

Exploring the Constraints and Mitigation Measures in the Teaching and Learning of Environmental Education in Selected Teachers' Colleges in Tanzania

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Abstract

This paper explored the constraints and measures needed to address the obstacles to quality teaching and learning of environmental education (EE) in teachers' colleges. The data were gathered from two teachers' colleges, one in the Morogoro region and the other in the Coast region. This paper employed a qualitative research approach and a case study design. The information was collected through semi-structured interviews and focus group discussions. The sample size was 34, comprising 14 tutors and 20 teacher trainees. The findings revealed major constraints, including resource shortages, inadequate training, insufficient integration of EE content into the curriculum, and limited knowledge among tutors. Conversely, identified mitigation strategies encompassed ongoing training, outdoor educational activities, increased educational resources, and fostering partnerships among community education stakeholders. These findings underscore the critical role of well-prepared teachers in enhancing the effectiveness of environmental education in Tanzanian primary schools.

Keywords: *Teacher preparation, Teacher Training, Environmental issues*

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Introduction

Environmental education (EE) plays a crucial role in sustainable development by fostering understanding, appreciation, and protection of natural environments. It addresses global environmental challenges such as land degradation, pollution, resource depletion, water quality, climate change, and antimicrobial resistance (Dhull & Verme, 2017; Nguyen et al., 2022). The 1972 United Nations Conference on the Human Environment in Stockholm marked the beginning of global initiatives on

EE, recognising its pivotal role (UNESCO, 1976; 1978). In the 1990s, UNESCO and UNEP prioritised teacher training in EE, leading to its integration into teacher education programs worldwide. Tanzanian policy also underscores the significance of EE, with the 2014 Education and Training Policy (ETP) emphasizing environmental awareness and management (Ministry of Education and Vocational Training [MoEVT], 2014).

The 2014 ETP emphasizes EE teaching and learning across all education levels, stressing the role of graduates in sustainable environmental practices for present and future generations (MoEST, 2023, Section 1.2.7). Despite these efforts, challenges persist, exacerbated by population growth and non-compliant social and commercial practices contributing to environmental degradation (Ibid.). Damoah and Omodan (2023) highlight that the policy's success largely hinges on teachers' dedication to the teaching and learning processes.

Tanzania has implemented various initiatives since the 1980s to promote environmental education (EE) across the country. The establishment of the National Environmental Council in 1983 marked a pivotal step, signalling a renewed focus on environmental issues (Ndeskoi, 2016). This council has been instrumental in formulating policies and coordinating national environmental programs and projects. In 1995, the Ministry of Education and Training (MoEC) issued the Education and Training Policy (ETP), mandating the integration of EE into all subjects at all levels of schooling. Similarly, the ETP 2014 reaffirms the importance of EE in education and training (MoEVT, 2014), aiming to foster the rational use, management, and conservation of the environment (MoEC, 1995). Curriculum revisions over time have incorporated EE issues into teachers' college curricula.

Additionally, grassroots initiatives such as environmental clubs, including the Malihai Club of Tanzania (established in 1988) and Roots and Shoots (established in 1990), have played crucial roles. These clubs, driven by individual or group environmental concerns, actively engage with EE in schools. Furthermore, communication efforts through various media channels—radio, newspapers, and television—have effectively promoted environmental messages and campaigns such as 'Maji ni Uhai' (water is life) and health and safety initiatives. Radio programmes and debates have also encouraged responsible behaviours to address environmental challenges facing the country.

Despite the government's efforts to integrate EE into the education system, its implementation has not produced the desired effects. It was believed that exposing teacher trainees to environmental issues would lead to behavioural changes and a multiplier impact, but this has not yet materialised in practice. Environmental problems and threats, including deforestation, loss of wild habitats, land degradation, drought, and environmental pollution, persist today (Kimaro, 2018; Kimaryo, 2011; Ndeskoi,

2016; Vice President's Office [VPO], 1997). Moreover, studies show that teachers who teach at the primary school level are not adequately prepared during their pre-service training to effectively teach and engage children with EE issues. Against this backdrop, this study aimed to investigate the constraints encountered in the teaching and learning of EE in teacher colleges, along with the mitigation measures taken to address those challenges. Two overarching research questions guided the inquiry.

- i. What constraints do tutors and teacher trainees encounter during the teaching and learning of EE?
- ii. What are the views of tutors and teacher trainees on mitigation measures that can address the challenges encountered in the teaching and learning of EE?

Theoretical Underpinnings

Paulo Freire founded Critical Pedagogy Theory (CPT) in 1971, challenging the teacher-centred model of educational systems that guided this paper. Learner-centred teaching and learning methodologies are promoted by CPT, which acknowledges the learner as a diverse thinker with diverse socioeconomic backgrounds, a desire for democracy, and an autonomous creature (Freire, 1993). Some of the key features of CPT include the rejection of the traditional banking model of education; conscientisation, or the process of raising critical consciousness among learners; problem-based education; the importance of praxis, which calls for the infusion of theory and practice in learning; and the role of dialogue in fostering solidarity and collective action. However, despite its strengths, the lack of a classroom implementation model to guide instructors may cause the CPT to ignore socioeconomic and cultural variations around the world and disconnect it from everyday school life (Bruenig, 2005). Moreover, learners may not universally embrace the CPT if educational practices incorporate information from diverse origins (Shor, 1992). As a result of their exposure to globalisation and information technology, instructors modelling essential pedagogical approaches should exercise caution while working with 21st-century young learners.

