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# Integrating Environmental Education into Secondary School Curriculum Implementation: A Mixed-Methods Study of Teachers' Attitudes and Perceived Challenges in Gulu City, Northern Uganda

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**Abstract**

**Purpose:** Environmental Education (EE) aims to improve students' environmental literacy and equip them with knowledge and skills to address the negative effects of human activities on the environment. However, understanding of the challenges teachers face in teaching EE in secondary schools in low- and middle-income countries remains limited. This study examined teachers' attitudes toward EE and the challenges of implementing EE-integrated curriculum in secondary schools in Gulu City, northern Uganda.

**Methodology:** We conducted a concurrent mixed-methods design grounded in the policy enactment theory. The study was conducted in Gulu City, which has 20 secondary schools, with a target of 723 teachers and 80 school administrators. We used multistage cluster sampling and systematic random sampling to select survey participants, with a sample of 280 teachers. We purposively selected 24 school administrators. We used a pre-tested questionnaire and semi-structured interview guides to collect quantitative and qualitative data, respectively. We used Stata version 14.0 for quantitative data analysis. Odds ratios and the associated 95% confidence intervals were reported. We transcribed qualitative data verbatim and analyzed them using Atlas. ti software. We identified themes and subthemes from the interview data.

**Findings:** Teachers in Gulu City (84.7%, n=203) held favourable attitudes towards EE. The association between attitudes and participants' characteristics varied by sex, level of work experience and school management. After adjustment, male teachers were more likely than female teachers to contend that the secondary school curriculum did not provide adequate time for EE implementation (AOR = 2.30, 95% CI 1.19-4.43). Similarly, teachers of subjects with content related to EE were less likely to perceive that effective EE teaching required extensive training in EE-supportive methodologies (AOR = 0.43, 95% CI 0.23-0.80). This trend also held for teachers with many years of experience compared with those with under four years of experience (AOR = 0.33, 95% CI 0.14-0.77). Challenges to integrating environmental education included limited resources (73.0%; n = 154) and the unstructured placement of EE in the curriculum (47.6%; n= 100). The interviews revealed that the challenges that teachers encounter in implementing the EE integrated curriculum include limited physical space for practical project activities and unrelated instructional materials.

**Unique Contributions to Theory, Practice and Policy:** The National Curriculum Development Centre needs to explicitly outline EE content within the school curriculum and provide policy guidelines to streamline delivery approaches. Teacher training institutions should strengthen EE content in teacher training programmes and provide need-focused refresher training for teachers.

**Keywords:** Environmental Education, Teachers' Attitudes, and Curriculum Implementation Challenges

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## 1. Introduction

Human activities such as extensive tree cutting and improper waste disposal, particularly of non-biodegradable wastes, have become serious environmental and health concerns in many countries. Unpredictable episodes of drought, flood, and landslides are increasingly becoming catastrophic weather patterns partly due to climate change heightened by environmental degradation (NEMA, 2021). In response to environmental degradation, the global community adopted policy measures to promote healthy environmental practices (Noh, 2023). One such initiative recommends incorporating Environmental Education (EE) into the education curriculum. Many education curricula worldwide implement EE as a long-term response to environmental degradation, often as a cross-cutting component (Damoah & Adu, 2020; Gebrekidan & Gebremedhin, 2024; Kimaryo, 2011; Ruthanam et al., 2021). The emphasis on EE was first recommended at the 1972 Stockholm Conference and at UNESCO's 1975 Belgrade Charter (Dorn, 2020). The 1977 Tbilisi Conference then provided the framework for EE programmes (Gebrekidan & Gebremedhin, 2024). In Uganda, the basic education curriculum includes EE as a cross-disciplinary component (NCDC AMENDED ACT, 2021), referred to as cross-cutting content. Implementation involves incorporating this content into core curriculum subjects. Despite policy support for EE implementation, Uganda and many other low- and middle-income countries (LMICs) continue to implement school EE programs on a small scale (Chasek, 2020; Heimlich, 1993; Westbury et al., 2016). Therefore, it is imperative to conduct an in-depth inquiry into the factors influencing EE implementation.

EE is an educational programme that equips learners with environmental literacy and the ability to act on and effectively communicate environmental concerns (Olowoyo et al., 2025). According to Bisaso (2025), EE fosters learners' positive attitudes and behaviours towards the environment. The programme aims to equip learners with the knowledge, attitudes, and skills needed to adopt sustainable environmental practices. In most education systems, integration often occurs through lesson delivery or other school activities, with EE content delivered as an extension of the curriculum or as part of holistic school programmes (NCDC AMENDED ACT, 2021). The integral approach to delivering cross-cutting curriculum content involves adapting teaching methods to integrate it alongside core subjects (Afroz, 2017). This approach depends heavily on teachers' innovativeness and competence in adapting their methods to accommodate cross-cutting content effectively. Factors such as teachers' pedagogical and content knowledge, as well as their perceptions and attitudes towards cross-cutting content, influence their implementation practices (Suarlin, 2023). Like other curriculum content, EE implementation requires teachers to have in-depth content knowledge and practical skills to organise hands-on activities that align with appropriate integration practices. Similarly, schools must have appropriate support infrastructure to facilitate meaningful practical integration activities (Bisaso, 2025). A critical examination of current pedagogical practices in schools indicates that many teachers deliver traditional subjects without effectively incorporating the principles and practices of EE (Kimaryo, 2011; Putu Kaler Surata & Utari Vipriyanti, 2018). This oversight limits efforts to make schools centres of innovation in addressing social concerns such as environmental degradation.

