

Education for Sustainable Economy: Review of Literature for Future Direction

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Abstract

Imagine a world where every classroom is a Launchpad for a greener future, where students are not just learning about the world but are equipped to reshape it. Welcome to the era of Education for a Sustainable Economy a transformative approach that blends learning with actionable impact. This study discusses the role education plays in sustaining the economy. Education for a sustainable economy focuses on equipping individuals with the knowledge, skills, and values necessary to support and advance economic practices that are environmentally sustainable, socially equitable, and economically viable. This study discusses education for a sustainable economy and stresses its significance in building a more sustainable future. It also examines the concept of sustainability, the three pillars of sustainability, and the components of education for a sustainable economy, the role of education in a sustainable economy and the challenges of education for a sustainable economy. The paper suggests that the National Universities Commission should propose the inclusion of place-based learning, where sustainability education is contextualized within local environments, making it more relevant and engaging for students.

Keywords: Education, Economy, Sustainable Economy

Introduction

The unhealthy use of natural resources has led to escalating planetary crises such as the climate change, biodiversity loss to profound social inequalities among others. This has led to discourse among practitioners on various ways to attain human development without destroying the ecosystem. There is a clamor call on paradigm shift from traditional educational structure to more flexible knowledge-driven educational system that enhance sustainable development. The role of education becomes a corner stone for the attainment of sustainable development. Education in this context is not merely the transmitter of knowledge but as a catalyst for fostering a sustainable and just future. Reengineering education as a lifelong process that develops the competencies such as critical thinking, system thinking, collaboration, and self-awareness that are necessary to navigate and address complex sustainable challenges (Kjellgren & Richter, 2021; Mohanty et al., 2024; Firescu, 2025).

This is also encapsulated in Education for Sustainable Development (ESD), a holistic and transformative learning process that empower learners to make informed decisions and take responsible actions for environmental integrity, economic viability, and equitable society for present future and generations (UNESCO 2020). Education when linked with sustainability depicts not only merely acquisition of knowledge and information but expanded knowledge

remit that emphasise learning that is interdisciplinary, participatory and aligned with global sustainable agendas (UNESCO Digital Library).

Sustainability development is a balance process of achieving the three interdependent pillars: environment, society and the economy as articulated in the Brundtland Commission's definition of 'meeting the needs of the present without compromising the ability of future generations to meet their own needs' (Werkheiser & Piso, 2015). Education for sustainable development has been on the front burner since its inception in the 1990s. It is imperative to mention that sustainability and education nexus grew with the adoption of the United Nations' 2030 Agenda and its sustainable development goals, target 4.7 specifically charging educational system to deliver knowledge, skills and values of sustainable development, peace, human rights and global citizenship. Thus, making ESD an explicit objective of international policy and a corner-stone for higher educational institutions, seeking to align curricula, research and campus operations with sustainable development goals.

It is in the realization of these, that there is an urgent call for a transition towards a sustainable economy- an economy system that delivers on the social needs of all within the ecological boundaries of the planet (Goodland et al., 1993). Central to this transformation is education, which must be realigned from its traditional functions of producing human capital for industrial growth to a transformative process that equips learners with the values, skills and knowledge to conceive, critique, and build this new economy (Baker, 2009; Hamed et al., 2024). Education for a sustainable economy, therefore, is not merely vocational training for 'green jobs'. It is a critical interdisciplinary and transformative learning process that fosters systems thinking, ecological literacy, ethical reasoning, and civic agency, enabling citizens to participate in and drive this economic transition (Shutaleva, 2023).

Moreover, scholars have advocated for the integration of sustainable principles into business, economics, and engineering curricula, leading to the development of a framework like Responsible Management Education (RME) and sustainable engineering (Abdelgaffar, 2021). Another significant trend is the shift from theoretical advocacy to practical implementation. This includes the proliferation of interdisciplinary programmes focused on sustainable business, social entrepreneurship, and curricula economy design. There is also a growing emphasis on experimental and action-oriented pedagogies such as project-based learning and sustainable enterprises, and sustainable transitions simulations-that allow students to grapple with real world complexity. This debate raises a profound question about the purpose of education. Is it to produce competent professionals for a slightly greener market, or to cultivate critical citizens who can question and redesign the economic system itself?