Despite these limitations, teachers' colleges adapted the CPT to explore the constraints encountered in EE teaching and learning and to navigate the views of tutors and teachers on the measures to address these challenges. By integrating CPT into EE teaching, tutors can empower teacher trainees to become informed, critical, and active agents of change in their communities and beyond. Additionally, by adhering to the principles of CPT in their teaching, tutors can empower teacher trainees to become transformative intellectuals about environmental resources, prepare them for their protection, and develop EE competencies, enabling them to integrate EE into their teaching in various primary schools in Tanzania.

The CPT is relevant to this paper since it provides a framework for comprehending the challenges faced by tutors and teacher trainees during the teaching and learning process. The CPT insists on empowering learners to create knowledge and transform their behaviours so that they can become agents of change in their communities. It is therefore believed that tutors' use of the CPT principles can help prepare and produce teacher trainees who are critical and informed of various environmental challenges and take appropriate measures to address them.

Methodology

The study employed a qualitative approach with a case study design to gain a comprehensive understanding of the constraints and mitigation measures in the teaching and learning of EE in teachers' colleges. A case study design facilitates the exploration of the questions of inquiry within its context using a variety of data sources (Baxter & Jack, 2008; Carter, 2020; Pesambili & Mkumbo, 2018; Pesambili & Mkumbo, 2024). The cases in this study were two teachers' colleges selected from two different regions in Tanzania that were responsible for the preparation of certificate teachers for primary schools in Tanzania. College A was founded in 1989, while College B was founded in 1972 (Mwilapwa, 2016). We purposefully selected the colleges from a pool of 22 government teachers' colleges, choosing them for their long history of providing both pre-service and in-service teacher training. We assumed these to be suitable sites capable of delivering relevant information for the study. We purposefully selected thirty-seven (34) participants for the study, including tutors (n = 14) and teacher trainees (n = 20). We selected subject tutors based on the subjects and levels they teach. This includes tutors engaged in teaching subjects such as science, geography, and civics.

Additionally, the researchers selected the top ten (10) performing teacher trainees from each college, taking into account the results of their annual first-year examinations. Thus, using purposeful sampling, the researchers selected the teachers' colleges and participants based on various criteria, including the key roles played by the participants and their direct experience in areas related to the study's subject. This guarantees that the information gathered is pertinent and valuable for answering the study questions. Furthermore, as they are responsible for implementing the curriculum, including EE content, these participants, who are tutors and teacher trainees, were highly relevant in providing the necessary information. Data generation methods included semi-structured interviews and focus group discussions (Pesambili & Mkumbo, 2018). We employed thematic analysis (Braun & Clarke, 2013) to analyse the data, using participants' verbatim quotations to illustrate the themes.

Findings and Discussion

The following subsections present and discuss the study findings, which are organised according to the research questions:

Constraints faced by tutors and teacher trainees in EE teaching and learning

The paper sought to explore tutors' and teacher trainees' views on the constraints encountered in the teaching and learning of EE in selected teachers' colleges in Tanzania. Five main themes dominated the views, which included the inadequacy of EE contents in the syllabi, a lack of relevant teaching and learning resources, inadequate knowledge and skills for effective EE content teaching in teachers' colleges, limited time for EE teaching and learning, low motivation among teacher trainees due to personal attitudes and beliefs about EE college activities, and a lack of community and institutional support.

Inadequacy of EE contents in the curriculum materials

According to the interviews conducted with tutors, one of the challenges in effectively teaching EE in teacher colleges was the insufficient coverage of EE topics in the subject syllabi and other curriculum materials. The majority of tutors, especially those in the field of civics, expressed their concerns about the unclear EE content in the syllabi, stating that the civics syllabus did not provide detailed instructions on how to integrate EE content. Tanzania's Education and Training Policy of 1995 and 2014 mandated the integration of EE into all educational curricula, weaving its materials seamlessly into the subject curriculum (MoEC, 1995; MoEST, 2014). However, tutors asserted that they had been accustomed to a subject-focused syllabus for numerous years, employing a multidisciplinary approach. To reinforce this point, one tutor made the following comment:

The subject syllabi we are teaching here don't specifically include any EE topics. Regrettably, the College A Science tutor hasn't given us any teaching guides to help us understand what EE content is and how to effectively incorporate it into the teaching and learning process (Civics tutor, College A).

Another tutor from College B had the following concerns:

Integrating environmental issues into the topics I teach is tough. I believe this is due to my lack of familiarity with the subject matter. In my subject, civics, I normally teach specific topics and sub-topics as outlined in the syllabus. Examples of these topics are the constitution, the parliament, the judiciary, etc. These topics, by their very nature, remain disconnected from environmental issues. As a result, it becomes extremely difficult to integrate EE into these other topics (Civics Tutor, College B).

Similarly, the civics tutors from College A voiced similar concerns about the challenges of teaching and learning EE at teacher colleges, citing the lack of primary delineation of EE topics and subtopics in curriculum materials like teaching modules and textbooks. In the following excerpt, one of the tutors expresses such concerns:

My lack of knowledge about what EE content to include in the various topics constrains me. The civics syllabus, particularly at my class level, does not say directly that this particular topic is concerned with environmental issues (Civics tutor, College A).