### Problem Statement

Teachers' pedagogical practices strongly influence the achievement of curriculum goals. Implementing cross-cutting curriculum content such as EE requires teachers to decide which content to integrate into their subjects and which teaching methods to use. In particular, EE is embedded in the teaching of various curriculum subjects (ERTEN, 2021), and its implementation depends on teachers' lesson-delivery practices. Factors that shape these decisions include teachers' attitudinal dispositions and the school context (Potter-Nelson & O'Neil, 2019). However, research on secondary school teachers' perceptions and attitudes toward EE in Northern Uganda remains limited. Although other studies have reported school-based challenges to EE implementation (Govender, 2026), these challenges often vary by school context. Grounded in Stephen Ball's (2011) Theory of Policy Enactment, this study examined secondary school teachers' attitudes toward EE, the challenges they face in implementing it, and the factors associated with teachers' attitudinal dispositions and EE implementation challenges.

### Objectives

1. To assess the attitudes of secondary-school teachers in Gulu City towards EE.
2. To explore the challenges to implementing EE in secondary schools in Gulu City.
3. To examine the factors associated with teachers' attitudes toward EE and perceived challenges to EE implementation in Gulu City.

 

**Review of Related Literature**

Teachers' effectiveness in implementing the curriculum is linked to their depth of content knowledge and their attitudes towards it (Liakopoulou, 2011). Teachers with in-depth curriculum knowledge and positive attitudes are more likely to be effective in their professional duties than those with negative attitudes. Andez-manzanal and Rodr (n.d.) examined the relationship between environmental knowledge and attitudes among university students and found that students with higher environmental knowledge held more positive attitudes towards environmental practices than those with lower knowledge scores. Another study by Damoah & Adu (2020) in South Africa examined teachers' challenges in promoting EE practices while teaching their respective subject areas. Their study revealed that, although the recommended approach to teaching EE in South African schools was to integrate EE themes into other subject areas, implementation was challenging because subject teachers held varied views, understandings, knowledge, and perceptions of EE. Teachers with a deeper understanding of EE content were more likely to implement EE effectively than those with limited knowledge of EE. However, most of these studies did not assess the association between teachers' characteristics and their attitudinal dispositions. Other studies (Alqarni, 2022; Russell et al., 2023; Gebrekidan & Gebremedhin, 2024) similarly found associations between teachers' EE attitudes and challenges to EE implementation. Roselimo (2014) analyzed the integration of EE into geography lessons in Lesotho secondary schools and found that teachers with limited EE knowledge placed greater emphasis on subject content and failed to integrate EE effectively. Roselimo's study also did not sufficiently explore the factors associated with EE attitudes that could influence EE integration in curriculum implementation. Across these studies, teachers' EE knowledge and attitudes influenced innovations and practices that strengthened EE. In Uganda, data on teachers' attitudes towards EE and the perceived challenges of implementing EE in secondary schools remain limited. Musana & Bisaso (n.d.) studied trends and challenges in environmental and sustainability education in Uganda. Although their study revealed challenges to environmental education, it didn't explore teachers' attitudinal dispositions. Given the differences in contexts and the unique nature of environmental degradation (rising levels of tree cutting) in Northern Uganda (Mucunguzi, 1995), it remained important to generate context-specific information on teachers' knowledge, attitudes, and practices of EE in northern Uganda. Such knowledge may inform innovations in schools and the community for practice-based EE implementation.

**Methodology**

This concurrent mixed-methods study was informed by the theory of policy enactment. The study used quantitative and qualitative approaches in data collection, analysis, and interpretation. The findings were triangulated to arrive at a comprehensive interpretation. Adopting methodological pluralism enhanced the comprehensiveness of the data and enabled the research questions to be addressed from broad perspectives (Parylo, 2014).

The study was conducted in Gulu City, northern Uganda. The study included 20 secondary schools, 6 government-aided and 14 privately owned. The study population comprised 723 teachers and 80 school administrators (head teachers, deputy head teachers, and directors of studies) working in these schools. The researchers used a multistage clustered sampling design and random sampling to select respondents. The study objectives and population distribution criteria informed the choice of sampling design (Hossan et al., 2023). Given the low number of government-aided schools in the study area, the study selected all six government-aided schools and 10 private schools to form the sample. The study selected private schools through simple random sampling from the study population. The study drew a representative sample of 243 participants from the sampled schools using systematic random sampling at a 95% confidence level and a 5.0% margin of error (Jung, 2014; Robinson, 2014). Each school contributed a proportionate number of participants based on its staff size. The interview sample comprised 32 respondents, purposively selected from among the school administrators based on their knowledge of the study's focus.

The researcher collected data using questionnaires, interview guides, and observation checklists. Before data collection, experts critically evaluated the research instruments to assess their reliability and validity. The researcher made appropriate refinements to achieve reliability and validity indices of 0.7. A total of 211 respondents completed the questionnaires (74 from government-aided schools and 137 from private schools). In each sampled school, the researcher distributed questionnaires to participants gathered in a single room, who completed them independently. The researcher collected all questionnaires the same day they were completed. The researcher interviewed 24 school administrators (at most two from each sampled school) and observed a lesson at each school. The questionnaires collected data on teachers' EE attitudes and perceived challenges to implementing EE EE-embedded curriculum, while interviews gathered administrators' perspectives on the challenges of implementing EE in schools. Lesson observations provided real-life insight into EE integration in

 

teaching. The researcher administered all tools on the same day of each school visit. This concurrent approach ensured that all research data were collected on the same day at each location.

