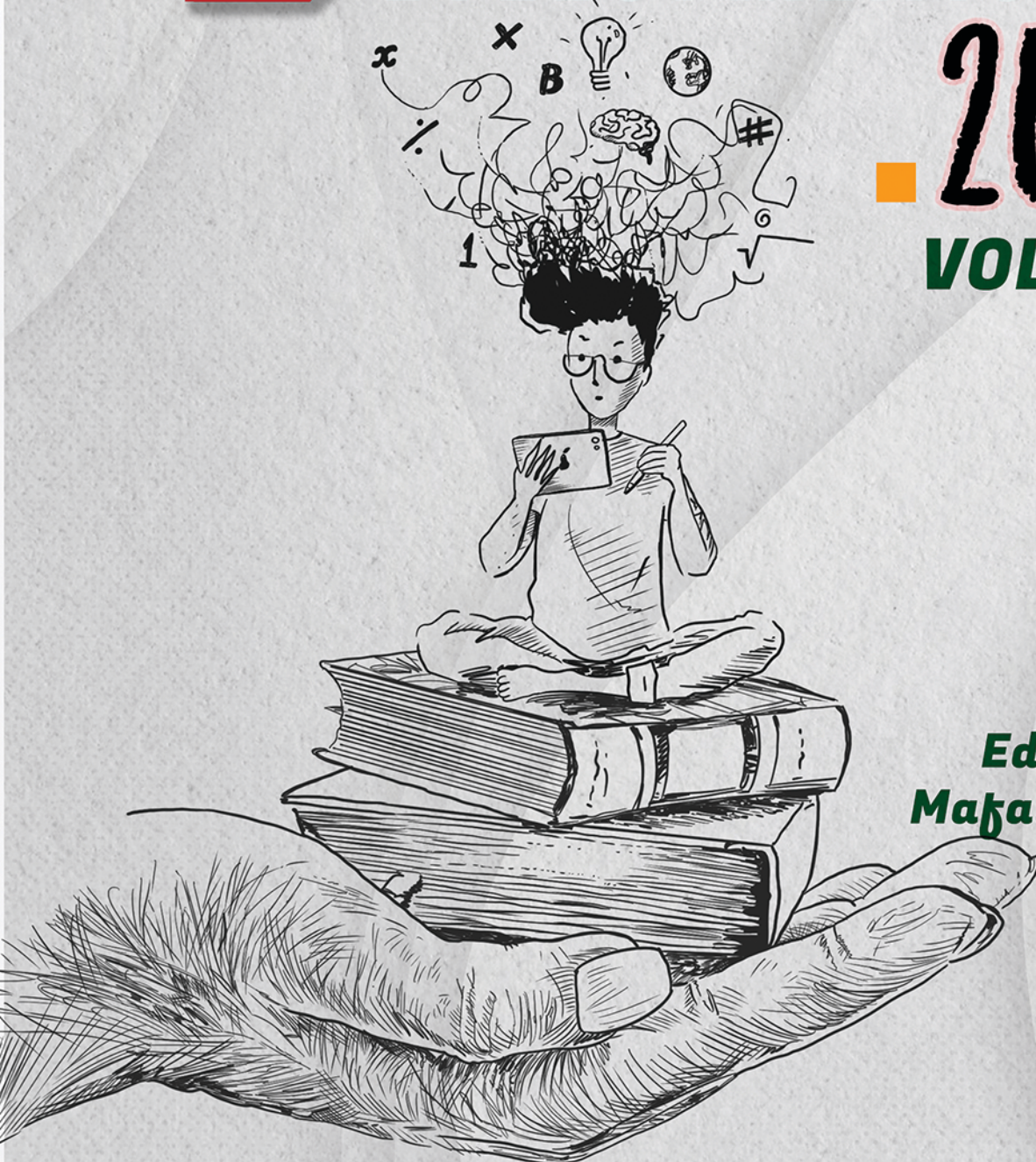


EDUCATION and NEW DEVELOPMENTS

2026
VOLUME 2



Edited by
Mafalda Carmo

Education and New Developments 2026

Volume 2

**Edited by
Mafalda Carmo**

Edited by Mafalda Carmo, World Institute for Advanced Research and Science (WIARS), Portugal

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FOREWORD

Dear Colleagues,

This book contains the full text of papers and posters presented at the International Conference on Education and New Developments (END 2026), organized by the World Institute for Advanced Research and Science (WIARS).

