

Commentary

# Education for sustainable development in art, science, technology, and the environment: Is there a methodological proposal for school and higher education?

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**CITATION**

Bernaschina D. Education for sustainable development in art, science, technology, and the environment: Is there a methodological proposal for school and higher education? *Sustainable Social Development*. 2024; 2(2): 2433.  
<https://doi.org/10.54517/ssd.v2i2.2433>  
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**ARTICLE INFO**

Received: 18 March 2024  
Accepted: 10 April 2024  
Available online: 22 April 2024

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**Abstract:** This article aims to examine the relationship between art, science, technology, and the environment to transform the vitality of developing methodological strategies through education for sustainable development. The main goal is to generate a greater importance of a new demand through the selective didactic proposal in different educational systems, both for school education and for higher education. The new methodological foundations for rethinking and reviewing the knowledge of educational research through documentary study and sustainability in the general educational system. This model of sustainable development in education—schooling and higher education—involves actions and activities based on the concept of sustainable development. There is a new search for different modalities and educational subjects for sustainable development. The new methodological orientation in both educational systems makes it possible to create teaching tools that address sustainability, tolerance, and self-care responsibility toward the future of climate change.

**Keywords:** school education; higher education; art; science; technology; environmental; sustainability; holistic approach

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## 1. Introduction

The sensitivity of the research has led many authors to consider nature as living beings and environmental communication, especially learning tools and teaching materials, taking into account that transforming sustainability education is related to holistic-philosophical theory, that is, creating new multidisciplinary knowledge for environmental culture, technology, biology, art, and science [1–6]. Education for Sustainable Development (ESD) is a learning approach to foster different attitudes and values, incorporating a sustainable and equitable future for all schools and higher education, depending on the educational system [7,8]. Also, there is a need in the ESD literature to include the holistic approach, since it represents multiple perspectives on the content of environmental, social, and economic factors, depending on the interrelationship between space and time [9–11]. However, it is possible to learn a new holistic approach to ESD. The great challenge facing our planet is quite urgent and very dramatic. According to the current definition of Global Goal No. 4 for Sustainable Development Goals (SDGs) [12], ESD is contemplating its goal of “ensuring inclusive and equitable quality education and promoting lifelong learning opportunities for all” [13]. Therefore, this global goal 4 for the SDGs requires a transformative approach to education that goes beyond literacy and sustainability. Not all emphasis should be on the quality of nature, but it envisions an inclusive education system that ensures equality of access for marginalized and impactful student groups. The idea of school and higher education underlies the competence of ESD for students through a series

of holistic, interdisciplinary content perspectives and democratic education strategies [9].

Most of the educational activities of human beings have altered the Earth's ecosystems in such a way that our very survival seems to be in danger due to new changes that are increasingly difficult to reverse. Instead, this means comprehensively addressing environmental, social, and economic problems before global warming increases to several dangerous levels and new climate change fins, deepening with eco-philosophy, such as the holistic approach and ethic systems. UNESCO's Education for Sustainable Development 2030 initiative aims to achieve the personal and social changes necessary to turn the new curriculum and teaching materials, especially the incorporation of students and teachers [14,15]. It becomes necessary to identify the abilities of "the weakest" to enhance his abilities within the class group; the consequent educational proposal will have to respond to the needs of pupils, taking into account the conditions of the extreme heterogeneity of the classes and aiming at the discovery of their bodies and their motor and communication skills to increase esteem and self-confidence [16,17]. It is difficult to judge the ESD in relation to the study of the holistic approach to the subject and the pluralistic approach to teaching in relation to the sustainability awareness of the students and, of course, the educational system [9]. The necessity arises to identify the strengths and abilities of those considered the most vulnerable within the class group. Subsequently, the educational proposal should cater to the diverse needs of students, taking into account the considerable heterogeneity within the classes. It is to explore and develop their physical, motor, and communication skills, fostering an environment that enhances self-esteem and confidence.

The main goal is to generate a greater importance of a new demand through the selective didactic proposal in different educational systems, both for school education and for higher education.