It is against this backdrop that this study intends to discuss education for sustainable development, reviewing literature for future direction. Specifically, the study outlines a coherent agenda for its future development by identifying key directions, gaps, and challenges. It seeks to provide scholars, practitioners and policy makers with a road-map for strengthening ESD as a pivotal force in shaping a sustainable future. And in so doing contribute to repository of knowledge on ESD. To achieve this, the study will rely on secondary data basically of available literature, textbooks, journals and online materials. Thus the paper is structured immediately after introduction, clarification of concepts, components of education for sustainable economy, the role of education in sustainable economy, importance of education for a sustainable economy, implementing education for sustainable economy, challenges and the way forward.

Results and Discussion

The Concept of Sustainability is based on Three Pillars

Environmental Sustainability

It entails utilizing resources in a way that preserves ecological balance and reduces environmental degradation. In industrialized and developing economies alike, maintaining a healthy environment has emerged as a critical issue for safeguarding biodiversity, guaranteeing energy stability and reducing environmental degradation. Reducing carbon dioxide (CO₂) and greenhouse gas (GHG) emissions is one way to do it. However, it has also been shown that these emissions play a significant role in raising the global level of environmental deterioration and bringing the world dangerously close to natural disasters. Consequently, this phenomenon suggests that environmental sustainability is necessary, and may necessitate the use of clean and efficient energy sources (Ashraf et al., 2024). The current economic system is based on a model of growth and consumption that is unsustainable in the long term. The pursuit of economic growth at all costs has led to environmental degradation, resource depletion and social inequality. Climate change, in particular, poses a significant threat to the planet and its inhabitants. The Intergovernmental Panel on Climate Change (IPCC) warns that global warming must be limited to 1.5°C above pre-industrial levels to avoid catastrophic consequences.

Social Sustainability

This is concerned with promoting social justice, human rights and inclusive economic development. While it is true that social values supporting sustainable development should prioritize equity, inclusiveness and justice, therefore opine an increasing body of evidence indicates that these values should also take into account the natural environment and how humans are connected to it. Further findings suggest that sustainable development would be extremely difficult, if not impossible, to achieve as long as over-consumptive attitudes and rampant individualism continue to dictate society's values and patterns of behaviour (Leal-Filho et al., 2022).

Economic Sustainability

This has to do with economic growth and development while minimizing waste and pollution. Economic growth and environmental sustainability are sometimes seen as competing objectives, particularly in developing nations where managing natural resources, while seeking economic growth, presents serious difficulties (Utomo et al., 2024). Economic sustainability encapsulates a wide range of corporate strategies and decision-making guidelines intended to achieve economic growth without enacting the detrimental environmental trade-offs that traditionally go hand in hand with expansion. Sustainable development aims to establish functional systems that gradually deplete natural capital, which is another name for natural resources so that the resources are still available for use by future generations (Ekins et al., 2003).

A fascinating new discipline called "Sustainability Education," or education for sustainable development combines a variety of educational approaches to encourage an awareness of the relationships between the environment, the economy and society. Sustainability education is a concept that is still developing but its main objective is to use education to promote civic involvement and environmental literacy, which will equip students for careers that will help create a more sustainable and fair future. Education for a sustainable economy means incorporating important concerns related to sustainable development such as biodiversity,

disaster risk reduction, climate change, poverty reduction, and sustainable consumption into teaching and learning (UNESCO, 2014).

Additionally, it calls for interactive teaching and learning strategies that inspire and enable students to alter their behaviour and take up sustainable development-related tasks. As a result, education for sustainable development fosters skills like creativity and critical thinking, seeing the future and group decision-making. It necessitates profound adjustments to the way education is currently and frequently provided (UNESCO, 2014). The U.S. Partnership for Education for Sustainable Development defines education for sustainability as a set of learning outcomes, learning methods and content that assists students in gaining a foundational understanding of the environment, economy and society. Additionally, it assists them in gaining perspectives, values and skills that direct and inspire them to pursue sustainable livelihoods, engage in democratic society and live sustainably.