Although curriculum and policy recommend integrating environmental education (EE) into the education system at all levels, including teachers' colleges, reported constraints impede its practical implementation. The subject syllabi often lack clarity on the environmental content to teach, potentially leading to ineffective EE teaching and learning. There is evidence to support these results from studies done in and outside of Tanzania (Adu & Benjamin, 2019; Damoah & Omodan, 2023; Kimaro, 2018; Makundi, 2003; Ndeskoi, 2016). These studies revealed that unclear subject syllabi hindered effective EE teaching in other subjects.

Lack of teaching and learning resources on EE

The availability of various types of teaching and learning resources used by tutors in the classroom is crucial to guaranteeing good EE teaching and learning. According to the findings from the interviewed tutors, a lack of relevant teaching and learning materials in teachers' colleges was one of the factors limiting the ability to offer EE successfully. Similarly, Dhull and Verma (2017) found that limited resources and support from institutional management and other critical agencies impeded tutors' access to training opportunities, resources, and reference materials for implementing EE in Indian teacher training colleges. The findings indicated that teachers' colleges had limited budgets, which impacted the purchase of teaching and learning materials requested by subject tutors in EE. Furthermore, the government has provided teacher colleges with computer teaching and learning materials, including desktops and laptops, as well as specific science reference books. However, the tutors acknowledged the lack of EE textbooks, wall charts, maps, globes, atlases, tutors' guides, and other supplementary learning materials was extremely limited compared to the current number of teacher trainees. The following statements from the participants reinforce these claims:

The government's funding for teachers' colleges often falls short of meeting expectations. I remember the last time the college administration requested a list of the teaching resources that each subject tutor was expected to supply. Regretfully, we did so, but we did not receive a favourable response (Science tutor, College A).

Another participant had this to add:

The problem is that there aren't enough resources to support my passion for teaching EE in my courses. It goes without saying that interactive learning would make environmental issues more exciting to teach and learn about. Admittedly, I lack the finances to purchase the necessary teaching and learning resources on my own. (Science tutor, College B).

In addition, teacher trainees confirmed that the lack of resources affects effective teaching and learning about EE issues. The following teacher trainees' voices lend support to the argument:

Lack of teaching and learning resources, such as textbooks, and the funds to purchase them present another challenge for most tutors. For example, we occasionally enjoy going on study excursions, but we haven't done so at our college since our first year. Typically, when we consider planning study tours, our tutors inform us that there is no financing available for field trips or outdoor learning activities (Teacher trainee, College B).

One major problem is that teaching at our teacher college is not realistic in EE areas. I've observed that our tutors only impart the topics and sub-topics that are mandatory for their respective subjects. The lack of relevant textbooks with EE content, which could enhance tutors' comprehension of EE topics, may be the root cause of this issue. As a result, I propose that the government provide relevant books and other instructional materials to facilitate successful EE teaching and learning in teacher preparation programmes (Teacher trainee, College A).

From the perspectives mentioned above, the participants indicated that government resources, including textbooks, are insufficient and only partially meet the demands for effective EE teaching and learning. Furthermore, the participants linked a lack of teaching materials to a lack of financial resources; they reported that teacher colleges lack funds to purchase teaching and learning materials and cover transportation costs for conducting study tours. This hindered tutors' ability to engage teacher trainees with outdoor learning.

Inadequate knowledge and skills among tutors in teaching EE

The findings also indicated that tutors had inadequate knowledge and skills to teach the EE content. Tutors expressed dissatisfaction with teaching EE content in areas like climate change, biodiversity, and sustainability. They also reported that, despite having such a poor foundation in EE, they have not received any in-service training focused on how to teach EE across other themes of teaching subjects. Generally, most of the participants indicated they should also have sufficient pedagogical skills related to EE so as to be able to design appropriate teaching strategies and

activities that engage trainees effectively in EE. The following assertions serve to confirm this:

You cannot properly teach EE if you are unfamiliar with the subject matter. So, all I can say is that having content alone isn't enough; we also need exposure to varied teaching approaches (Science Tutor, College A).

Another tutor had this to add:

Indeed, a lack of subject knowledge necessitates pragmatic learning to improve comprehension of environmental issues. Furthermore, the interconnectedness of EE with other topics and concepts makes it challenging to grasp, as it is not a standalone subject (Geography Tutor, College A).

Also, one of the tutors from College B echoed similar thoughts, stating:

I don't teach EE in my lessons because I'm unsure of what content to blend with the topics I teach in my subject and how to teach it (Civics tutor, College B).

The quotes above suggest that insufficient preparation for pre-service and in-service EE training significantly contributes to the inadequacy of EE competency among tutors, which in turn affects the effectiveness of EE teaching and learning. This finding is consistent with Ng'ang'a (2010), who found that in Kenya, the instructors in the study sample were comparatively highly qualified, implying that they were likely to be well-skilled, informed, and competent in the teaching of EE. However, that study revealed that the previous teacher training programme was quite generic in terms of EE, as only two out of the twenty sampled teachers had at least some specific pre-service training in dealing with EE. In comparison, the remaining 18 teachers had no such preparation.

Teacher trainees' findings during focus groups indicated that tutors appeared to lack environmental knowledge and pedagogical skills in how to teach EE. Additionally, they frequently reported that internal examinations and tests rarely included EE content, and the majority of participants confirmed this. For example, some teacher trainees narrated the following statements during the FGD:

Since we rarely receive grades in EE, I believe this is because we lack the necessary knowledge and skills. Our tutors typically employ traditional evaluation methods that focus primarily on rote memorisation and may fail to capture students' abilities to apply knowledge, think critically, and engage in problem-solving relevant to environmental issues (Teacher trainees, College A).