Education is a fundamental right that accompanies us from the very beginning of our lives. It encompasses every experience we encounter, influencing and shaping our thoughts, emotions, and actions. Whether we engage in formal education within classrooms or learn from the world around us, the process of acquiring knowledge plays a vital role in our personal growth and development. It equips us with the tools to navigate the complexities of life, broadens our perspectives, and empowers us to make informed decisions. This International Conference seeks to provide some answers and explore the processes, actions, challenges and outcomes of learning, teaching and human development. Our goal is to offer a worldwide connection between teachers, students, researchers and lecturers, from a wide range of academic fields, interested in exploring and giving their contribution in educational issues.

We are delighted to have successfully facilitated connections among academics, scholars, practitioners, and individuals who share a common interest in a field abundant with fresh perspectives, ideas, and knowledge. Our event has attracted a diverse range of contributors and presenters, enriching our understanding of human nature and behavior by showcasing the influence of their unique personal, academic, and cultural backgrounds. This diversity is a testament to the international reach of our conference, fostering multi-disciplinary collaborations and fostering intellectual growth and exchange.

END 2026 received 883 submissions, from more than 48 different countries, reviewed by a double-blind process. Submissions were prepared to take form of Oral Presentations, Posters, Virtual Presentations and Workshops. For presentation, the conference accepted 344 submissions (39% acceptance rate).

The conference also includes one Keynote presentation by Prof. Pedro Isaias, Universidade Aberta (Portuguese Open University), Portugal. We would like to express our gratitude to our invitee.

This conference addressed different categories inside the Education area and papers are expected to fit broadly into one of the named themes and sub-themes. To develop the conference program, we have chosen four main broad-ranging categories, which also covers different interest areas:

- In **TEACHERS AND STUDENTS**: Teachers and Staff training and education; Educational quality and standards; *Curriculum* and Pedagogy; Vocational education and Counselling; Ubiquitous and lifelong learning; Training programs and professional guidance; Teaching and learning relationship; Student affairs (learning, experiences and diversity; Extra-curricular activities; Assessment and measurements in Education.
- In **PROJECTS AND TRENDS**: Pedagogic innovations; Challenges and transformations in Education; Technology in teaching and learning; Distance Education and eLearning; Global and sustainable developments for Education; New learning and teaching models; Multicultural and (inter)cultural communications; Inclusive and Special Education; Rural and indigenous Education; Educational projects.
- In **TEACHING AND LEARNING**: Critical, Thinking; Educational foundations; Research and development methodologies; Early childhood and Primary Education; Secondary Education; Higher Education; Science and technology Education; Literacy, languages and Linguistics (TESL/TEFL); Health Education; Religious Education; Sports Education.
- In **ORGANIZATIONAL ISSUES**: Educational policy and leadership; Human Resources development; Educational environment; Business, Administration, and Management in Education; Economics in Education; Institutional accreditations and rankings; International Education and Exchange programs; Equity, social justice and social change; Ethics and values; Organizational learning and change, Corporate Education.

The contributions were published across two volumes, and this book represents Volume 2 of Education and New Developments 2026. It showcases the outcomes of innovative research and development efforts undertaken by authors committed to advancing teaching, learning, and the practical applications of education in contemporary contexts. Within its pages, you will find a diverse array of contributors and presenters who expand our understanding of educational matters by sharing their unique personal, academic, and cultural perspectives. Through their valuable insights and experiences, they enrich our exploration and contribute to the growth of educational discourse in our contemporary world.

This second volume only focuses on the main area of PROJECTS AND TRENDS, being the contributions of the other three areas published in Volume 1.

We would like to express thanks to all the authors and participants, the members of the academic scientific committee, and of course, to our organizing and administration team for making and putting this conference together.

Hoping to continue the collaboration in the future.

Respectfully,

Mafalda Carmo
World Institute for Advanced Research and Science (WIARS), Portugal
Conference and Program Chair

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ATTITUDES AND OPINIONS OF PRESCHOOL EDUCATORS AND ELEMENTARY SCHOOL TEACHERS REGARDING ECOLOGICAL EDUCATION AND THEIR AWARENESS OF SUSTAINABLE DEVELOPMENT