According to the U.S. Partnership for Education for Sustainable Development, three core standards shape sustainability education. They are as follows: (1) Students must understand sustainability as a situation that is linked to ecological, economic and social systems. To make wise judgments in the future, students need to comprehend how social, environmental and economic elements interact. Science Technology Engineering Mathematics STEM, education that is multidisciplinary is in a unique position to foster these connections and raise student comprehension and engagement levels. Teachers can use STEM education strategies to help pupils understand how systems are interrelated. In the classroom, students could study light bulbs and their operation while also talking about energy saving and its scientific basis.

Outside of the classroom, students talk about the value of plants to both humans and animals while also learning about how they grow; (2) To acquire the knowledge, abilities and attitudes required to consistently enhance the health and well-being of both the current and future generations, students must adopt a multidisciplinary approach. In addition to teaching information, sustainability education aims to equip students with the skills necessary to handle problems in the real world. Fortunately, teachers may apply a range of STEM methods to link sustainability knowledge to inquiry and action. For example, project-based learning encourages students to work on lengthy, practical projects that require them to use knowledge from several fields to solve complicated problems; (3) The fundamental ideas and practices of sustainability must be understood and used by students. Teachers must give pupils a fundamental concept of sustainability for sustainability education to be effective. Sustainability was described as "meeting the needs of the present without compromising the ability of future generations to meet their own needs" in the Brundtland Commission's Report of the World Commission on Environment and Development which was published in 1998 (SOU, 2021).

Key Components of Education for a Sustainable Economy

What does education for a sustainable economy look like in practice? Some key components include:

Integrating Sustainability into Curriculum

This method encourages creativity, teamwork and critical thinking while enabling students to investigate issues from multiple angles or multidisciplinary education. Sustainability issues frequently cut across academic fields and a great influence on the development of higher educational institutions globally. Key stakeholders include manufacturing firms of all stripes, who depend on universities to meet their workforce demand for qualified personnel.

Universities are also expected by society to educate our children and support their personal growth by reaching a saturation point for both intellectual and scientific knowledge. In all these goals, colleges are working to create sustainability curricula to raise awareness of sustainability issues and give undergraduates a toolset that will give them an advantage over other candidates in the labour market. Only by using a trans disciplinary approach would it be able to develop such a program (Tasdemir & Gazo, 2020).

Green Skills Training

This provide students with practical skills in areas like renewable energy, sustainable agriculture and eco-friendly technologies. The world's need for green skills is increasing as it moves toward a more sustainable economic model. The green transformation is expected to provide 8.4 million jobs for young people by 2030. An estimated 1.4 new employment will be produced for every green job, according to a spiraling projection. But by 2030, it is predicted that 60% of youth worldwide will be unprepared with the skills needed to succeed in the green economy. For this reason, "Green Skills for Youth: Towards a Sustainable World" is a particularly significant theme for this year's International Youth Day. The theme serves as a wake-up call for policymakers, other development stakeholders and young people in general, particularly in Ghana, where 83.4 per cent of youth between the ages of 15 and 24 are believed to lack digital skills. Now is the perfect time to raise awareness among young people and provide them with the green skills they need to survive in this evolving climate (Senu, 2023).

Economic Literacy

Economic literacy is key to sustainable development. Teaching students about the economic benefits and consequences of sustainable practices should be encouraged. Every country's ability to grow and flourish depends heavily on its economy. It has a significant impact on how a nation's natural and human resources develop. An individual can make better decisions if he has a solid understanding of economics. For example, an entrepreneur who understands economics will undoubtedly make more profitable and logical business decisions than his counterpart who does not (Oleabhiele & Ede, 2018)

Climate Change Education

When it comes to giving present and future generations the comprehensive information and abilities they need to tackle climate-related issues locally, nationally and worldwide, education is an essential part of the fight against climate change. For students to play the role of future earth stewards, they must have a thorough awareness of the sources of climate change and the mitigation strategies for it (Kumar et al., 2023). To do this, schools in Nigeria and other countries will need to revive the dwindling interest in STEM (science, technology, engineering, and mathematics) education. This is because STEM skills are essential for creating practical mitigation measures for climate change.