## **2. Materials and methods**

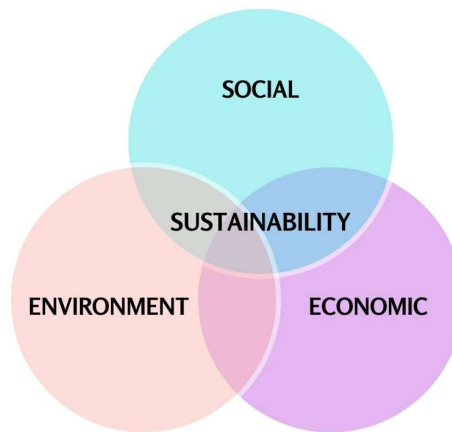
The systematic approach employs teaching materials development and adaptation, incorporating diverse and complementary subjects like bioart, environmental art technology, recycled art, and other related areas. This approach applies teacher training and educational practices across various levels of universal education.

The new methodological foundations to rethink and review the knowledge of educational research through documentary study and sustainability in the general educational system. Likewise, the research used in the literature study to deepen the various characteristics depending on the educational analyses, both for school education and for higher education, but not all sources were provided for different studies; also, some sources were collected, compared, and analyzed according to the SDGs of qualitative research. These initiatives seek institution-wide curricular change to recognize overlaps between ESD and other thematic agendas, such as interdisciplinary teaching and learning, graduate employability, and citizenship education [18].

### 3. Results

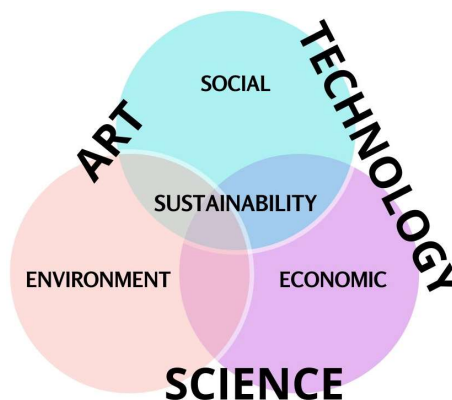
This model of sustainable development of education—schooling and higher education—involves actions and activities based on the concept of sustainable development. Therefore, this complexity of the SDGs system generates teaching quality and transversal educational learning through sustainable development along with activities based on art, science, technology, and the environment.

When discussing sustainable development, it is considered that sustainability has three dimensions: the environment, the economy, and society (**Figure 1**); therefore, the main idea revolves around achieving a good balance, expressed using other commonly used terms such as pillars, domains, aspects, and spheres [19]. Finally, several authors have discussed the three dimensions of sustainability to classify planetary (or ecological) integrity, transforming the other term into an environmental dimension [20,21].



**Figure 1.** Three dimensions of the original model [19].

This visual representation shows sustainability as three circles that intersect their three dimensions to intervene in the new concept related to the methodological proposal in different educational systems, depending on the level of student learning or the teaching of professional teachers. Next, there are several representations between art, science, technology, and the environment to transform the selective didactic proposal in different educational systems (**Figure 2**).



**Figure 2.** Additional three areas along with the three dimensions of the original model [19].

It is hard to analyze ESD based on the new meanings or the different educational branches together with the three long-term dimensions, or the major priority changes, that is, depending on the SDGs through educational modalities and subjects for sustainable development. Both figures are parts of the innovative proposal through a holistic approach and educational ethics, depending on the teaching role and its establishments/institutions within the contents of didactic material or different programs of the complementary subject.

#### 4. Discussion

There is a new search for different modalities and educational subjects for sustainable development. For example, some ESD keys are included in various educational subjects to optimize sustainable development and, of course, the improving use of didactic tools throughout the universal education system (Table 1).