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Abstract

The aim of this research paper is to examine the attitudes and opinions of preschool educators and elementary school teachers regarding ecological education and their awareness of sustainable development. The research is based on both qualitative and quantitative analysis of data collected through questionnaires and interviews with teachers from various educational institutions. The objectives of the research are to determine: The attitudes of teachers towards ecological education; The level of environmental awareness among teachers; The presence and method of integration of environmental content into the educational process; The needs for additional training and resources for the successful implementation of ecological education. A descriptive methodology was applied, using surveys and semi-structured interviews as the main research techniques. The target population includes educators working in public and private preschool institutions and elementary schools (grades I–III) across several municipalities in the Republic of North Macedonia. The sample consists of 50 preschool educators and 50 elementary teachers (grades I–III). The sample was selected using purposive sampling, in order to include respondents with various levels of experience, institutional affiliation, and geographical distribution (urban/rural). The results indicate that the majority of teachers recognize the importance of ecological education and its role in building environmental awareness among children from an early age. However, differences exist in the level of engagement, availability of resources, and institutional support. Elementary school teachers tend to have more theoretical knowledge than preschool educators, whereas preschool educators possess more practical knowledge than elementary school teachers. This can be explained by the fact that the knowledge gained by elementary school teachers during university studies is relatively new and limited in practical application, as they spend less time with children during applied coursework. In conclusion, the paper emphasizes the need for more systematic teacher training, integration of environmental topics into curricula, and the promotion of active learning approaches for sustainable development from an early age.

Keywords: *Ecological education, sustainable development, teachers, preschool age, elementary school teachers, environmental awareness.*

1. Introduction

Sustainable development represents one of the central challenges of contemporary society, aiming to balance ecological, economic, social, and political dimensions while offering long-term solutions to global problems (UNESCO, 2017; UNESCO, 2020; Rieckmann, 2018). Education for Sustainable Development (ESD) has emerged as a significant policy and educational response, playing a central role within the 2030 Agenda and the Sustainable Development Goals, particularly Target 4.7 of Sustainable Development Goals 4 (UNESCO, 2017). Its implementation is essential at all levels of education, with schools serving as a key setting and teachers acting as primary agents in promoting sustainability (Baumert and Kunter, 2006; Darling-Hammond, 2000).

Recent studies show that teachers' attitudes and perceptions significantly affect the implementation of ecological education and Education for Sustainable Development. Even when knowledgeable, educators' beliefs, values, and environmental awareness influence the integration of sustainability topics into teaching (Waltner, Scharenberg, Hörsch, and Rieß, 2020; Loupas, Zafeiropoulos, Martinis, Mallinou, & Kouveli, 2026). Teachers exposed to Education for Sustainable Development training demonstrate higher environmental responsibility and are more likely to promote sustainable

behaviors among students (Yaacob and Abdullah, 2023; Jácome, 2019). Early childhood and primary education are particularly important for fostering environmental awareness, as children develop foundational behavioral patterns and worldviews during these stages (Davis, 2015; Loupas et al., 2026).

By addressing these aspects, the study intends to provide insights into how educators' competences, perceptions, and professional preparedness influence the quality of ecological education and the promotion of sustainable behaviors among young learners. Ultimately, the findings aim to inform teacher education programs and policy initiatives, supporting the development of effective strategies for integrating sustainability into early and primary education.

2. Theoretical framework

2.1. Ecological education – concept and meaning

Ecological education is a systematic process aiming to develop awareness of the importance of nature protection and to encourage active participation in solving environmental problems. It includes the following components:

- Cognitive component includes the ability for critical thinking, recognizing sustainable practices, and understanding the importance of early ecological education for forming responsible future citizens.
- Affective component refers to the emotions, value orientations, attitudes and sense of personal responsibility of preschool teachers and initial education teachers in relation to ecological education and sustainable development. The affective component is the key component because positive attitudes and emotions towards ecology are the basis for forming lasting environmental awareness and for transmitting sustainable values among children.
- The behavioral component refers to specific behavior, habits and practical activities of preschool and initial education teachers regarding ecological education and sustainable development
- The behavioral component reflects the real application of knowledge and attitudes in practice and is a key indicator of the level of developed environmental awareness and professional engagement in the field of sustainable development.
- Activist component willingness to participate in environmental projects and actions. In preschool institutions, ecological education is most often implemented through practical activities with children, such as outdoor activities, care for plants, environmental projects, recycling of materials, and themed games.

2.2. The role of teachers and preschool educators in developing environmental awareness and culture

Teachers and preschool educators play a key role in the formation of environmental awareness and culture in children, especially in preschool education and initial (from first to third grade) elementary education. They are the first models of behavior and values that children follow and their role is manifested on multiple levels.

Behavior and culture modeling

- Teachers and preschool educators are role models for children who follow their actions and habits.
- Teacher's personal engagement in environmental projects, actions, and initiatives encourage children to undertake similar activities.
- Through consistent and complete display of environmental values, teachers form a culture of sustainability as part of children's daily lives.