**Data Analysis and Findings**

**Characteristics of Study Participants**

Most questionnaire participants were male (72.5%; n=153), married (82.5%; n=174), and taught subjects that did not directly relate to environmental concepts (55.0%; n=116) (Table 1). With respective to participants' sex, the distribution of participants was typical of the population; Gulu City had 723 secondary school teachers (Gulu City Development Plan, 2022), of whom 73% (528) were male, a ratio comparable to that in the sample. The pattern reflected in the distribution of participants for the interview was similar to that of the questionnaire respondents (Table 2)

Table 1. Characteristics of Study Participants

| Variable | Frequency, N=211 | Percentage (%) |
|---|---|---|
| Age group | | |
| ≤25 | 7 | 3.3 |
| 26-45 | 189 | 89.6 |
| 46-59 | 15 | 7.1 |
| Sex/Gender | | |
| Male | 153 | 72.5 |
| Female | 58 | 27.5 |
| Marital Status | | |
| Married | 174 | 82.5 |
| Single | 37 | 17.5 |
| School Type | | |
| Private | 78 | 37.0 |
| Government-aided | 133 | 63.0 |
| Subject Taught | | |
| Environmental-related | 95 | 45.0 |
| Environmental-unrelated | 116 | 55.0 |
| Years of teaching experience | | |
| 1-3years | 55 | 26.0 |
| 4-10years | 98 | 46.4 |
| >10years | 56 | 26.6 |
| Highest level of Education | | |
| Diploma | 52 | 24.6 |
| Bachelors | 144 | 68.3 |
| Masters | 15 | 7.1 |

 

Table 2. Characteristics of Participants for the Qualitative Interviews

| Personal Data | Frequency (N = 24) | Proportion (%) |
|---|---|---|
| Gender | | |
| Male | 17 | 71% |
| Female | 7 | 29% |
| Teaching experience | | |
| <5 years | 8 | 33% |
| 5-10 years | 7 | 29% |
| >10 years | 9 | 38% |
| Education level | | |
| Diploma | 1 | 4% |
| Bachelors | 23 | 96% |
| Others | 0% | 0% |
| | | |
| Special trainings in EE | | |
| Yes | 10 | 42% |
| No | 14 | 58% |

**Response Rate**

For the questionnaire, the response rate was 99.9% (n = 210). The response rates for participants interviewed and those observed during class teaching were 80% (n = 24) and 93.8% (n = 15), respectively. The questionnaire response rate was likely high because we sampled, administered, and collected completed questionnaires on the same day. The interview response rate was lower because, in some schools, the targeted administrators were absent on the day of data collection.

**Attitudes of Teachers towards Environmental Education**

Using a five-point Likert scale, with responses ranging from strongly agree (level 1) to strongly disagree (level 5), we collected data on teachers' attitudes towards EE (Table 3). The data revealed that most participants held favourable attitudes towards EE; 96.7% (n=203) either strongly agreed or agreed that they derived benefits from the environment. The majority of participants (71.9%, n=151) did not view the inclusion of EE content in the curriculum as simply causing overload, a view echoed by 88.8% (n=179), who added that EE helped students understand concepts in other subjects more easily. However, more than half of the teachers (55.7%; n=117) said preparing EE lessons was demanding, while 65.1% stated that effective EE teaching required extensive training in EE-related methodology (Table 3).

Interview submissions aligned with the questionnaire findings. Respondents interviewed considered EE vital to implementing the school curriculum. They stated that EE raises students' awareness of environmental degradation and human impacts on the environment. More specifically, they emphasized EE's role in transforming communities, providing environmental knowledge and skills, and raising learners' awareness of issues such as wetland encroachment and deforestation. These submissions indicated a positive attitude toward EE among both secondary school teachers and administrators. Some of the submissions were as follows:

"*Yes, I have a strong feeling that once this awareness is created in the learners, as they grow, they become sensitive to issues of environmental degradation, human activities that could perhaps affect the environment directly. Major problem is that we don't appreciate that our activities contribute to almost 90% of environmental degradation*" R7.

"*Yes. Because if it is taught it helps students to have the knowledge of how to protect their environment and even if they are out of school, they can protect their environment*" R12.

"*Yes. We have people who may be destroying the environment ignorantly. Teaching EE impacts the sense of responsibility. There are those who may practice what we teach in class. Helps to give the necessary skills required to address environmental challenges, e.g., deforestation*" R17.

Respondents considered EE beneficial to both learners and the wider community. They recognised its role in enhancing environmental literacy as a sustainable way to combat environmental degradation; therefore, integrating it into the curriculum is considered a worthwhile undertaking.

