

***Achieving Sustainability Through Interdisciplinary Approach:
An Analysis of Teacher Education Transformed Curriculum***

Eveline O. Anyolo, University of Namibia, Namibia
Sakaria M. Ipinge, University of Namibia, Namibia
Anna N. Hako, University of Namibia, Namibia

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Abstract

The concept of interdisciplinary approach is fast becoming a key instrument and more relevant in that it enables students to apply knowledge and skills across multiple disciplines in addressing sustainability challenges through multiple lenses. The fact that sustainability challenges frequently involve a variety of stakeholders and elements that have an impact on social, economic, and environmental issues, working within a group of people from varied backgrounds can be an effective means of problem solving. The study utilizes a desktop analysis of empirical studies to establish the contributions of interdisciplinary approach to sustainable development in teacher education. Findings revealed that interdisciplinary teaching is significant to both students and educators. It provides students with more opportunities for investigation and discovery as they are included in the learning process. In doing so, students improve their critical thinking abilities and acquire a more comprehensive understanding of the subjects. Additionally, it gives educators the chance to examine other philosophies and methods of instruction, which might result in learning that is more efficient. The findings further revealed that to collaborate effectively, experts and/or stakeholders from various backgrounds and disciplines need to pinpoint a particular problem and have a shared understanding of what is expected of them. Hence, an interdisciplinary approach enhances university students' competencies in sustainability. The Namibian National Environmental Education and Education for Sustainable Development Policy stresses the need for capacity building in ESD in addressing complex sustainability challenges in an effort to achieve the United Nations Sustainable Development Goals (SDGs).

Keywords: Interdisciplinary Approach, Sustainability, Teacher Education

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Introduction

Today, the world is faced with many urgent issues/challenges such as climate change, water scarcity, corruption, moral decay, poverty etc. which are affecting the world population. These challenges require complex solutions for humanity to cope with this modern and changing world. Meanwhile, new fields of study have emerged to meet the needs of this changing world and as a result the limited nature of the disciplinary approach insufficiently addresses the management and teaching of these fields (Turna et al., 2012). This led to a renewed interest in interdisciplinary approach to teaching. Therefore, the concept of interdisciplinary approach is fast becoming a key instrument and more relevant in that it enables students to apply knowledge and skills across multiple disciplines in addressing problems through multiple lenses (Ashby & Exter, 2019). The purpose of this paper is to demonstrate the importance and contributions of interdisciplinary approach to education for sustainable development in teacher education. It commences by defining the concept of interdisciplinary in education, followed by the literature regarding interdisciplinary and its application in education for sustainable development and ESD in teacher education for sustainability in Namibia.

The Concept of Interdisciplinary Approach to Education

Turna et al. (2012) conceptualize interdisciplinary education as the idea of studying a particular subject from a variety of angles. While the definition of a discipline is specialized knowledge, an interdisciplinary approach is a method for addressing complex or all-encompassing issues like gender equality, poverty, climate change, and sustainable cities and communities that cannot be fully addressed in all of their dimensions by a single discipline. The goal of the interdisciplinary approach is to combine information from other disciplines to achieve an outcome that is greater than the sum of its parts. A key aspect of interdisciplinary instruction is that it uses and integrates methods and analytical frameworks to study a theme, issue, question, or topic, interdisciplinary from other academic disciplines. Although disciplinary approaches are used in interdisciplinary education, it goes beyond them by drawing conclusions from a range of pertinent disciplines, synthesizing their contributions to understanding, and then incorporating these concepts into a more comprehensive and, ideally, clear framework of analysis. In other words, interdisciplinary methods are required for tackling complex challenges including teen pregnancy, new drugs development, genetically modified foods, and health care access to fully address the issues' complexity and provide workable policy solutions. Many scholars have argued that the use of a single discipline viewpoint might inhibit critical evaluation of one's own and other viewpoints (Tahira & Haider, 2019). Contrarily, interdisciplinary education challenges students to synthesize what each subject has to give before attempting to find solutions to difficulties that have been raised in order to gain a deep and full understanding of complicated situations. Interdisciplinary teaching, therefore, differs from multi- or cross-disciplinary teaching in that it calls for the synthesis and integration of various points of view rather than just the consideration of various points of view.