**Table 1.** Keys of ESD about the methodological proposal for school and higher education.

Key	Description	Parameter based on SDGs
Artful awareness for sustainable development	Within the framework of ESD, a significant goal is to cultivate a nuanced understanding and appreciation for sustainable development issues through artistic expression. This encompasses themes such as climate change, biodiversity loss, poverty, and social inequality, aligning with UNESCO's SDGs.	(1), (2), (3), (5), (6), (7), (8), (9), (10), (11), (12), (13), (14), (15)
Holistic critical thinking	ESD encourages a holistic approach to critical thinking, urging learners to analyze intricate global challenges with depth and insight. This involves exploring the intricate interconnections between social, economic, and environmental factors within the realms of art, science, and technology, in line with UNESCO's SDGs.	(1), (5), (6), (7), (8), (9), (10), (11), (12), (13), (14), (15), (16), (17)
Interdisciplinary fusion for comprehensive solutions	ESD champions interdisciplinary approaches that seamlessly integrate insights and perspectives from various disciplines, including art, science, technology, and environmental studies. This approach is essential for developing comprehensive and sustainable solutions in alignment with UNESCO's SDGs.	All, and except of (4)
Artistic civic engagement for positive impact	ESD seeks to empower individuals through artistic expression, enabling active civic engagement in communities. By merging art and science, individuals can contribute meaningfully to positive social and environmental change, aligning with UNESCO's SDGs.	All, and except of (4)
Ethical foundations in art, science, and environment	ESD places a strong emphasis on ethical values, including social responsibility and environmental stewardship, instilling a sense of duty toward present and future generations. This ethical framework is integral to UNESCO's SDGs.	(1), (3), (5), (6), (7), (8), (9), (10), (11), (12), (13), (14), (17)
Integrated skills development for sustainability	ESD focuses on cultivating practical skills within the intersection of art, science, and technology. This includes critical thinking, problem-solving, collaboration, and communication skills, all crucial for addressing sustainability challenges in alignment with UNESCO's SDGs.	All, and except of (4)
Artful promotion of sustainable lifestyles and choices:	Through the integration of art, science, and environmental ethics, ESD encourages individuals to adopt sustainable behaviors and lifestyles. This involves considering the environmental, social, and economic impacts of their choices, contributing to the realization of UNESCO's SDGs.	All, and except of (4)

Note: SDGs do not correspond to the listing of 17 goals with their targets and indicators about the key and the description: (1) = No poverty; (2) = Zero hunger; (3) = Good health and well-being; (4) = Quality education; (5) = Gender equality; (6) = Clean water and sanitation; (7) = Affordable and clean energy; (8) = Decent work and economic growth; (9) = Industry, Innovation and Infrastructure; (10) = Reduced inequality; (11) = Sustainable cities and communities; (12) = Responsible consumption and production; (13) = Climate action; (14) = Life below water; (15) = Life on land; (16) = Peace, justice and strong institutions; (17) = Partnership for the goals [7,8,12].

However, some points to contextualize the preparatory skills, as well as this table, incorporate the objective (SDG 4) associated with ESD into several goals for 2030. It is not easy to create a new methodological proposal for students, depending on the educational system of school and higher education. Through the creation of inclusive

teachings in various branches or didactic knowledge towards the future of the SDGs, it is possible to propose free, equitable, and sustainable quality education to produce and motivate independent and relevant learning. It is possible to ensure that the entire educational system, of course, including school and higher education students, have various personalized access—similar to the Finnish educational system—for teaching.

The question is not so much whether these are the key concepts; rather, they provide a starting point for developing interpretations within the disciplines of environmental, functional, cultural, and critical literacy [22]. However, the current situation of equal access through sustainable culture in the universal educational system to transform art, environmental, technological literacy, and scientific/experimental study, depending on school and higher education, and including education in general. Not all the skills necessary to access the educational project and teaching work are limited to specific levels, but all levels of teaching and vocational training are for vulnerable people, including people with disabilities, sexual orientations (or diversity), women, indigenous peoples, and economically disadvantaged people. This inclusion is not achieved through social reinforcement integrated into the methodological proposals of various educational areas for sustainable development.

## **5. Conclusion**

There is no search for holism in complementary education for sustainable development within the educational system. The new methodological orientation in both educational systems makes it possible to create teaching tools that address sustainability, tolerance, and self-care responsibility toward the future of climate change. With this complexity of the educational interaction of the SDGs, it is essential to analyze the alternative quality, that is, the educational practice is connected with the role of teaching to facilitate student learning, of course, the study plan on the knowledge of various disciplines, classroom management and guidance to solve problems and sustainable development, and of course, professional ethics within the universal educational system.

It is relevant to value teaching motivation and the connection between environmental culture, technology, biology, art, and science with the didactic tools used. It is not always possible to determine new criteria for different knowledge (or new concepts) in school and higher education to enrich students at various levels of learning.

Finally, to highlight the new debate through UNESCO's SDGs that prevents educational work through the set of creative-experimental practices that relate art, science, technology, and, of course, the crisis of climate change to support the environment. On the other hand, our methodology aims to use new teaching instruments to improve literacy and sustainability for school and higher education within ESD.

**Conflict of interest:** The author declares no conflict of interest.

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