Another teacher trainee at College B added:

A lack of adequate knowledge and skills on environmental issues among our tutors poses a significant challenge to our understanding of the subject matter.” In most situations, our tutors have failed to involve us in outdoor environmental learning activities. I strongly recommend educating instructors in this field, enabling them to incorporate EE into their lessons by involving us in projects and hands-on activities instead of relying solely on textbooks (Teacher trainees, College B).

The study by Liu et al. (2020), which found that pre-service teachers in China had low levels of environmental knowledge and lacked confidence in their ability to teach EE, is consistent with this finding. These observations align with those made by Gamira and Fiomumwe (2021), who found that inadequate training in terms of pedagogical content knowledge in EE and a lack of resources were significant impediments to teaching EE (EE) at Lowveld University in South Africa. Cutter-Mackenzie and Smith (2003) noted similar findings, revealing that elementary teachers lacked knowledge of environmental issues, with 85% of participants having received no formal training in Education for Sustainability (EFS) at university.

Low teacher trainees’ motivation due to personal attitudes and beliefs about EE

Another finding from the data was instances of low motivation among trainees as a result of their beliefs about environmental education. The findings of the current study indicated that teacher trainees’ attitudes towards EE issues resulted in a lack of enthusiasm among trainees for college environmental initiatives that took place after in-classroom teaching and learning sessions. Some of the tutors who participated in the interview conveyed this concern:

Occasionally, during classroom teaching and learning, I remind my students about the importance of personal hygiene and proper waste management and disposal in the college environment. Still, surprisingly, the same students at times become the primary agents for environmental degradation within the college environment (Science tutor, college A).

In a similar vein, another tutor said:

Aaa... What I can say is that when teacher trainees arrive at our college, the majority of them exhibit characteristics and actions that are not appropriate or pleasant for the setting. For instance, despite the strategic placement of dustbins throughout the college campus, the majority of teacher trainees frequently discard pieces of paper and water bottles in random locations, demonstrating a lack of understanding and rationale for maintaining cleanliness. So, I believe that continuing to provide EE at our teacher college is crucial for future teachers to be able to influence their students’ behaviour in schools in order to support the environment (Science Tutor, College B).

From this assertion, the findings imply that personal attitudes and opinions about environmental issues might influence how trainees approach EE and their future teaching of EE in primary schools in Tanzania. Zonur (2021) supports this argument by asserting that the knowledge, awareness, attitudes, and behaviours of prospective teachers significantly influence and shape the attitudes, characteristics, and behaviours of the young students they will instruct, particularly in relation to environmental issues. Evidently, the tutors expressed concern and expected the teacher trainees to exhibit positive attitudes and practices toward the environment, thereby positioning them as agents of change for both students and communities. However, if the teacher trainees have unfavourable opinions and beliefs regarding environmental concerns, they may struggle to acquire balanced information for future students.

Moreover, the focus group discussion sessions with teacher trainees revealed that their personal beliefs and attitudes towards environmental concerns influenced their participation in the college's after-class environmental activities. Some of the teacher trainees stated that they believe teacher education programmes would have been effective in providing them with a strong foundation in terms of both content and pedagogy in EE. Such knowledge and skills in environmental issues would enable them to serve as mirrors and agents of change in schools and their communities. Additionally, some teacher trainees contended personal attitudes and ideas about environmental issues can influence how they approach teaching these subjects. They may struggle to present accurate and balanced information to their future students if they have unfavourable views or beliefs regarding environmental concerns.

According to the study findings, some teacher trainees were not attending EE issues, and other EE launched programs at their teacher colleges due to personal attitudes that did not emphasise environmental education. These attitudes resulted in a lack of enthusiasm among trainees for college environmental initiatives that took place after in-classroom teaching and learning sessions. Some FGD teacher trainees supported these arguments with the following quote:

If we appropriately provide environmental education to teacher trainees and then use it, we will serve as reflectors and change agents in our own society, educating other members on the necessity of conserving and maintaining our habitats. (Teacher trainees, College B).

Overall, the FGD findings suggest that cultural and personal beliefs about gender roles among the teacher trainees limit the participation of some male trainees in college-planned extra-curricular environmental activities. During the FGD sessions, some male teacher trainees expressed their belief that activities such as sweeping the college compound were exclusively for female teacher trainees, a belief they held.

Limited time allocated to EE content

The findings showed that all tutors were worried about not having enough time to facilitate the actual teaching and learning of environmental issues in teacher colleges, leading them to restrict their teachings to the lecture method in order to cover the content within the time constraints. This finding contradicts the principles of the critical pedagogy theory by Freire (1972), which calls upon educators to transform their teaching model from the banking model to democratic learning approaches. Tutors also contended that effective EE teaching and learning necessitates learners' active participation in practical tasks that allow them to interact with the outside world. Consequently, the tutors held the view that 50 minutes did not provide enough time to plan and involve over 50 learners in diverse learning tasks related to the concurrently taught topic information. For example, the civics tutors from both colleges reported that the minimum time allotted for a single period is 50 minutes, while the maximum length is 100 minutes (MoVET, 2009). Furthermore, the syllabus specifies the number of periods for each topic, suggesting that the tutor must limit their instruction to the allotted time. One of the tutors raised the following concerns about time management:

One of the challenges I experience in meeting my lesson objectives is the time allotted to my teaching subject. For both first- and second-year students, the curriculum offers civics one time each week, with a duration of 50 minutes in each learning session. So, in reality, this time is insufficient for intensive and engaged teaching and learning in both the classroom and other contexts (Civics tutor, College B).