Interdisciplinary teaching is significant to both students and educators. It provides students with more opportunities for investigation and discovery as they are included in the learning process. In doing so, students improve their critical thinking abilities and acquire a more comprehensive understanding of the subjects. Additionally, it gives educators the chance to examine other philosophies and methods of instruction, which might result in learning that is more efficient. As a result, there may be a greater sense of community among the students

and educators, which may improve motivation and engagement. As indicated earlier, interdisciplinary education, which has been shown to improve learning results and learning excitement, enables students to exercise critical thought, recognize their own prejudices, embrace the unknowable, and respect moral conundrums. Additionally, it helps students comprehend ideas from many fields, synthesize knowledge about a subject, and, in the end, provides a more comprehensive grasp of a problem. Interdisciplinary instruction goes beyond multi-disciplinary or cross-disciplinary instruction, which just calls for the examination of several points of view, and frequently necessitates cooperation between many educators in order to be adequately carried out. Interdisciplinary courses and projects can provide students with a holistic view of their field of study. This approach not only enriches their education but also enhances their problem-solving skills and encourages creativity, positively affecting their mental well-being (Chow et al., 2018).

An interdisciplinary approach is considered a crucial method for enhancing university students' competencies in sustainability (Grierson & Munro, 2018). Promoting sustainable development is the new resolution in the context of climate change and biodiversity loss (Baker, 2015). Development and the high consumption of resources demand that all human activities have a sustainable approach, which can be applied through interdisciplinary solutions (Velásquez et al., 2022). According to (Elliott (2012) these solutions are characterized by creativity, innovation, efficiency, and, in most cases, low cost.

The Origin of Education for Sustainable Development

Although the concept of sustainable development emerged back in the early 1970s, it was first defined in 1987 by the United Nations report, 'Our Common Future' which is referred to as the Brundtland Report of the World commission on Environment and Development. The Brundtland Report defined sustainable development as development that meets the needs of the present without compromising the ability of future generations to meet their own needs (WCED, 1987). After this definition, the concept of sustainable development became a top priority for local, regional, and global organizations and countries with an emphasis on sustaining the present for the benefit of future generations (Abu-Alruz et al., 2018). The concept was also regarded as an improvement that addresses the issues of the present without a compromise on meeting the needs of the generations to come (Sauvé et.al., 2016).

Sustainable development can be interpreted in numerous ways such as environmental, economic and social. Similarly, Purvis et al., (2019). describing sustainable development in terms of three pillars, environment, economy and society. Social and cultural factors are the cause of environmental problems and development is needed to meet humans' social and economic needs to promote environmental conservation (Borg et.al., 2014) for sustainable development. It requires that countries improve institutional quality, manage natural resources, safeguard the environment, and attain social inclusiveness (Younis, & Chaudhary, 2017). This means that sustainable development entails the use of resources that do not threaten the health of humans or the environment and do not jeopardize future generations' chances of satisfying their needs (Dernbach, & Cheever, 2015). Much of the current literature on sustainability pays particular attention to the country's ability to achieve SDG (Glass & Newig, 2019). Since practically all disciplines are relevant to the Sustainable Development Goals (SDGs) of the United Nations (UN), the interdisciplinary approach is the scientific approach humanity needs to achieve the SDGs. In other words, the idea of sustainable development aids in bringing together all academic fields that contribute to achieving the SDGs. This implies that to address the issue, new knowledge must be produced. Because

sustainability challenges frequently involve a variety of stakeholders and elements that have an impact on social, economic, and environmental issues, working within a group made up of people from varied backgrounds can be an effective means of problem solving. Collaboration is crucial for developing effective answers to environmental issues. It guarantees that all significant players share responsibility for active engagement and have authority over decisions. To collaborate effectively, experts and/or stakeholders from various backgrounds and disciplines need to pinpoint a particular problem and have a shared understanding of what is expected of them.

