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Sustainable Future through Education: How Green Skills Could Improve the Professional Development of the Next Generation

Laurențiu – Gabriel DINCĂ[1], Iliana CARAGEA[2] and Emanuelle PERȚA[3]

[1,2,3]Faculty of Cybernetics, Statistics and Economic Informatics, Bucharest University of Economic Studies, Romania

E-mail: laurentiu.dinca@stud.ase.ro

Abstract. The integration of green skills in the educational sector has become an essential activity to ensure both a sustainable future and improved professional development opportunities. This paper aims to explore the role of education in training the future generation with the necessary level of acknowledgement and competencies necessary to thrive in a greener environment. Several case studies have been conducted around the world in different institutions, both public and private entities and addressed the key challenges encountered in the process of encapsulating the necessary activities in the educational curriculum. To conclude, the research cultivate environmental, economic, and social issues of tomorrow.
Keywords: *green skills, sustainability, education, employment opportunities*

1. Introduction

The European Union has policy objectives aims for a climate-neutral world. Hence, its wishes to take a lead role in the world on the green and digital transition to spearhead economy based decarbonization. The European Green Deal is seen as a strategy that encapsulates policies on environment, economy and industry. Decarbonization is the desire and ambition to accomplish a climate-neutral Europe by 2050 with a modernized and efficient industry. Developing national education systems serves the purpose of protecting democracy and democratic values and at the same time enhances social justice and equitable growth. Lifelong education is crucial in achieving effective and sustainable transition to the new order by providing people with relevant skills. Education policies on the other hand should ensure that all educational policies for all levels addresses issues on climate change and environmental education as well as basic education and continuing education in a lifelong perspective. [1][2][3]

The COVID-19 pandemic showed the importance of integrating information and communication technologies (ICT) in education and training. Moreover, it accelerated some trends already present beforehand, for example, a rising interest and usage of online learning for all. The Planetary Boundaries (PB) provide a structure for assessing the threats to the planet, including limits for climate change, ozone depletion, acidification of oceans, changes in land systems, water consumption, pollution from chemicals, loading of atmospheric aerosols, and depletion of biodiversity. Taking into

consideration the challenges issued by PB, it to propose a radical worldwide education campaign that aids education policy-makers, planners, and institutions in reshaping education and learning systems. Key points of intervention should include an evidence base for educational priorities (unconditional measures), capacity development for curriculum reform and co-design of PB-relevant teaching resources and ICT-based learning tools (conditional measures), and networking and global coordination. [4][5][6]

The world's youth will play a crucial role in the twenty-first century, inheriting the planet's human rights, resources, and environmental legacies. However, education systems will need to change significantly if young people are to be equipped to act meaningfully on the challenges posed by PB. Tailored educational responses on PB across the education systems are required, with education policies and strategies integrated into programs of change alongside partners from health, climate, and environment sectors. PB-relevant education should constitute dedication to a minimum level of academic effort across basic education, general and vocational upper secondary education, and the higher education sector.

2. The Importance of Green Skills in a Sustainable Future

2.1. Definition and Scope of Green Skills

Green skills can be broadly defined as "the knowledge, abilities, values, and attitudes needed to live in, develop, and support a society that reduces the environmental impact of human activities" [13]. These skills are often tied to industries that are crucial in the transition to net-zero emissions, including power, home heating, waste, and resources. They encompass practical skills, such as heat pump installation, as well as attitudes and awareness of systems thinking and environmental stewardship.

Green skills consist of a range of capabilities needed to promote environmental sustainability. These abilities include more than just technical knowledge, but also soft skills like problem-solving, innovation, and leadership. It is essential to integrate environmental skills across all educational disciplines to address climate change, protect biodiversity, and encourage sustainable economic practices [8].

Education in sustainability is essential in preparing individuals to tackle urgent environmental and social issues, by providing them with the necessary knowledge, skills, and values for a more sustainable future [7]. This form of education promotes a change in mindset, resulting in a deeper grasp of the interrelation between people and the environment, along with a duty to build a fairer society for both nature and society.

2.2. Relevance of Green Skills to Sustainable Development Goals

Green skills help in achieving sustainability-related goals of the United Nations namely the fifth and the fourth objective. Green skills help an educational system in attaining knowledge and necessary abilities enabling people to engage in sustainable economic sectors and activities which would further advance the promotion of a green economy workforce [8].

Green skills are essential in attaining Sustainable Development Goals (SDGs), specifically SDG 13 (Climate Action) and SDG 7 (Affordable and Clean Energy). Green skills play a crucial role in climate mitigation efforts and the promotion of sustainable practices that align with the SDGs by providing individuals with the technical and interpersonal abilities required for sectors like renewable energy and waste management [13].