As a result, the 50-minute time limit per period was insufficient for activities that required educating and organising 60–70 teacher trainees with no textbooks and perhaps a limited grasp of the subject matter taught. These findings are consistent with those of a study conducted in the Philippines by Corpuz et al. (2022), which discovered that one of the reported challenges faced by teachers in the integration of EE in the teacher education curriculum was a lack of time to allow activities for students that could have increased their environmental literacy and involvement. Furthermore, the absence of active curriculum content specifying EE learning outcomes led the tutors to focus their teaching on what they observed in the curriculum. This implies that there is a need to allocate enough time for a comprehensive understanding of EE if the goals are to be realistic.

Lack of community and institutional support

Despite the critical role that community and institutional support play in defining the quality and effectiveness of EE, the study findings revealed a lack of community involvement and institutional support in the teacher colleges studied. The selected colleges' lack of institutional support for EE limited its effectiveness. In addition, the

tutors emphasised that a lack of community and institutional support in terms of expertise and moral support hampered the effective integration of novel teaching methods, project-based learning, and cross-disciplinary collaboration. The following quotation expresses the tutors' feelings:

In my opinion, the college administration is not always helpful to tutors. For example, I intended to start debate sessions in college for teacher trainees to discuss various academic, environmental, and other social life issues, as well as a civics club to promote democratic practices among students and help them improve their communication skills. Regrettably, when I presented my idea to the administration, they informed me that it would not be feasible due to the college's already full schedule (Civics tutor, College A).

This assertion makes it clear that a lack of support has a negative impact on the effectiveness of EE in colleges. We further observed a deficiency in the connection and cooperation between teachers' colleges and other significant environmental stakeholders, such as environmental officers from district councils and experts from national environmental agencies like NEMC, resulting in restricted access to outside knowledge and inadequate assistance for the efficient teaching and learning of EE. During the interview, the tutor shared the following observations:

There is no link between teaching colleges and the district's environmental department. We understand that each district has environmental officers tasked with closely collaborating with the community on a variety of environmental issues. However, these officers and experts fail to communicate with the management of the teacher colleges, hindering their ability to plan visits to the colleges and conduct seminars for tutors, teacher trainees, and the entire college community on environmental conservation and building a sustainable society, among other topics (Science tutor, College A).

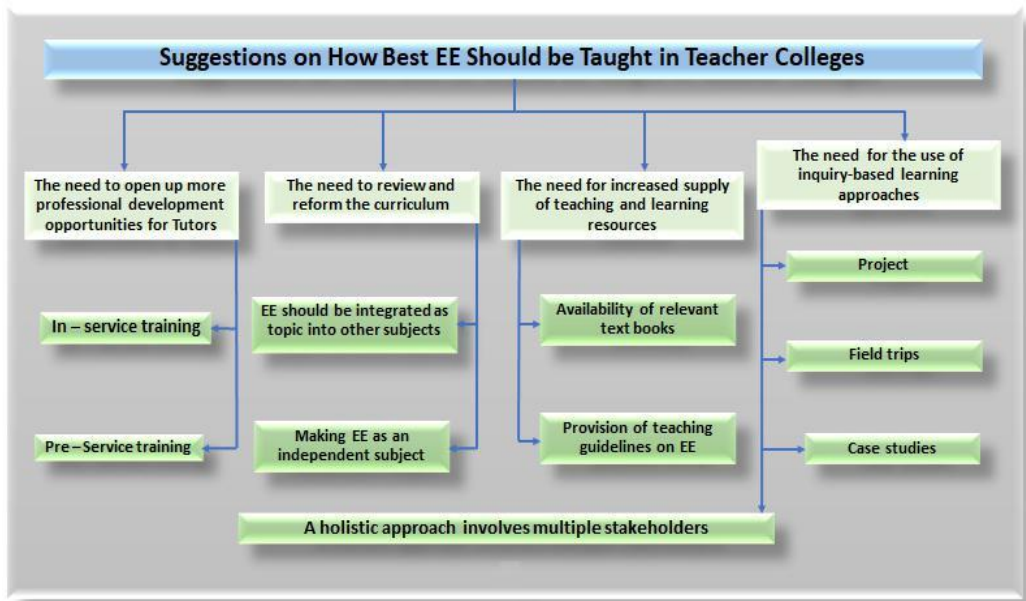
The geography tutor from College B expressed a similar perspective, saying, "*I have never seen environmental experts coming to the college to share experiences, assess the environmental status of the college, and advise where possible*". According to these quotes, effective EE teaching and learning necessitate connections involving a variety of stakeholders. However, the findings of this study reveal that the link between various EE players in teachers' colleges is typically lacking. This hinders the development of holistic perspectives on environmental concerns.