 

Table 3. Attitudes of secondary school teachers on Environmental Education

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| The benefits that I get from the environment are great. | 153 (72.9) | 50 (23.8) | 1 (0.5) | 6 (2.9) | 0 (0.0) |
| EE can help students understand concepts in other subjects more easily | 83 (39.3) | 96 (45.5) | 15 (7.1) | 13 (6.2) | 4 (1.9) |
| The school syllabus logically organizes environmental topics. | 40 (19.1) | 71 (33.8) | 20 (9.5) | 67 (31.9) | 12 (5.7) |
| I integrate environmental concepts after covering the core subject content | 41 (19.5) | 109 (51.9) | 12 (5.7) | 40 (19.1) | 8 (3.8) |
| EE is an overload in the school curriculum | 16 (7.6) | 31 (14.8) | 12 (5.7) | 108 (51.4) | 43 (20.5) |
| It is demanding to prepare EE lessons | 41 (19.5) | 76 (36.2) | 13 (6.2) | 66 (31.4) | 14 (6.7) |
| Integrating EE requires extensive teacher training | 44 (21.1) | 92 (44.0) | 7 (3.4) | 54 (25.8) | 12 (5.7) |

**Challenges to Integrating Environmental Education**

Participants were prompted to comment on perceived challenges to integrating EE into the secondary school curriculum implementation. On a Likert scale of 1-5 (1 = strongly agree, 2 = agree, 3 = undecided, 4 = disagree, 5 = strongly disagree), up to 69.2% (n=146) stated that outdated and inadequate school facilities hindered EE implementation. About 73.0% (n=154) reported a lack of instructional materials, and 77.7% (n=164) reported a lack of qualified teachers for EE; both hindered the programme's implementation. However, 48.8% (n=79) of participants reported that policy-related challenges affected EE teaching in their schools (Table 4), while 48.3% (n=102) perceived that the curriculum did not provide adequate time for EE implementation. Teachers' views from post-observation conferences following lesson observations highlighted similar challenges with the school EE programme. Key challenges included limited information about EE, inadequate time allocated in the curriculum, and the curriculum's failure to explicitly indicate EE content.

 

Table 4. Perceived Challenges to Integrating Environmental Education

| Perceived Challenges | Responses | | | | |
|---|---|---|---|---|---|
| | Strongly Agree n (%) | Agree n (%) | Undecided n (%) | Disagree n (%) | Strongly Disagree n (%) |
| There is a lack of environmental policy in my school | 41 (19.4) | 49 (23.2) | 13 (6.2) | 83 (39.3) | 25 (11.9) |
| There is poor coordination of EE programs in the school | 28 (13.3) | 83 (39.3) | 19 (9.0) | 64 (30.3) | 17 (8.1) |
| The curriculum is overcrowded and does not support the integration of EE | 36 (17.1) | 43 (20.4) | 16 (7.6) | 91 (43.1) | 25 (11.9) |
| There is not enough time to implement EE in the school curriculum | 30 (14.2) | 72 (34.1) | 11 (5.2) | 75 (35.6) | 23 (10.9) |
| Outdated and inadequate facilities in schools upset efforts to implement EE in the school curriculum | 50 (23.7) | 96 (45.5) | 14 (6.6) | 44 (20.8) | 7 (3.4) |
| Lack of instructional materials and funding affects efforts to implement EE | 48 (22.8) | 106 (50.2) | 6 (2.8) | 42 (19.9) | 9 (4.3) |
| Lack of qualified teachers for EE hinders implementation | 72 (34.1) | 92 (43.6) | 10 (4.7) | 26 (12.3) | 11 (5.2) |

**Interview Responses on Challenges to Teaching EE**

Interviews with school administrators reported several challenges to teaching EE in secondary schools in Gulu City. These issues included limited time for EE activities due to a busy curriculum, and limited financial and material resources. Some responses are as indicated below:

"*One of the barriers is time. If you engage more with the EE, you may not cover other content in the syllabus. Teachers try to cover the syllabus and pay less attention to the EE. Teachers are more exam-oriented"* R22.

"*We have barriers of time. There are too many activities condensed within the time, so we have limited time for club activities. People are often drawn to the many activities, and unless it is very urgent, attention may not be given*" R13.

Financial constraints, in particular, limit resources for EE activities, making it difficult for schools to organize and carry out practical projects.

"*Limited resources, including financial, land, and structural constraints, are the challenges I can identify that hinder the implementation of EE*" R16.

Other participants reported limited open spaces within the school. They would use the open spaces for outdoor EE-related project activities to consolidate concepts learnt in class. Many schools had only buildings, with little room for other activities.

"*Another challenge that we have is the shortage of space. The learners want to have a larger plantation that could help conserve the environment, but we find that the available space is insufficient*" R5.

"*Another challenge that we have is the shortage of space. The learners want to have a larger plantation that could help conserve the environment, but we find that the available space is insufficient … and negative attitude of school authorities. They do not accept funding for the practical part of EE*" (R5).

Some teachers of subjects with inherently limited EE content held misconceptions about the relevance of including EE in their lessons. This perception fosters a mindset that fails to recognize EE as a cross-cutting element across all subjects in the curriculum.

"*One challenge is the misconception about integrating EE into the curriculum subjects. Some teachers believe EE content aligns only with specific subjects, such as agriculture, biology, and geography. They think it is not relevant to other subjects.*" R17.

 

Some participants stated that the community had low environmental literacy, which led to negative attitudes toward managing environmental issues. A teacher observed that the community seemed unsure about how to support the school EE programme.

"*Negative perception by the people on EE has led to poor waste management, for instance, dumping plastics anyhow. They feel it is not their responsibility*" (R7).

"*One, I would think the knowledge is still somewhat limited among people. What to be done exactly is unclear. Yes, it is coming up, it is improving with the new curriculum, but it was low*" R20.

The challenges to implementing EE were varied and widespread. Limited space was a particular issue for private schools, while teachers' proficiency remained a common challenge across all school types. Furthermore, schools often faced limited resources, including financial and material resources, which negatively affected EE implementation.