3. The Importance of Green Skills in a Sustainable Future

3.1. Definition and Scope of Green Skills

STEM education plays a vital role in incorporating sustainability into the curriculum. STEM education can provide students with the necessary tools to address intricate sustainability challenges by encouraging innovation, creativity, scientific thinking, and problem-solving skills. Moreover, STEM

education ought to foster students' sustainability mindsets, equipping them to deal with the multidisciplinary aspect of sustainable development and aid in enhancing the well-being of current and upcoming generations [15].

It is vital to integrate green skills across the entire curriculum, especially in the subject areas of Design and Technology. Such subjects provide learners with the chance to devise cleaner alternatives and in so doing, address sustainability issues. The Malaysian education system has started the introduction of green skills in the secondary school curriculum in the hope of fostering lasting changes at a tender age [9].

Since 2018 it has been observed the need of integrating such skills in the educational framework, thus we may exemplify the application of the Fuzzy Delphi Method in determining the vital components of green skills to be integrated into high school curricula [12]. The components consist of eco consciousness, environmentally friendly techniques, science, technology, engineering, math abilities, and business acumen. These skills are in line with the objectives of developing a workforce ready to participate in sustainable practices and come up with innovative solutions to environmental challenges. The process of obtaining expert agreement guarantees that the identified elements are important and ranked accordingly for designing curriculum.

3.2. Teacher Training and Capacity Building

Teachers have a crucial impact on molding the attitudes and actions of the future generation. In order to successfully provide sustainable education, teachers need to acquire a range of skills, such as recognizing the causes of unsustainable behaviors and fostering critical thinking and independent reflection in their students. Sustainable education involves empowering students through interdisciplinary learning methods that tackle the economic, social, and environmental aspects of formal and informal curricula, helping them become effective changemakers in their communities [14].

Teacher education is crucial in developing environmental skills. Having a skilled teaching workforce is essential for incorporating green skills into the curriculum. Malaysia's emphasis on technical and vocational education underscores the importance of ongoing professional growth to improve teachers' abilities in teaching green skills efficiently [10].

Nevertheless, it is also highlighted the importance of providing teacher training to incorporate green skills into the education system [13]. The UK's plan for sustainability and climate change emphasizes the importance of educating teachers to effectively provide green skills training. Professional development programs and ongoing learning workshops can assist teachers in incorporating climate literacy and sustainability topics into their teaching approaches.

4. The Importance of Green Skills in a Sustainable Future

4.1. Successful Implementation of Green Skills in Education Programs

Australia signed the Green Skills Agreement, which has incorporated green skills into the TVET programs. Focus on such initiatives is placed at building human capital that is necessary for sustainable development within the construction, energy, and manufacturing sectors [8].

Countries like Kenya and Mexico are addressing this challenge by equipping students with green skills through innovative projects. In Kenya, for example, students developed gardening solutions to tackle food poverty, integrating sustainability practices into their daily education. Similarly, in Mexico, a project called “Drops of Hope” was developed by students to combat water scarcity through innovative water management [11].

5. Challenges and opportunities

5.1. Barriers to Integrating Green Skills in Education Systems

The lack of teacher training and awareness is a significant barrier to effectively integrating green skills. Many educators are not sufficiently equipped to teach environmental issues, which limits students' exposure to green skills. Moreover, insufficient public awareness and media engagement exacerbate the challenges [9].

The lack of harmony between climate policies and education systems is a major challenge. Education and skills training are frequently overlooked in climate policies, with only a small fraction of climate finance going towards education, hindering the preparation of youth for green jobs. Moreover, green jobs are not well understood, leading to a lack of awareness, and many young individuals feel ill-equipped to pursue them because of inadequate skills and limited information about career opportunities [11].

Several papers underlined the necessity for a definitive agreement among experts regarding which green skills should be given priority in educational programs. Although the Fuzzy Delphi Method is useful [12], the absence of uniform guidelines for incorporating these components into different educational systems still hinders progress. The research also underscores the challenges of incorporating green skills into current secondary education subjects.

6. Conclusion and future work

The objective of integrating green skills into the educational framework is a relatively new, but critical area which needs to be further explored, especially in the academic and professional context. As the world, as we know, faces increasingly urgent environmental challenges, it is necessary to prepare the next generation with the required level of knowledge regarding a sustainable future. While the current paper highlights the importance of incorporating green skills in the educational sector and aims to identify the potential socio-professional pathway, there has remained a significant gap in terms of empirical evidence in order to fully understand the long-term impact of these initiatives.

To properly assess this, it is essential to conduct quantitative research within our own university, with a focus on how the integration of green skills in the curriculum of different specialties will affect the level of acknowledgement for the students. Such research should address key metrics, such as employability, level of involvement in volunteering activities or innovation capacity. By gathering data on these factors, we can provide a foundation for evidence-based recommendations that could shape not only our institution’s approach, but also serve as a model for other institutions.

These findings will be transcribed into future academic papers, contributing to the broader discourse on sustainable education. Through continuous investigation and institutional collaboration, we can help ensure that education evolves to meet the demands of a rapidly changing world, and that green skills become central to professional development for the next generation.

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