Mitigation measures in teaching and learning EE: Views of tutors and teacher trainees

We collected insights from tutors and teacher trainees on effective EE teaching methods in teacher colleges to achieve desired outcomes. Findings underscored the necessity for four critical elements to enhance EE instruction: professional development (in-service and pre-service training), curriculum revision to integrate EE across primary teacher education subjects, increased availability of teaching materials (textbooks, modules, guidelines), and adoption of inquiry-based learning approaches. Figure 1 summarises participants’ perspectives on mitigating constraints to effective EE teaching and learning in teacher colleges.

Figure 1

Participants’ Suggestive Measures for Addressing Barriers to Teaching and Learning of EE in Teacher Colleges



Source: *Fieldwork 2020*

More professional development opportunities for tutors on EE content

The results of this study indicated that there is a need to prioritise opportunities for tutors’ professional development in order to ensure the competencies required for effective EE teaching. This could help tutors prepare teacher trainees for a knowledge-driven, technology-driven economy. The tutors argued that, given their obligation to train competent EE teachers, they should give priority to capacity building through diverse professional development programmes, enabling them to incorporate EE themes into their instruction. EE. The emergence of sustainable development has broadened the scope of EE, necessitating continuous professional

development for tutors. It is crucial to stay up-to-date with the trend and maximise its influence on EE teaching and learning in teachers' colleges. The following quote emphasises the need for a strong and efficient teacher training programme to improve EE delivery in schools:

I believe that promoting a holistic approach in EE teaching and learning requires teachers to be well-prepared, a process that should begin during teacher training.” In this regard, we tutors must have a strong foundation in EE, and owing to new educational reforms, college tutors must stay up-to-date on any newly adopted changes in the curriculum so that we can deliver excellent and relevant education to our teacher trainees. This approach will enable them to effectively teach EE in schools (Science tutor, College B).

It is clear from the previous extract that qualified tutors can develop qualified teacher candidates. This suggests that in order to prepare excellent and well-trained teachers, it is essential that the tutors possess adequate EE knowledge and abilities in order to provide the teacher candidates with broad exposure to how they might improve their EE competency after graduation. According to Ramos et al. (2021), the current environmental challenges require competent experts, currently underutilised in the market, to teach EE.

The focus group findings showed that the tutors lacked sufficient EE knowledge because teacher trainees stated that they were only given a partial education on environmental issues. Thus, teacher trainees recommended that in-service training be provided to tutors in order to update and improve their pedagogical knowledge and EE content. During FGD sessions, the following statement was expressed by one of the teacher trainees:

I strongly advise the government to ensure that, through its Ministry of Education, all tutors in various time schedules receive frequent seminars or online training. This will guarantee their understanding of the new curriculum and policy reforms, enabling them to receive training on the appropriate implementation methods (Teacher trainees, College A).

Findings from the tutors' and teacher trainees indicated that EE teacher training is acknowledged as one measure of addressing the tutors' barriers in developing quality instructors for preparing future teacher trainees.

Curriculum review and reforms for adequate coverage

The study findings suggested that there is a need to ensure adequate coverage of EE content in teacher colleges. This will provide a comprehensive and informative curriculum in terms of breadth and depth in terms of EE content. Thus, it has to be revised so that it addresses EE clearly and profoundly. Generally, because of a lack

of sufficient EE content in the Tanzanian primary teacher education curriculum, the majority of the interviewed tutors stated that they lacked EE content to be integrated into their teaching, claiming that the teacher education curriculum did not satisfactorily cover the content part on EE, nor did it address the methodology component for the teacher trainees' graduates to be able to teach EE.

Need for assessment of EE content

Moreover, when asked about the extent of their assessments in the field of EE, teacher trainees revealed that they rarely receive assessments on environmental topics. During the focus group discussion, the teacher trainees shared the following observations.

Well, I believe the best strategy is to make it a separate topic, as this will encourage instructors to teach and examine it critically." Currently, our teacher only asks us to define specific environmental concepts like deforestation, soil erosion, and environmental degradation in internal examinations and tests, focusing on a low-level area. (Teacher trainees, College A).

Another participant had this to add:

Let's treat EE as a separate subject, just like the other subjects." What are your thoughts? I know that by making it a separate topic, our tutors will have more time to teach and organise various learning activities that match real-life circumstances (Teacher trainees, College A).

Some tutors also said that the government's new curriculum reviews, which take into account the opinions of education stakeholders and make sure that the primary teacher education curriculum is properly implemented, will not fix the problem of tutors' pedagogy not matching subject content because of too many subjects and too few college hours. The current findings are in agreement with Bladow (2023), who argues that, when considering the future of Earth, all people must collectively foster EE integration for students of all ages, ultimately leading to more environmentally aware citizens who care for others and their communities.

In addition, the tutors who teach science, civics, and geography reported the need to make EE a separate subject because of its relevance to human survival. The following quote concerns EE's role in shaping our lives and protecting our environment from harm:

I think EE can best be included in the school curriculum as an independent subject starting from pre-primary to higher secondary based on its vital position of providing an opportunity for young learners to know their environment well and how to take action against the current and future environmental problems (Civics tutor, College B).

As a result, it is critical to consider such commendable initiatives aimed at making EE content realistic in teachers' colleges.