The three aspects of sustainable development should all be seen as necessary for sustainability (Purvis et al., 2019). Sustainability is defined as a practice that guides the use of current resources in an effort to ensure the availability of such resources to the generation to come (Ozili, 2022). It is the ability to make responsible decisions in using and allocating resources to economic and non-economic activities in an effort to achieve some desired social, economic and environmental outcomes (Ozili, 2022). The concept sustainability involves harmonious actions consistent with nature, ecology oriented towards future generations (Kapecki, 2020).

It has been asserted in the literature that teacher education can be considered the major contributor to the sustainability (Dickson et al., 2013; Godemann et al., 2014) as it can play an important role in developing students' knowledge, skills, and attitudes needed as global change agents to promote, create, and shape a more sustainable future for the world (Kelley & Nahser, 2014; Wiek et al., 2016). According to Kabadayi (2016) teachers education programs are expected to provide graduating students with the needed knowledge and understanding that can be used now and in the future to be considered as change agents towards sustainability.

In this regard, the United Nations Assembly declare a United Nations Decade for Sustainable Development (UNDESD) resolution where everyone has the opportunity to gain knowledge, skills, and attitudes from education and learn the principles, values, and practices needed for sustainable future (Pipere, Veisson, & SalÓte, 2015). This declaration calls on Member States to incorporate sustainable development issues into all sectors of education (UNESCO, 2009), in order to achieve quality education for all. Grosseck et al. (2019) defined ESD as the practice of teaching for sustainability. Further, UNESCO describes ESD as a collection of diverse disciplines, like climate change, the management of the effects of social and economic changes, environmental economics, etc. (UNESCO, 2018). As sustainability issues are complex, it is critical for humanity to understand them, and an interdisciplinary approach is believed to be the key factor (UNESCO, 2013). In light of this, ESD can be seen as a holistic approach, involving the integration of critical sustainable development issues into all teaching and learning strategies (Grosseck et al., 2019).

Methodological Considerations

This paper employed a desktop study as research methodology to systematically review the secondary data on the use of interdisciplinary approach in teacher education for sustainability at the University of Namibia. We specifically reviewed secondary sources, such as government and university directives, policies and peer-reviewed journal articles, which deal directly with the use of interdisciplinary approach in promoting sustainability in teacher education. The review resulted in a thematic analysis of how sustainability is promoted in teacher education in Namibia and elsewhere.

Findings

The introduction of the knowledge-based economy concept and the quickening of globalization have raised the need for integrated curriculum development in Namibia. The new education curriculum reform has set the integrated curriculum as a goal, allowing students to develop their sense of creativity and innovative abilities while learning through active inquiry, active engagement, and hands-on experience. Since teachers and teacher educators will have a big impact on how citizens are educated well into the future, it is essential to align teacher education with the Fourth Industrial Revolution Guidelines, requirements and policies. The idea of integrating ESD with interdisciplinary educational themes is emphasized more strongly in the curricula and education policies. The aim of Namibia's curricular reform on professional ESD skills and competences for higher education teachers is to help academics reorient their subjects' curricula in order to contribute to the sustainable development goals of the United Nations' Agenda 2030 (Seikkula-Leino et al., (2021). In this context, Geli et al. (2019) suggest that to successfully implement the SDGs locally, there must be unparalleled cooperation in key areas of development, including creating supportive policy environments, building human capacity, mobilizing and effectively utilizing public funds, fostering transformative change through science, research, technology, and innovation, and overseeing accountability.

ESD and Teacher Education

There is a consensus among social scientists that it is crucial to instill in students, especially younger ones, a love and appreciation for nature in addition to focusing on environmental issues (Braune & Volkmann, 2022). As the first policy of its kind in Southern Africa, Namibia implemented the National Environmental Education and Education for Sustainable Development Policy in 2019. The policy highlights training and capacity building in ESD (across all sectors) as one of the primary strategies for addressing sustainable development challenges and advancing the Sustainable Development Goals (SDGs) of the United Nations. The policy intends to provide learners with quality education (SDG 4), equipping them with the information and abilities needed to shape a more sustainable future.