**Perceived Challenges to EE Implementation among Male and Female Teachers**

A Chi-square test assessed whether respondents' sex was significantly associated with perceived challenges to implementing EE in secondary schools. The test revealed that these challenges differ significantly by participants' sex. Compared with female teachers, male teachers were significantly more likely to perceive that "There is a lack of environmental policy in my school" (P = 0.006) and that "There is not enough time to implement EE in the school curriculum" (P = 0.013) (Table 5).

Table 5. Perceived challenges among male and female teachers

| **Perceived Challenges** | **No** | | **Yes** | | **Chi Square** | **P-Value** |
|---|---|---|---|---|---|---|
| | **Female n (%)** | **Male n (%)** | **Female n (%)** | **Male n (%)** | | |
| There is a lack of environmental policy in my school | 42 (34.71) | 79 (65.29) | 16 (17.78) | 74 (82.22) | 7.42 | **0.006** |
| There is poor coordination of EE programs in the school | 33 (33.00) | 67 (67.00) | 25 (22.52) | 86 (77.48) | 2.90 | 0.089 |
| The curriculum is overcrowded and does not support the integration of EE | 41 (31.06) | 91 (68.94) | 17 (21.52) | 62 (78.48) | 2.26 | 0.133 |
| There is not enough time to implement EE in the school curriculum | 38 (34.86) | 71 (65.14) | 20 (19.61) | 82 (80.39) | 6.15 | **0.013** |
| Outdated and inadequate facilities in schools upset efforts to implement EE in the school curriculum | 18 (27.69) | 47 (72.31) | 40 (27.40) | 106 (72.60) | 0.002 | 0.965 |
| Lack of funding affects efforts to implement EE | 11 (23.40) | 36 (76.60) | 47 (28.66) | 117 (71.34) | 0.51 | 0.477 |
| Lack of instructional materials affects efforts to implement EE | 14 (24.56) | 43 (75.44) | 44 (28.57) | 110 (71.43) | 0.33 | 0.886 |
| Lack of qualified teachers for EE hinders implementation | 32 (26.67) | 88 (73.33) | 26 (28.57) | 65 (71.43) | 0.09 | 0.759 |

 

**Challenges of Inadequate Time to Teach EE and the Need for Training in EE Methodology.**

We further examined perceived challenges to teaching environmental education in secondary schools in relation to participants' characteristics. The perception that schools have inadequate time to implement EE was more than twice as common among male participants as among female participants, adjusted odds ratio (aOR = 2.30; 95% CI: 1.19-4.43). This perception was less common among teachers in public (government-aided) schools, crude odd ratio (cOR = 0.47; 95% CI: 0.26-0.82) than in private schools, and less common among teachers with more than 10 years of teaching experience (cOR = 0.43 (95% CI: 0.20-0.92) than among those who had taught for less than 4 years. However, except for differences by participants' sex, these associations were not statistically significant after adjustment for other factors (Table 6).

Most participants (77.7%, n = 164) perceived that schools taught EE poorly because most teachers lacked extensive training in EE-supportive methodologies. This perception was less common among teachers of environment-related subjects (aOR = 0.43; 95% CI: 0.23-0.80) and among experienced teachers with more than 10 years' teaching experience (aOR = 0.33; 95% CI: 0.14-0.77) than among those teaching subjects unrelated to EE and those with less than four years' experience, respectively (Table 7).

Table 6. Factors Associated with Inadequate Time to Implement EE in Schools

| **Variable** | **Total** | **Time to implement EE in schools** | | **cOR (95% CI)** | **aOR (95% CI)** | **P-Value** |
|---|---|---|---|---|---|---|
| | | Inadequate (%) | Adequate (%) | | | |
| **School type** | | | | | | |
| Private | 78 | 47 (60.3) | 31 (39.7) | 1 | 1 | |
| Government | 133 | 55 (41.4) | 78 (58.6) | **0.47 (0.26-0.82)** | 0.61 (0.33-1.12) | 0.111 |
| **Sex** | | | | | | |
| Female | 58 | 20 (34.5) | 38 (65.5) | 1 | 1 | |
| Male | 153 | 82 (53.6) | 71 (46.4) | **2.19 (1.17-4.11)** | **2.30 (1.19-4.43)** | **0.013** |
| **Subject taught** | | | | | | |
| EE unrelated | 116 | 58 (50.0) | 58 (50.0) | 1 | 1 | |
| EE related | 95 | 44 (46.3) | 51 (53.7) | 0.86 (0.50-1.49) | 0.90 (0.50-1.61) | 0.721 |
| **Years of Experience** | | | | | | |
| <4 | 55 | 30 (54.5) | 25 (45.5) | 1 | 1 | |
| 4 - 6 | 58 | 34 (58.6) | 24 (41.4) | 1.18 (0.56-2.49) | 1.05 (0.48-2.28) | 0.901 |
| 7 - 10 | 42 | 19 (45.2) | 23 (54.8) | 0.69 (0.31-1.54) | 0.65 (0.28-1.51) | 0.322 |

| | | | | | | |
|---|---|---|---|---|---|---|
| >10 | 56 | 19 (33.9) | 37 (66.1) | **0.43 (0.20-0.92)** | 0.47 (0.21-1.07) | 0.072 |
| **Marital Status** | | | | | | |
| Married | 174 | 82 (47.1) | 92 (52.9) | 1 | 1 | |
| Not married | 37 | 20 (54.1) | 17 (45.9) | 1.32 (0.65-2.69) | 1.04 (0.48-2.23) | 0.929 |
| **Education level** | | | | | | |
| Bachelors | 144 | 73 (50.7) | 71 (49.3) | 1 | 1 | |
| Diploma | 52 | 24 (46.2) | 28 (53.8) | 0.83 (0.44-1.57) | 0.88 (0.42-1.56) | 0.516 |
| Masters | 15 | 5 (33.3) | 10 (66.7) | 0.49 (0.16-1.49) | 0.64 (0.20-2.07) | 0.456 |

