact and ensure more equitable access to valuable initiatives.

Conclusions. In conclusion, environmental education is implemented in Polish schools, but it is fragmented and often depends on local initiatives, appearing across different subjects. It remains fragmented, with environmental content integrated into natural science curricula in an ad hoc manner. The absence of a coherent educational policy limits its ability to shape students' attitudes. The most significant barrier is the insufficient preparation of teachers in terms of both ecological knowledge and teaching methodologies. Systemic training, workshops, and substantive support must be made accessible to all teachers, not just the most motivated.

Although educational resources and tools supporting environmental education are available, their use is constrained by limited information, limited accessibility, and insufficient integration with the national curriculum. It is therefore advisable to introduce mechanisms that facilitate the use of these materials at school level. Environmental education is most effective when based on practical activities, such as field projects, outdoor classes, cooperation with parents, and engagement with the local community. Such practical experiences foster responsible attitudes and enhance the overall effectiveness of education [25; 33].

Non-governmental organisations play an essential role in delivering environmental education, but currently only a limited number of schools benefit from their activities. Integrating NGO programmes into the formal education system could increase their reach and improve long-term educational outcomes. International examples, such as the Slovak model, demonstrate that introducing separate teaching pathways or elective subjects devoted to ecology can be an effective solution. Poland should consider adopting similar approaches that are adapted to its own national context. Furthermore, aligning national strategies with broader European frameworks, such as the European Green Deal and UNESCO's Education for Sustainable Development (ESD) initiatives, could provide a clearer direction for policy and practice.

Developing environmental education requires a systemic approach, including integrating it as a cross-cutting theme into the curriculum, providing dedicated funding, professionalising teacher support, and creating conditions for cooperation between schools, institutions, and local communities. Incorporating environmental education as a cross-cutting issue within the school curriculum, supported by targeted funding and teacher training, is essential to prepare young people for life and encourage them to take responsibility in a world facing complex environmental challenges [25; 33]. Furthermore, environmental education promotes positive pro-environmental behaviours and increases civic engagement [3].

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ЕКОЛОГІЧНА ОСВІТА В ПОЛЬСЬКИХ ШКОЛАХ: АКТУАЛЬНІ ПРОБЛЕМИ, ПРАКТИКА ТА ПЕРСПЕКТИВНІ ШЛЯХИ РОЗВИТКУ

Анотація. У статті представлено стан екологічної освіти в польській шкільній системі, підкреслюючи її важливість та висвітлюючи існуючі проблеми і можливості для розвитку. Хоча проекологічний зміст включено до основної навчальної програми, головним чином у рамках природничих предметів, у статті наголошується, що екологічна освіта реалізується фрагментарно та несистемно. Основними бар'єрами для ефективного впровадження є відсутність окремого предмета, обмежена підготовка вчителів, недостатнє використання наявних навчальних ресурсів та низький рівень екологічної свідомості серед учнів і педагогів.

Аналіз показує, що екологічна освіта повинна бути міждисциплінарною та практично орієнтованою, включати польові проекти, позакласні заходи, співпрацю з місцевими громадами та ініціативи, спрямовані на участь сімей. Важливу роль відіграють неурядові організації, які пропонують цінні ініціативи, проте їх охоплення залишається обмеженим. Водночас екологічна освіта потребує інтеграції з більш широкими програмами сталого розвитку, такими як Цілі сталого розвитку Організації Об'єднаних Націй (SDGs), щоб забезпечити узгодженість між національною практикою та глобальними пріоритетами. Покращення ситуації вимагає чіткої освітньої політики, професійної підготовки та підтримки вчителів, інтеграції навчальних матеріалів у навчальні програми та посилення партнерства між школами, установами та НУО.

Аналіз міжнародної практики, наприклад словацької моделі, показує, що введення додаткових предметів або освітніх шляхів у сфері екології може значно підвищити ефективність навчання. Підсумовуючи, автори стверджують, що для підвищення ефективності екологічної освіти необхідний цілісний, системний підхід, що поєднує узгоджену освітню політику, належне фінансування, професійну підтримку педагогічного персоналу та тісну співпрацю між школами, установами та місцевими громадами.

Ключові слова: екологічна освіта, освіта для сталого розвитку, екологічна свідомість, вчителі, освітня політика.

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