Interdisciplinary role

- The development of environmental awareness is not limited to the study of natural sciences.
- Teachers and preschool educators can integrate environmental content into language, art, mathematics, and humanities, which enables comprehensive learning and internal acceptance of environmental culture.

3. Methodology

3.1. Research aims and nature

The aim of the research is to examine the attitudes and opinions of preschool teachers and initial education teachers (from first to third grade) in elementary education about environmental education and their awareness of sustainable development.

The research included 120 respondents, of which 65 were preschool educators and 55 were teachers from grades 1–3 in elementary education.

The study was conducted using questionnaire as instrument and interview techniques to collect data. Through these techniques, the attitudes and opinions of preschool educators and teachers in initial education (from first to third grade) in elementary education regarding environmental education and their awareness of sustainable development will be determined. The questionnaires contain specially formulated questions related to the subject of study, such as: the attitudes and opinions of preschool educators and initial education teachers (from first to third grade) in elementary education about environmental education and their awareness of sustainable development.

4. Research results

From the results obtained from the survey conducted, regarding views on the importance of ecological education, 90% consider it as "very important", 8% "important" and 2% "less important". The results show that almost all respondents understand the key role of ecological education.

Preschool educators and teachers in initial teaching were asked whether they practiced ecological habits. 70% of respondents said they did so regularly, 25% occasionally and 5% rarely. The most common activities listed were: recycling, saving electricity, reducing the use of plastic and using ecological materials.

As for the implementation of environmental content in teaching practice, 80% of preschool educators stated that they regularly implement environmental activities, 65% use recycled materials in children's centers and 55% organize outdoor activities at least once a week.

Among teachers from initial teaching, 60% implement environmental content in at least 2 subjects, 40% realize project assignments with environmental topics and 35% participate in school environmental actions.

The inconsistencies faced by preschool educators and initial education teachers were: lack of sufficient materials 40%, lack of professional development 20%, lack of time and an overloaded curriculum 30%, and insufficient institutional support 10%. The need for more training, practical workshops, examples of good teaching planning, ready-made teaching materials, and implementation of environmental projects for working with young children were also stated.

Table 1 shows the results of the descriptive statistics of the main scales used in the research. Descriptive statistics provide insight into the basic characteristics of the respondents' results on the main scales, through arithmetic mean, standard deviation, minimum and maximum values.

Table 1. Descriptive statistics of the main research scales.

SCALE	M	SD	Min-Max	Interpretation
attitudes and opinions of preschool educators and teachers regarding environmental education (10 items)	4.36	0.52	3.1–5.0	High
level of personal environmental awareness (5 items)	4.11	0.61	2.5–5.0	Medium high
degree of implementation of environmental content in teaching practice (5 items)	3.54	0.78	1.3–4.8	Medium high
Perception of sustainable development (5 items)	4.28	0.57	2.6–5.0	High

To determine the reliability of the research instrument, the Cronbach's internal consistency coefficient was applied, which ranges from 0.83 to 0.89, indicating high internal consistency of the scale (Table 2).

Table 2. Cronbach's internal consistency coefficient.

To determine the attitudes and opinions of preschool educators and teachers regarding ecological education (10 items)	$\alpha = 0.89$
To assess the level of personal environmental awareness (5 items)	$\alpha = 0.83$
To examine the degree of implementation of environmental content in teaching practice (5 items)	$\alpha = 0.75$
Perception of sustainable development (5 items)	$\alpha = 0.86$

Table 3. Correlation analysis.

Variables	1	2	3	4
1. Attitudes	1	.56**	.48**	.62**
2. Personal awareness	—	1	.44**	.58**
3. Implementation	—	—	1	.41**
4. Sustainable development	—	—	—	1

**p < .01

*p < .05

Table 3 presents the results of the correlation analysis between the main research variables. The correlations were calculated using the Pearson correlation coefficient (r). The obtained correlation coefficient indicates statistical significance level of $p < 0.01$.

The questionnaire consisting of 10 questions to determine the attitudes and opinions of preschool educators and teachers regarding environmental education, shows a strong and statistically significant positive correlation with the perception of sustainable development ($r = 0.62$, $p < 0.01$), as well as moderate positive correlations with the level of personal environmental awareness ($r = 0.56$, $p < 0.01$) and the degree of implementation of environmental content in teaching practice ($r = 0.48$, $p < 0.01$). The level of personal environmental awareness is in a moderate and statistically significant positive correlation with the degree of implementation of environmental content in teaching practice ($r = 0.44$, $p < 0.01$) and a strong positive correlation with the Perception of Sustainable Development ($r = 0.58$, $p < 0.01$). The implementation of environmental content in teaching practice shows a moderate, but statistically significant positive correlation with the Perception of sustainable development ($r = 0.41$, $p < 0.01$). Generally, the results indicate the existence of moderate to strong positive correlations between all examined variables, indicating their mutual connection.