Increased supply of teaching and learning resources

Findings indicated the importance of ensuring an appropriate supply of teaching and learning resources in terms of financial, physical, fiscal, and human resources in teacher colleges. They generally maintained that proper teacher preparation, quality physical and human resources, and enough physical and human resources are essential because it is difficult to imagine learning without resources. During the interview, one of the tutors stressed the importance of providing relevant teaching and learning materials such as textbooks, teaching guidelines, modules and other reference reading materials, laboratory equipment, tutors' guides, employing more tutors, and improving working conditions for tutors. The lack of appropriate EE textbooks, as observed in colleges, not only hinders tutors' ability to prepare classroom instruction but also creates an unfavourable environment for teaching and learning through critical approaches to EE. The researcher made several observations when examining the impact of teaching and learning resources on tutors' ability to connect EE content to other topics. In regards to this, one tutor stated:

Because of a lack of teaching and learning tools, I usually speak and have the teacher trainees take notes. As a result, I advise the Ministry of Education to make efforts to provide enough teaching and learning materials for teacher colleges. The government is increasingly demanding digital education at all levels of learning; how can this happen in situations when teacher colleges lack infrastructure such as electrical power, projectors, and computers? For example, in college, we use our own laptops to prepare lessons, and we usually print the notes to use in class. We don't use projectors because they are not available here (Civics Tutor, College A).

Furthermore, a number of tutors suggested establishing criteria for instructors to adhere to in order to teach EE properly. They claim that rules are vital because they help tutors make critical judgements about what to teach and how to teach it. Furthermore, they asserted that guidelines hold significant value, given their lack of EE training during teacher preparation. The following quotations support tutors' claims about the importance of a tutor's guide to the tutor:

The first thing I would recommend is that the Ministry of Education develop guidelines for teaching EE in teacher colleges across all subjects." It would be authentic to have distinct environmental subjects for every subject and class, from primary school to college. This will help elementary school students receive an education that will benefit them in their post-

graduation community lives. Furthermore, it would keep tutors focused on teaching specific environmental issues rather than presenting them as cross-cutting difficulties within other disciplines' topics (Science Tutor, College B).

Another tutor had this to add:

We need to integrate EE into the subjects that we teach, so the ministry needs to develop guidelines that help the tutor know what to incorporate into each topic and what methods to use, just like in the other subject tutors' guides (Geography tutor, College A).

Based on the findings, it is obvious that having access to teaching and learning resources and materials, especially textual materials, is critical. These problems demonstrate that tutors heavily rely on textbooks and tutors' teaching standards as a source of knowledge. We can attribute this to their training and the limited availability of alternative knowledge sources within institutions. Teachers' lack of originality and imaginative skills in improvising materials from the local environment can also contribute to this issue.

The use of Inquiry-Based Learning approaches

Inquiry-Based Learning (IBL) is an educational approach that emphasises active learning, critical thinking, and problem-solving. It encourages students to ask questions, conduct research, and make discoveries on their own or in partnership with others to explore and investigate topics of interest. The majority of participants in this study recommended the use of inquiry-based approaches and critical thinking processes in teaching and learning, in which trainees actively investigate environmental issues, ask questions, and create their own understanding. This finding concurs with Londa et al. (2020), which found that environmental learning using the inquiry method in Tondano Lake, Indonesia, had a significant effect on student knowledge. Furthermore, the findings are consistent with Freire's CP beliefs on the significance of utilising an inquiry-based approach in the teaching and learning process since it fosters environmental literacy by engaging learners in critical thinking about diverse environmental challenges in their lives (Freire, 1970). To back up this claim, teacher trainees who took part in FGD sessions made the following claims:

We need to learn about the factors that contribute to environmental distortion so that we can avoid future environmental damage. As a result, it is past time for our tutors to shift their teaching methods to more practical, engaging learning styles outside of the classroom (Teacher Trainees, College B).

Similarly, during one of the interview sessions, a tutor from college B expressed support for the need to encourage inquiry-based learning as a means of effective teaching and learning of EE concerns, stating that:

Inquiry-based approaches improve trainees' problem-solving abilities and critical thinking abilities while also instilling a sense of ownership and empowerment in their learning process (Civics tutor, College B).

Generally, the findings and various assertions made by tutors and teacher trainees call for urgency to address the challenges encountered in teacher preparation for teaching EE in teachers' colleges so as to achieve the desired outcomes.

Conclusion and Recommendations

The study's findings highlight inadequate capacities among tutors in teaching Environmental Education (EE) in teachers' colleges, hindering the development of environmental literacy among trainees. While integrating EE as a core component is commendable, tutors face challenges in effectively embedding EE into their subjects. Various constraints were identified that impede the teaching and learning of EE. To bridge these gaps, several mitigation measures were proposed to enhance EE implementation in Tanzanian teachers' colleges.

Adequate preparation of pre-service teachers for effective teaching and learning of EE necessitates tutors possessing sufficient knowledge and skills in EE. Given the constantly changing global landscape, teachers' colleges must equip educators with environmental literacy to address emerging issues such as climate change. The study recommends that the Ministry of Education, Science, and Technology (MoEST) regularly organize and conduct in-service training for tutors to enhance their EE competencies for effective teaching and learning. Additionally, assessment for learning should systematically integrate EE content into both continuous assessments and final examinations to evaluate learners' EE proficiency in teacher colleges. Furthermore, the Tanzania Institute of Education (TIE) should enhance the integration of EE into the national curriculum for teacher education, ensuring the availability of suitable teaching and learning resources.