Role of Education in Sustainable Economy

One of the most important instruments for sustainable economic growth is education. Sustainable economic development cannot be attained by any country without investing in its human capital. More than ever, society is being advanced by higher quality education and the innovations and technologies that go along with it. Even so, a lot of emerging nations struggle to keep up with the rapid pace of development, leading to challenges in raising GDP and catering for the needs of the most underprivileged segments of their society. Inadequate education, particularly in developing nations, has been held accountable for the overall lack of

progress (Abanyam et al., 2020). Education plays a crucial role in developing a sustainable economy by:

Raising Awareness

Educating individuals about the importance of sustainability and the impact of their economic choices. The idea of sustainable development has long been part of political discourse and achieving it has grown in importance on a global scale. Success in this area depends not only on wise government policies but also on society's engagement. A variety of direct and indirect tools are available to encourage and reinforce positive changes in social attitudes with awareness campaigns being one of the most crucial (Borawska, 2017).

Developing Skills

This has to do with providing the skills needed to create, manage and participate in sustainable economic systems. Our future depends on skills, and developing skills is critical to creating stronger communities and sustainable growth. A skilled labor force is required to fuel the expansion of the private sector which will create jobs and prosperity for citizens across the nation. Additionally, a robust system of further education and skills development is essential to social mobility, reopening doors for people to succeed in the workforce, gain confidence through accomplishment and participate fully in civil society (GOV.UK, 2024).

Fostering Innovation

Encouraging innovative solutions that address economic, environmental and social challenges is necessary. Innovation plays a critical role in environmental sustainability by integrating environmentally friendly practices into production processes and encouraging a more comprehensive and sustainable approach to innovation. Eco-innovation which encompasses technological, organizational, social and system innovations, significantly advances sustainable development by minimizing the environmental impact of production while maximizing the potential for economic growth.

Importance of Education for a Sustainable Economy

Why is Education for a Sustainable Economy Important? The importance of education for a sustainable economy cannot be overstated. Here are just a few reasons:

Economic Growth

One of the main factors influencing economic growth, employment and wages is education. Education for a sustainable economy contributes to economic growth by developing the skills and knowledge needed for sustainable industries and entrepreneurship. Ignoring the economic aspect of education would jeopardize the prosperity of coming generations and have far-reaching effects on social exclusion, poverty and the viability of social security systems (Grant, 2017). For every US\$1 spent on education, as much as US\$10 to US\$15 can be generated in economic growth (UNESCO 2012). Education is about more than just how many people have completed their elementary, secondary or postsecondary education—it is also about how important that education is. For instance, Hanushek and Kimko (2000) discovered that it is not just years of education but the quality of education that has a strong correlation with economic growth.

Long-Term Viability

A project is economically viable if the economic benefits of the project exceed its economic costs when analyzed for society as a whole. The economic costs of the project are not the same as its financial costs externalities and environmental impacts should be considered. Externalities (positive or negative) are economic impacts that affect persons not necessarily part of the project scope (WORLD-BANK, 2024). A sustainable economy focuses on balancing environmental health, social equity and economic prosperity. Education helps people understand how to manage resources wisely, reduce waste and implement practices that protect the environment while fostering economic growth.

Informed Decision-Making

One of the primary cognitive functions of humans is decision-making which plays a crucial role in formal education. Many of the decisions we make in our daily lives are instinctive. These choices are frequently made in a hasty, unthinking and post-hoc deliberate thought. The decision requires a lot of thought and is consequently rather informed. Here, "decision-making" refers to the logical process that results in the choice of a preferred option or plan of action from a variety of possibilities that are evaluated according to predetermined standards (Garrecht et al., 2018). Knowledge about sustainable practices equips individuals and businesses to make informed decisions that align with long-term goals rather than short-term gains. This includes understanding the impact of their choices on the planet and society.

Innovation and Skills Development

The greatest significant change that education can bring about is probably in the way we think, behave and carry out our duties to the environment and one another. Education equips people with the knowledge and abilities needed to succeed in the new sustainable economy, whether they want to work in smart agriculture, renewable energy, forest rehabilitation, resource-efficient city planning or the prudent management of robust ecosystems. Educating people about sustainability drives innovation by encouraging the development of new technologies and solutions that address environmental and social challenges. It also prepares the workforce with the skills needed for emerging green industries and jobs.