Teachers are identified as the change agents in their schools and communities in NaDEET's new professional development program, Teach for ESD: Improving Education for Sustainable Development (ESD) Teaching and Learning Experiences in Namibia, which is in line with this national strategy. By instilling a stronger attitude for nature in our future leaders, it seeks to promote a more sustainable world. The program's main goal is to equip enthusiastic teachers with the information and abilities necessary to implement ESD initiatives in their schools. To that end, it offers materials, hands-on training, and assistance.

ESD and Interdisciplinary Approach

The National Environmental Education and Education for Sustainable Development Policy stresses the need for capacity building in ESD in addressing complex sustainability challenges in an effort to achieve the United Nations Sustainable Development Goals (SDGs). This highlights the need for Namibian higher education institutions (HEIs) to mainstream ESD into their education, research and development programmes. The introduction of ESD in Namibian Higher Education Institutions (HEI) emerged in a structured and strategic way. Various institutions integrated ESD in the form of environmental education in their traditional environment subjects and various programs. At

the University of Namibia's (UNAM) the then Faculty of Education has introduced Environmental Education modules in the B.Ed Lower Primary and in the B.Ed. Adult Education courses. Other courses in the then Faculties of Science and Law as well as the Department of Geography and Environmental Studies at UNAM are carriers of ESD subject matter (University of Namibia, 2011). In this way, ESD is being studied in an interdisciplinary approach which aims to combine information from a variety of angles in an effort to tackle critical sustainability challenges in this changing world. The integration of ESD at the University of Namibia is seen as one way of focusing the social, economic and cultural factors to empower people to acquire an understanding of the complexities of environmental and developmental issues of living sustainably (University of Namibia, 2011). Consequently, this will enable future teachers to teach issues of sustainable development to their learners.

ESD as a University Module

In 2022, the University of Namibia teacher education curriculum went through a major transformation. The transformation process was informed by three main drivers namely, the national Basic Education reform, the need for continuous improvement of the UNAM curricula and changing Higher Education landscape in response to the Fourth and Fifth Industrial Revolutions. The overall purpose for curriculum transformation is to contribute towards the UNAM vision, mission and strategic direction, with the aim to address national and international development goals contained in the Vision 2030, NDPs, Harambee Prosperity Plan II as well as the Africa Agenda 2063 (Goal 2). The curriculum reform also emphasizes on the SDG number 4 on quality education which is aiming at achieving inclusive and quality education for all which reaffirms the belief that education is one of the most powerful and proven vehicles for sustainable development. It is also acknowledged that the students produced by the University of Namibia are,

prepared for more complex life and work environments in the 21st century, which demand skills such as creativity and innovation, critical thinking and problem solving, and communication and collaboration as well as dispositional skills which include flexibility and adaptability, initiative and self-direction, social and cross-cultural skills, productivity and accountability, and leadership and responsibility. (UNAM, 2020, p.3)

In the transformed curriculum, modules such as Education for Sustainability, Sustainability and Environmental Awareness and Environmental Education and Sustainability as well as Learners and Learning Environment were introduced. The purpose of these modules is to prepare student teachers to implement sustainability in their everyday life and profession through their attitudes and practices. This enables students to develop personal responsibility that will help them respond to the 4th and 5th Industrial Revolutions (IRs).

Conclusions

Interdisciplinary instruction is a great approach to keep students interested and provide them a more complete education. It encourages students to investigate subjects from several angles and to hone their critical thinking abilities. Additionally, it gives educators the chance to expand their teaching methods and keep up with the most recent advancements across a variety of subjects. Interdisciplinary teaching is unquestionably, therefore, something to take into consideration if you are seeking strategies to engage your students and provide them a

more in-depth education. This is a significant method to support students in developing a more comprehensive understanding of subjects and to promote a feeling of community in the classroom with the correct planning and techniques.

This study is theoretical in nature; hence its scope is limited due to its well-defined and specific objective. The quality, quantity, or diversity of the data may also be limited by the methodological aspects employed in this investigation.

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Contact emails: eanyolo@unam.na
smiiping@unam.na
ahako@unam.na