References

- Bladow, J. (2023). *Integrating environmental education into teacher preparation programs* [Doctoral dissertation], The University of North Dakota. UND Scholarly Commons. <https://commons.und.edu/theses/5231>
- Braun, V. & Clarke, V. (2013). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77-101.
- Breunig, M. (2005). Turning experiential education and critical pedagogy theory into praxis. *Journal of Experiential Education*, 28, (2), 106-122.
- Carter, S. (2020). Case study method and research design: Flexibility or availability for the novice researcher? In *Inclusive theory and practice in special education* (pp. 301-326). IGI Global.
- Corpuz, A. M., San Andres, T. C., & Lagasca, J. M. (2022). Integration of environmental education (EE) in teacher education programs: Toward sustainable curriculum greening. *Problems of Education in the 21st Century*, 80(1), 119.
- Creswell, J. W., & Poth, C. N. (2016). *Qualitative inquiry and research design: Choosing among five approaches*. Sage.
- Cutter-Mackenzie, A., & Smith, R. (2003). Ecological literacy: the ‘missing paradigm’ in EE (part one). *EE Research*, 9(4), 497-524.
- Damoah, B., & Omodan, B. I. (2023). Tracing the footprints of environmental education in teacher education: A review of pre-service teachers’ training in universities. *Journal for Educators, Teachers and Trainers*, 14(5), 184-196.
- Dhull, P., & Verma, P. (2017). EE in teacher education and challenges. *International Journal of Academic Research and Development*, 2(5), 84-87.
- Freire, P. (1972). *Pedagogy of the oppressed*. New York: Continuum.
- Gamira, D., & Firomumwe, T. (2021). Attitudes of pre-service geography teachers towards teaching EE at Lowveld University. *Journal on School Educational Technology*, 16(4), 20-32.
- Kimaro, A. R. (2018). *Integrating environmental education (EE) for sustainability into primary school curriculum in Tanzania: Exploring stakeholders’ views and perceptions*. [Doctoral dissertation, The University of Education Administration, Germany). <https://phsg.bsz-bw.de/front door/index/index/ docId/81>
- Kimaryo, L. A. (2011). *Integrating EE in primary school education in Tanzania: Teachers’ perceptions and teaching practices* [Doctoral dissertation, Abo Akademi University Press]. Finland: Abo Akademi University Press. <https://www.doria.fi/bitstream/ handle/10024/67481>

- Londa, T. K., Warouw, F. F., & Nusa, J. G. N. (2020, May). Environmental learning with inquiry method in Tondano lake. *In 4th Asian Education Symposium (AES 2019)* (pp. 167-170).
- Özonur, M. (2021). An investigation of prospective teachers' awareness toward environmental issues. *International Journal of Curriculum and Instruction, 13*(2), 1845-1856.
- Makundi, E. (2003). Environmental education curriculum policy in Tanzanian schools. *Southern African Journal of Environmental Education, 20*, 135-141.
- Ministry of Education and Culture [MoEC]. (1995). *Education and training policy*. MoEC.
- Ministry of Education, Science and Technology [MoEST]. (2023). *Education and training policy* of 2014 version 2023. MoEST.
- Ministry of Education and Vocational Training [MoEVT]. (2009). *EE strategy (2010-2014)*. MoEVT. http://www.Tzdpq.Or.Tz/.../Education/.../ENVIRONMENTAL_STRA_TEGY_Format_A.
- Ministry of Education and Vocational Training [MoEVT]. (2014). *Education and training policy*. MoEVT.
- Mwilapwa, B. T. (2016). *A historical account of Ilonga Teachers College*. Unpublished report submitted to the Commission of Education, Dar es Salaam.
- Ndeskoi, T. (2016). The status of Tanzania's primary school curriculum on environmental education from the 1980s-2010s. *Papers in Education and Development, 36*.
- Ng'ang'a, N. N. (2010). *Challenges and opportunities of teaching EE in secondary schools in Kenya: The case of Ruiru District* [Master's thesis]. Kenyatta University. <http://thesisbank.jhia.ac.ke/3076>
- Palmer, J. (1998). *EE in the 21st century: Theory, practice, progress and promise*. Routledge.
- Pesambili, J. C., & Mkumbo, K. A. K. (2018). Implications of female genital mutilation on girls' education and psychological well-being in Tarime, Tanzania. *Journal of Youth Studies, 21*(8), 1111–1126. <https://doi.org/10.1080/13676261.2018.1450969>.
- Pesambili, J. C., & Mkumbo, K. A. K. (2024). Beyond the surface: Unpacking the methodological and ethical challenges of researching into a sensitive female genital mutilation practice. *SN Social Sciences, 4*(22), 1–20. <https://doi.org/10.1007/s43545-023-00822-4>.

- Tiago, E., Rodrigues, R., & Ramos, R. (2021). Challenges and importance of EE in the education system in Portugal. *Revista Brasileira de Educação Ambiental*, 16(4), 49-59.
- UNESCO. (1976). *Final report of the international workshop on EE, Belgrade (Yugoslavia), 13-22 October 1975. Document ED -76/WS/97*, Paris. UNESCO.
- UNESCO, T. D. (1978, February). The Tbilisi Declaration. *In Intergovernmental conference on environmental education* (pp. 14-26). Tbilisi, Georgia: USSR.
- Yuan, K. S., Wu, T. J., Chen, H. B., & Li, Y. B. (2017). A study on the teachers' professional knowledge and competence in EE. *EURASIA Journal of Mathematics, Science and Technology Education*, 13(7), 3163-3175.