Policy and Advocacy

The continued effects of climate change on environmental sustainability in different parts of the world are a serious issue as they may have an impact on social and economic sustainability as well. The United Nations has endorsed suitable education policies for sustainability which are promoted by educational institutions worldwide to support sustainable development in the coming generation (Artie, 2019). An informed population is better positioned to advocate for and support policies that promote sustainability. Education fosters awareness about the importance of regulations and initiatives aimed at creating a sustainable economy.

Implementing Education for a Sustainable Economy

Implementing education for a sustainable economy requires a multifaceted approach that involves various stakeholders, including governments, educational institutions, teachers, and communities.

Government Support

Governments play a crucial role in implementing education for a sustainable economy by: (1) Developing Policies, Developing policies and frameworks support sustainability education. Government policies are essential in fostering economic expansion and forming the society of

the future. It is critical to establish specific goals and track results to assess the effectiveness of policy interventions. Governments run the risk of adopting a short-term approach to policymaking, concentrating on producing results quickly at the expense of significant outcomes that can only be realized through longer-term policy initiatives (Jacobs, 2008); (2) Providing Funding: The core of the educational crisis in many nations worldwide is funding. In Nigeria, there seems to be an ongoing funding crisis as well as a lack of clear structures and strategies for funding education. The Nigerian government's overall vision was to place Nigeria among the world's top twenty economies by 2020. In the light of the economic revolution brought about by the rapid advancements in information and communication technology (ICT), it is evident that any nation that wishes to be taken seriously on the international stage must have exceptionally advanced educational systems (Leach , 2008); (3) Setting standards for sustainability education: The government should, in practice, establish participatory frameworks to guarantee greater public involvement in urban planning, public campaigns as well collaborate with all levels of government to design strategies for promoting education for a sustainable economy (Sarabdeen, 2024).

Educational Institutions

Educational institutions can implement education for a sustainable economy by:

Integrating Sustainability Principles into Curriculum

Integrating education sustainability principles into all subjects and levels of education. The curriculum should be developed with the sustainability competencies and the Education for Sustainable Economy competencies in mind. These encompass a complex and integrated set of knowledge, procedures, attitudes and values that people use in various contexts to solve real-world problems from an economic, social and environmental standpoint (Fuertes-Camacho et al., 2019).

Providing Green Skills Training

Providing students with practical skills in areas like renewable energy, sustainable agriculture and eco-friendly technologies. One cannot stress the value of green skills for students. With problems like pollution, deforestation and climate change plaguing our world, we must teach future generations and equip them with tools or skills to take care of the environment. Environmental education plays a critical part in promoting sustainable lifestyles, prudent decision-making, and an understanding of natural systems (Eco-media, 2023).

Encouraging Research

Sustainability research has not developed into a commonly accepted collection of research questions, operational definitions and processes, or a research paradigm, despite a long-standing interest in program sustainability challenges. A cohesive framework would facilitate the assimilation of data from this heterogeneous array of investigations into robust research conclusions and suggestions for public health, thus advancing the endeavour to establish a more comprehensive field of global sustainability science. When there is a lack of guidelines about the study and assessment of program sustainability, individual studies often have to create their definitions, lists of variables and procedures for gathering and analyzing data (Scheirer & Dearing, 2011). Therefore, research on sustainability issues and solutions should be encouraged.

Teacher Training

Teachers play a critical role in implementing education for a sustainable economy. They require training and support to effectively integrate sustainability principles into their teaching. To effect social change, future educators must obtain sustainability competencies as well as education competencies for sustainable development. The curriculum must incorporate sustainability. Since skilled teachers are essential for high-quality education, teachers must be empowered and hold professional qualifications. They must have the required initial training and be furnished with practical and successful methodological techniques. Without a doubt, to recognize potential obstacles, hazards and effects, today's professionals need to be able to comprehend how their work interacts with society and the environment on a local and global scale. Thus, it is essential to integrate sustainability competencies into the teaching profession by creating education for sustainability competencies and tying sustainability instruction to student learning (Fuertes-Camacho et al., 2019).