Table 7. Factors Associated with Requirements of Extensive Training in EE Methodology

| **Variable** | **Total** | **Extensive training required** | | **cOR (95% CI)** | **aOR(95% CI)** | **P-Value** |
|---|---|---|---|---|---|---|
| | | **Yes (%)** | **No (%)** | | | |
| **School type** | | | | | | |
| Private | 78 | 59(75.6) | 19(24.4) | 1 | 1 | |
| Government | 133 | 77(57.9) | 56(42.1) | **0.44(0.24-0.82)** | 0.67(0.33-1.33) | 0.247 |
| **Sex** | | | | | | |
| Female | 58 | 32(55.2) | 26(44.8) | 1 | 1 | |
| Male | 153 | 104(68.0) | 49(32.0) | 1.72 (0.93-3.20) | 1.61(0.82-3.16) | 0.167 |
| **Subject taught** | | | | | | |
| EE unrelated | 116 | 84(72.4) | 32(27.6) | 1 | 1 | |
| EE related | 95 | 52(54.7) | 43(45.3) | **0.46 (0.26-0.82)** | **0.43(0.23-0.80)** | **0.008** |
| **Years of Experience** | | | | | | |
| <4 | 55 | 37(67.3) | 18(32.7) | 1 | 1 | |
| 4 - 6 | 58 | 45(77.6) | 13(22.4) | 1.68 (0.73-3.88) | 1.68(0.71-4.01) | 0.24 |
| 7 - 10 | 42 | 31(73.8) | 11(26.2) | 1.37 (0.56-3.33) | 1.26(0.50-3.20) | 0.62 |
| >10 | 56 | 23(41.1) | 33(58.9) | **0.34 (0.16-0.74)** | **0.33(0.14-0.77)** | **0.01** |

 

| | | | | | | |
|---|---|---|---|---|---|---|
| **Marital Status** | | | | | | |
| Married | 174 | 111(63.8) | 63(36.2) | 1 | 1 | |
| Not married | 37 | 25(67.6) | 12(32.4) | 1.18 (0.56-2.51) | 0.91(0.39-2.10) | 0.817 |
| **Education level** | | | | | | |
| Bachelors | 144 | 94(65.3) | 50(34.7) | 1 | 1 | |
| Diploma | 52 | 34(65.4) | 18(34.6) | 1.00 (0.52-1.96) | 0.92(0.45-1.88) | 0.811 |
| Masters | 15 | 8(53.3) | 7(46.7) | 0.61 (0.21-1.77) | 0.94(0.29-3.07) | 0.924 |

## Discussion

### Teachers' EE Attitudes

This study found that most teachers in Gulu City held positive attitudes towards EE. Teachers believed they derived benefits from the environment and thus appreciated the inclusion of EE content in their subjects. However, attitudes differed significantly between male and female teachers in Gulu City. Male teachers were more likely to perceive policy gaps that could streamline EE implementation and to view the secondary school curriculum as content-crowded. These findings align with County & Control (2018) preliminary evaluation of environmental attitudes among EE instructors, students, and school parents in Florida. They found significant differences in environmental attitudes across the groups they studied. However, they found no significant difference in EE attitudes by participants' sex. However, County & Control (2018) and Sarıkaya & Saraç (2018) reported that women expressed greater concern for the biosphere than men. Cini and Mifsud (2017) found a similar pattern, reporting that women had stronger environmental attitudes than men. Relatedly, Noh (2023) found that females were more likely to say that existing laws and regulations did not go far enough to protect the natural environment. Kimaro (2026), examining primary school teachers' awareness and experiences of environmental changes and challenges in Tanzania, recommended strengthening teachers' EE awareness to improve their attitudes toward EE implementation in schools. Deviations between the current study's findings and earlier related studies may reflect contextual differences across study areas. For instance, the USA education system studied by County and Control differs from Uganda's in both organization and approaches (Ssebaggala, 2017). Moreover, school organization and instructional practices also varied across the study areas. This study found that teachers' sex, level of experience, subject specialization, and type of school (private versus public) significantly influenced teachers' attitudes toward EE in Gulu City. These factors should inform interventions to improve teachers' attitudes toward EE in Gulu City. It may be worthwhile to focus more on improving the attitudes of male teachers, less experienced teachers, and those specializing in subjects with limited EE content, since these categories held comparatively lower attitudes toward EE.