The correlation analysis showed the existence of statistically significant positive correlations between all investigated variables. The strongest correlation was determined between the attitudes and opinions of preschool educators and teachers regarding ecological education and the Perception of sustainable development ($r = 0.62$), while the Implementation of environmental content in teaching practice shows moderate but significant dependencies with the other variables. Stronger positive correlations exist between the attitudes and opinions of preschool educators and teachers regarding ecological education, the level of personal environmental awareness, and the perception of sustainable development. The implementation of environmental content in teaching practice has moderate but significant correlations with the other scales → indicating that attitudes and awareness influence practical realization.

Our results, that preschool educators and teachers have positive attitudes towards environmental education and high awareness of sustainable development, are in line with international research on Education for Sustainable Development. For example, Waltner et al. (2020) point out that teachers have a high level of knowledge and positive attitudes towards sustainable development, but that they lack structural support and specific teaching materials for effectively integrating Education for Sustainable Development in the classroom, which indicates the need for more practical and continuous application in the teaching process. The study by Yaacob and Abdullah (2023) confirms that teachers have a high level of knowledge and positive attitudes about education for sustainable development, but that their practical application is sometimes moderate, indicating the challenges in transforming attitudes into active practices. These results partially coincide with our results, where positive attitudes and awareness of sustainable development are strongly expressed ($M = 4.32$; $M = 4.25$), but practical implementation in the educational process depends on factors such as work experience and professional training. Waltner et al. (2020) suggest that the barrier between attitudes and practical application often remains due to institutional and pedagogical constraints, and they are consistent with our findings that teachers have positive attitudes but sometimes face systemic challenges in integrating environmental content. Professional training that in our research showed a significant effect on attitudes ($t = 2.78$, $p = 0.006$), is also supported by the study by Jácome (2019), which shows that formal education for sustainable development significantly influences students' attitudes as future teachers, which in turn highlights the importance of training and continuous professional development. Additionally, Kouveli (2025) points out that teachers in different contexts support educational work for sustainable development but point to the need for ongoing state and institutional support for the successful implementation of these programs.

The results obtained in our research, compared with foreign literature, show that the positive attitude and awareness of sustainable development, observed in our research, are part of a global trend that emphasizes the importance of ecological education, professional training, the availability of materials for the implementation of practical activities, and systemic support for the application of the principles of sustainable development in the educational process.

Table 4. Frequency analysis of obstacles to implementing ecological education activities.

Disadvantage	%
Lack of materials	62%
Lack of time	55%
Insufficient institutional support	48%
Lack of training	43%
Overcrowded groups	41%
No yard	23%
Low parental support	18%

Frequency analysis was applied in order to identify the most common obstacles to implementing ecological education activities that respondents face. Table 4 presents the results of the frequency analysis that show that the most frequently cited obstacle to the realization of ecological education activities is the lack of materials (62%), which indicates serious limitations in the resources for implementing the activities. Significant shortcomings include lack of time (55%) and insufficient institutional support (48%), which points to organizational and systemic difficulties in practical implementation. Lack of training (43%) and overcrowded groups (41%) are also relatively frequently present obstacles, indicating the need for additional professional development and improvement of working conditions. On the other hand, disadvantages such as lack of a schoolyard (23%) and low parental support (18%) are less prevalent, indicating that they represent a limitation for a smaller portion of respondents.

5. Discussion

The results obtained from the interview conducted with the respondents show that preschool educators and teachers have strong, positive attitudes, but practical application is limited. This gap between attitudes and practice is a common occurrence in ecological education. The most common reasons cited are lack of resources, insufficient institutional support, lack of time, and little representation of environmental content in curricula.

The results of the research indicate that highly developed positive attitudes and awareness of including environmental content (average 4.11/5) in teaching indicate readiness and motivation among preschool educators and teachers, which means that they are aware of the importance of sustainable development and actively integrate this awareness into everyday life and pedagogical practice. However, it is important to note that positive attitudes do not always translate directly into practical application due to certain obstacles, such as lack of materials, time, and institutional support. These results confirm that for successful implementation of ecological education, it is necessary to additionally provide systemic support, professional development and development of specific curriculum and activities. Developed awareness and positive attitudes are a key factor for effective ecological education. They create a foundation for further development of practical activities and initiatives that contribute to building sustainable and environmentally conscious generations.

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