Community Engagement

Enhancing school facilities, hiring qualified instructors and promoting diversity will all help to raise the standard and accessibility of education globally. However, community involvement and local expertise have been neglected in favour of bigger and more ambitious goals in the current worldwide education development agenda. It is pertinent to state that a thorough understanding of social capital and its educational origins, along with a more recent history of community involvement and education in developing nations will enhance the implementation education for sustainable development. This brief suggests that the international community, national and local governments and non-governmental organizations encourage community involvement in primary and secondary school administration, goals, and daily operations (Monk, 2017). Community engagement is essential for implementing education for a sustainable economy. Educational institutions can engage with local communities and stakeholders to promote sustainability and social responsibility.

Challenges of Education for Sustainable Economy

Some impediments to sustainable economy have been identified such as

Curriculum Constraints

Traditional educational systems may have rigid curricula that do not easily accommodate new sustainability concepts. Although education for sustainable development (ESD) has drawn a lot of attention, it can be difficult to incorporate ESD into current educational systems (Zainal Abidin et al., 2024). Integrating sustainability into existing subjects can be challenging due to limited resources and resistance to change. Teachers steer clear of Education for sustainable economy themes in the classroom because they think it takes a lot of time and effort to address the numerous ideas and conversations. Because there are nno enough instructional resources available on these topics, teachers are required to complete substantial interdisciplinary preparatory work that they find difficult. Teachers therefore mostly rely on the pertinent information included in the readily available study materials. If educators merely utilize textbooks to impart knowledge to their students, they run the risk of creating a false division between social issues and academic subjects (Khadim et al., 2022).

Resource Limitations

Educational institutions may face financial constraints that limit their ability to invest in new technologies and teaching materials. In Nigeria, financial and cost constraints prevent instructional technologies from being sustainable (Sangra & Gonzalez-Sanmamed, 2019).

There may be a shortage of trained educators who specialize in sustainability. When it comes to teaching pupils topic on sustainable development, teachers are crucial. Thus, it is essential to comprehend the obstacles to effective and efficient education. When teaching education for sustainable economy themes, over half of instructors in public and private schools encountered moderate to considerable obstacles. Despite having the least amount of curriculum coverage, Sustainable Consumption and Production was thought to be the most difficult teaching theme (Hamwy et al., 2023).

Resistance to Change

Stakeholders, including educators, students and businesses, may resist shifting towards sustainable practices due to established norms and interests. It is possible that stakeholders will not instantly perceive the benefits of switching to more sustainable practices because of a variety of factors and concerns. The difficulty lies in overcoming this opposition and bringing the interests of the stakeholders in line with the sustainability requirement. To get the support of the stakeholders and promote significant change, it is essential to comprehend their viewpoints and develop an engaging story about the advantages of making sustainable decisions (Peloza et al., 2012).

Conclusion

To create a future where economic growth is in line with social justice and environmental preservation, education for a sustainable economy is essential. Education can lead the shift towards a more sustainable and equitable economy through the incorporation of sustainability principles into curricula, the use of innovative pedagogical approaches and the promotion of lifelong learning. To build a resilient and inclusive future, communities, businesses, lawmakers and educators must work together to address the issues and seize the opportunities in this field. We can provide the information, abilities and attitudes needed for future generations to tackle the intricate problems our world faces by incorporating sustainability principles into education. Prioritizing education for a sustainable economy is crucial as we go forward and strive to make the world fairer, just and sustainable for everyone.

Suggestion

The manager of schools should advocate for flexible curriculum that incorporates interdisciplinary approaches, allowing educators to entrench sustainability topics across various subjects. This approach encourages creative, critical thinking and adaptability to emerging sustainability issues. National Universities Commission should propose the inclusion of place-based learning, where sustainability education is contextualized within local environments, making it more relevant and engaging for students. This can be done by leveraging on existing subjects to explore sustainability in real-world contexts. The managers of tertiary education should adopt technology-enabled solutions, such as online resources and virtual labs, to overcome physical and financial constraints. These will enhance the teaching of sustainability without overburdening existing resources. Also, integrate artificial intelligence and big data in enabling sustainable economy addressing both their potential and their peril. Government should prioritize the continuous professional development of teaching and non-teaching staff, focusing on sustainability education. Training programs should equip faculty members with the knowledge and skills needed to integrate sustainability into their teaching effectively. The government should assist in providing funding for sustainability in education initiatives.

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