### Challenges to School EE implementation

Challenges to implementing the secondary school EE programme in Gulu City included resource constraints, the implicit presentation of EE content in the curriculum, teachers' limited skills in integrating EE concepts, and limited contact time for EE because the curriculum is widely perceived as crowded. Physical barriers, such as limited space that restricted practical work, were also noted, even though practical work is the preferred approach to teaching EE. Related studies on EE have reported similar findings: Olowoyo et al. (2025), reporting on the implementation of EE in South African schools, highlighted time constraints as a factor that led teachers to prioritize rapid syllabus coverage, sometimes to the detriment of effective EE implementation. They also found that the South African EE programme lacked clear direction and that teachers had limited exposure to environmental pedagogies. Richter & Sousa (2019) similarly reported limited resources and a lack of trained staff as key challenges to planning and implementing sustainability education in many African higher education institutions. They also found gaps between curriculum specifications for education for sustainable development and the practices that actually take place in promoting social and environmental responsibility. These findings are consistent with the current study's findings. The implicit definition of EE content in Uganda's secondary school curriculum aligns with the lack of clear direction reported by Olowoyo et al. (2025). The secondary school curriculum structure offered limited guidance to teachers on EE content and methodologies. (Bisaso, 2025) noted in trends and challenges of sustainable and environmental education in Uganda that there was a lack of strong policies focusing on whole-institution approaches to EE implementation, in addition to the challenges

 

of low EE awareness and methodological capacity among teachers. As teachers enact the curriculum (Casimiro, 2016), i.e., interpret, adapt, and implement it, they are bound to be subjective because of the lack of clear guidelines. The essence of integral curriculum implementation is that, during curriculum adaptation, teachers choose strategies that incorporate cross-disciplinary content into the teaching of traditional subjects (Bisaso, 2025), so that the content is delivered as the subjects are taught. Teachers therefore use their discretion in deciding which EE content to integrate and which methodologies to use. This likely affects standardization in curriculum implementation. It was also noted that different curriculum subjects lend themselves to different delivery methods, which again create room for non-standardized, method-dependent integration practices. While the written curriculum reflects the curriculum developers' perspective (Casimiro Lopes, 2016) and was standardized, the enacted curriculum often reflects the implementer's (teacher's) perspectives and, for content not explicitly outlined, often results in non-standardized practices. As Olowoyo et al. (2025) state, teachers' knowledge of and attitudes towards the curriculum strongly influence curriculum enactment processes. Therefore, our findings that teachers' perceptions of having limited time to cover the curriculum are attitudinal and have implications for integrating cross-disciplinary content, such as EE. It also indicated a mismatch between teachers' pedagogical perceptions and the general curriculum's implementation guidelines, which were often developed on the basis that the content matched the time allocated for coverage.

## Conclusion and Recommendations

### Conclusions

Attitudes of teachers in Gulu City towards EE vary by sex, school ownership and years of experience in teaching. Interventions to improve the integration and teaching of EE in secondary schools need to be tailored to teachers' sex, school type, and years of teaching experience. In addition, interventions to improve the adoption of EE in the secondary school curriculum and its implementation should target the challenges of implementing EE. These challenges include limited resources, limited physical space in some schools, and an unstructured placement of EE in the curriculum.

### Recommendations

To address the challenges posed by the implicit nature of EE in the school curriculum, NCDC may need to explicitly outline EE content, propose appropriate delivery approaches, and strengthen support systems for school environmental education.

Given teachers' limited skills and knowledge of appropriate methods for integrating EE into curriculum implementation, the Ministry of Education and Sports could consider refresher training and continuous professional development to improve teachers' pedagogical competence and address mismatches in curriculum enactment. Training priorities on instructional materials and methods, use of the wider environment in EE delivery, EE content and appropriate integration methods could be given to teachers whose subjects inherently lack environmental content, as they face greater challenges in integrating EE. The Refresher trainings could also target less experienced teachers who have poorer attitudes towards EE.

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Regular evaluations of curriculum implementation should determine whether teachers adhere to the practices recommended in the curriculum and whether these practices align with national goals of education for livelihood.

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## References

Afroz, J. (2017). Environmental Education in the Age of Environmental Degradation: A Comparative Study of Elementary Level Students of Delhi and Dhaka. *Education Journal*, *6*(4), 133. https://doi.org/10.11648/j.edu.20170604.12

Alqarni, M. S. (2022). *by*. *December*.

Andez-manzanal, R. F., & Rodr, L. (n.d.). *Evaluation of Environmental Attitudes : Analysis and Results of a*

 

*Scale Applied to University*. 988–1009. https://doi.org/10.1002/sce

Bisaso, J. M. and R. (2025). Trends and Challenges in Environmental and Sustainable Education in Uganda. In R. M. and M. R. Thomas (Ed.), *Brock Education Journal* (first). Taylor and Francis Ltd.

Casimiro, A. (2016). The Theory of Enactment by Stephen Ball: And What If the Notion of Discourse Was Different? *Education Policy Analysis Archives*, *24*(25), 1–19. https://epaa.asu.edu/ojs/article/view/2111/1744

Casimiro Lopes, A. (2016). The Theory of Enactment by Stephen Ball: And What If the Notion of Discourse Was Different? *Education Policy Analysis Archives*, *24*, 1–19. https://www.redalyc.org/journal/2750/275043450050/html/

Chasek, P. (2020). *Lessons from 50 years of UN sustainable development policy Stockholm and the Birth of Environmental Diplomacy Key Messages*. 1–8.

Cini, A., & Mifsud, M. (2017). Knowledge, attitudes and behaviour towards the environment of secondary school teachers. In *Handbook of Lifelong Learning for Sustainable Development* (pp. 211–227). Springer.

County, L., & Control, H. (2018). *A Preliminary Evaluation of Awareness , Knowledge , and Attitude in Environmental Education Specialists , Instructors , Students , and P .... A PRELIMINARY EVALUATION OF AWARENESS , KNOWLEDGE , AND ATTITUDE IN ENVIRONMENTAL EDUCATION SPECIALISTS , INSTRUCTORS , STUDENTS ,. May*.

Damoah, B., & Adu, E. O. (2020). *Teacher ' S Awareness of the Integrated Environmental Education Curriculum in South Africa*. *17*(6), 280–295.

Dorn, C. (2020). *of the United Nations International Environmental Education Program ,. 18*(december), 83–108.

Dubale, A. A., Minale, A. S., & Tamiru, A. B. (2026). Bridging policy and practice: environmental education implementation in secondary school geography classrooms in Ethiopia, Amhara Region. *International Research in Geographical and Environmental Education*, 1–18. https://doi.org/10.1080/10382046.2026.2716092

Gebrekidan, T. K., & Gebremedhin, G. G. (2024). Integration and effectiveness of formal environmental education in Africa and India: Review. *European Journal of Sustainable Development Research*, *8*(2), em0253. https://doi.org/10.29333/ejosdr/14368

Heimlich, J. E. (1993). Nonformal environmental education: Toward a working definition. *Ericcsmee*, *May*, 1–7.

Hossan, D., Mansor, Z. D., & Jaharuddin, N. S. (2023). *Research Population and Sampling in Quantitative Study*. *13*(3).

Kimaro, A. R. (2026). *Primary School Teachers ' Awareness and Experiences in Addressing Environmental Challenges in Tanzania : The Case of Dar es Salaam and Kilimanjaro Regions*. *33*(1), 96–110.

Kimaryo, L. A. (2011). *Integrating Environmental Education in Primary School Education in Tanzania*. http://www.abo.fi/stiftelsen/forlag/

Liakopoulou, M. (2011). *The Professional Competence of Teachers : Which qualities , attitudes , skills and knowledge contribute to a teacher ' s effectiveness ? 1*(21), 66–78.

Mucunguzi, P. (1995). Environmental Education in the Formal Sector of Education in Uganda. *Environmental Education Research*, *1*(2), 233–240. https://doi.org/10.1080/1350462950010208

Musana, J., & Bisaso, R. (n.d.). Trends and Challenges in Environmental and Sustainability Education in Uganda. *World Review*, 40–54.

NCDC AMENDED ACT (2021).

Noh, J. (2023). *A Comparative Study of the Integration of Sustainability in the Lower Secondary Science Curriculum of Sweden and South Korea Environmental Education Major*.

Olowoyo, J., Lion, N. G., Agboola, O. O., Mugivhisa, L., & Olaiya, O. O. (2025). Environmental Education Environmental education inclusion in the curriculum of high schools : challenges of the current piecemeal approach. *International Research in Geographical and Environmental Education*, *0*(0), 1–16. https://doi.org/10.1080/10382046.2025.2556853

Parylo, O. (2014). Qualitative, quantitative, or mixed methods: An analysis of research design in articles on principal professional development (1998–2008). *Ceased*, *6*(3), 297–313.

 

https://doi.org/10.5172/MRA.2012.6.3.297

Putu Kaler Surata, S., & Utari Vipriyanti, N. (2018). The subak cultural landscape as environmental education: Knowledge, attitudes, and experiences of Balinese teachers, student teachers, and students. *The Journal of Environmental Education*, *49*(1), 59–70. https://doi.org/10.1080/00958964.2017.1406890

Raselimo, M. (2014). Integration of environmental education into geography lessons: is there change in school geography following the LEESP intervention? *Http://Dx.Doi.Org/10.1080/03736245.2013.847800*, *96*(2), 119–133. https://doi.org/10.1080/03736245.2013.847800

Richter, B. W., & Sousa, L. O. De. (2019). The implementation of environmental education to promote sustainability : an overview of the processes and challenges. *International Journal of Sustainable Development & World Ecology*, *26*(8), 721–731. https://doi.org/10.1080/13504509.2019.1672220

Russell, C., Chandler, P., & Dillon, J. (2023). Editorial: humour and environmental education. *Environmental Education Research*, 1–9. https://doi.org/10.1080/13504622.2023.2183845

Ruthanam, M., Reddy, P., & Pillay, D. (2021). Teachers' Choices of Teaching Methods for Environmental Education: A case study of Life Skills teachers at a primary school in South Africa. *Southern African Journal of Environmental Education*, *37*(1), 124–142. https://doi.org/10.4314/sajee.v37i1.9

Sarıkaya, R., & Saraç, E. (2018). An analysis of pre-service teachers' attitudes towards environmental issues in terms of various variables. *Universal Journal of Educational Research*, *6*(1), 99–109. https://doi.org/10.13189/ujer.2018.060109

Ssebaggala, L. (2017). *Comparative Study of Secondary Mathematics Curriculum between Uganda and the United States*. *4*(1), 1–7.

Suarlin, S. (2023). Integrating Environmental Education to Form Environmental Care Characters in Schools. *Advances in Community Services Research*, *1*(2), 47–56. https://doi.org/10.60079/acsr.v1i2.335

Westbury, I., Aspfors, J., Fries, A. V., Hansén, S. E., Ohlhaver, F., Rosenmund, M., & Sivesind, K. (2016). Organizing curriculum change: an introduction*. *Https://Doi.Org/10.1080/00220272.2016.1186736*, *48*(6), 729–743. https://doi.org/10.1080/00220272.2016.1186736