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Influence of Principals' Incorporation of Climate Change Education into Curriculum on Climate Change Awareness amongst Students in Public Secondary Schools in Westland Subcounty, Kenya

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ABSTRACT: Climate change has become an existential environmental threat ravaging societies disproportionately. While it remains a complex global challenge with debilitating impacts, its mitigation considers climate change awareness as prerequisite for informed action, adaptation and sustainability. SDG 13; Climate Action, moreover views climate change education as a tool for empowerment-enhancing climate knowledge and skills-thereby transforming young people into agents of climate change rather than mere spectators. This role of education in climate change awareness can leverage principals' inclusion of CCE into curriculum for enhance climate change awareness thus environmentally conscious future generation. This paper investigated the influence of principals' incorporation of CCE into curriculum on climate change awareness amongst students in public secondary schools in Westland Subcounty, Nairobi. Both quantitative and qualitative research methods were employed in the study in which 15 school principals, 70 secondary school teachers and 460 students were purposively sampled for the study. Questionnaires and interview schedules were administered to students and teacher, and school principals respectively. Pearson Chi-square test (x^2=79.826 p=0.005) was highly significant indicating that principals incorporated CCE into curriculum that contributed to climate change awareness amongst students. This showed that there is significant relationship between principals' incorporation of CCE into curriculum and climate change awareness. It is evident from the results of the study that developing CCE curriculum, supervision and instruction, provision of materials and integration of ICT were given key consideration. It is then recommended that principals should leverage on ICT to bolster sharing of CCE materials and resources, develop monitoring and evaluation tools, provide TML as well as effective instructional supervision. To improve principals' vocation, there is need to equip principals with knowledge, skills and competencies.

KEYWORDS: Climate change education, Climate change awareness, Principals.

1.0 INTRODUCTION

Climate change according to the World Bank (2021) is a problem of human origin, its progression can be advanced by leveraging educational programs inculcating ideals aimed at environmental literacy (UNESCO, 2019). To this extent, education continue to receive policy attention in numerous global frameworks geared towards climate mitigation. Article 6 of UNFCC outlines education & training as key priorities (UNESCO &UNFCC,2016). Moreover, article 12 of the Paris Agreement, the 2030 Agenda for Sustainable Developments (SDG4), sustainable consumption & production (SDG 12) and climate action (SDG13) consider education as prerequisite for awareness. Additionally, other accelerated efforts highlight significance of multi-sectoral approach which have culminated in the Declaration of the Common Agenda for Education and Climate Change. GEM report (2024), however, noted that despite ineffable role of education, it remains underemphasized in broader climate change policing prompting inadequate implementation and budgetary prioritization.

Youth & climate change survey (2023) reported average climate change awareness amongst the young population globally. However, the young population who participated in the study decried inadequate competencies to take own initiatives. Majority believed in the efficacy of curricula, workshop (64%), learning events/training (55%), e-learning sources (51%), experience sharing with other youths (51%) & conferences (50%), as the source of climate change knowledge (UNITR,2023). Despite educational curriculum preference, Kariuki et all., (2016) observed inconsistent infusion of climate change education in curriculum though education is as effective as other policies addressing greenhouse effect (Mege, 2024)

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Studies by Stanford University have further examined how the inclusion of CCE into curriculum enhances environmental behaviors by 83%. Besides, Afrianto (2023) noted increase in dissemination of climate information in schools under sub-thematic areas: green jobs, green taxes, water footprint, renewable energy, recycling and up-cycling, etc. In Italy, climate actions such as clean- up operations, visit farms and learning first-hand knowledge have been incorporated into curricula at the junior and senior school levels. Technological resources such as EducaClima platforms provide teachers and students with resources in a wide range of subjects; responsible consumption, energy and mobility. In Vietnam, MoET in 2010 committed to milestone initiative to develop MoET Action Plan Education and Sector Response aiming to infuse CCE into curriculum (Kariuki, et all.,2016).

Seychelles Curriculum Framework has revised the curriculum to address CC as a cross- cutting subject-enabling incorporation of key themes; industries and environmental impact, weather and climate, demographics & urbanization (Hassen, (2023), while also implementing UNFCCC recommendations. As a result, eight in ten (80%) teenagers are conversant with climate related issues, the highest level of awareness recorded (Afrobarometer, 2023). In Kenya, Kariuki et all, (2016) noted little efforts except the development of National Climate Response Strategy whose recommendations have been partially implemented. Studies by Ochieng & Gichuki (2014) further indicated low awareness in the general population partly due to unsubstantial climate change knowledge in the curriculum. Report of study UNICEF, (2024) noted emerging pressure on the government to infuse CCE into curriculum. Collaborations with ALEF Education, KICD, and UNICEF and other pro-environment cooperate organizations continue provide leadership and resources to mainstream CCE (MoE, 2021)

1.1 Statement of the Problem

The Kenya National Climate Change Policy (Sessional Paper 3 of 2016) has emphasized the important role of climate change and adaptation mainstreaming into school taught curriculum. The call for CCE infusion into curriculum helps learners understand the causal link between climate change and sustainable development thus promoting responsible resource management and better environmental protection. Further studies have unearthed that by integrating CCE into taught school curriculum, schools empower students with necessary competencies to address climate change, become more environmentally conscious hence fostering responsibility and ownership in climate change mitigation. Despite this glaring role of curriculum, studies have shown that most students understand climate as an environmental issue but have the limited knowledge and skills about mitigation and adaptation (UNESCO, 2017). In another study, most students perceived climate change as a national concern that only require government intervention, Gichuki, (2024) as well as low integration of climate change education in schools in Nairobi. More devastating, studies by Kariuki (2017) on the role of curriculum in climate change awareness indicated inadequate climate change education integration into taught curriculum in Kenya's current education system with little focus forged in social science like geography. It is against this backdrop of low perception, awareness and inadequate CCE integration that the researcher sought to narrow the knowledge gap through this study.

1.2 Objective of the study

To determine the influence of principals' incorporation of climate change education into curriculum on climate change awareness in public secondary schools in Westland Subcounty, Kenya.

1.3 Research hypothesis

$H_0$1: There is no significant relationship between principals' incorporation of climate change education into curriculum on climate change awareness in Westland Subcounty, Kenya

1.4 Literature review

1.4.1 Concept of climate change awareness

According to Washington State Department of Health, climate change are changes in climate that occur over a long period of time manifesting in the forms of drought, increasing floods and raging heat waves. The IPCC 5th Assessment Report (2013) observed that human activities have largely contributed to climate change occasioning the increased atmospheric levels of greenhouse gases (carbon dioxide, methane, nitrous oxide). Raising awareness about climate change is a multifaceted movement founded firstly on climate change awareness. Net Impact (2019) defines climate change awareness as the understanding and increased consciousness about climate change. It further observed it's the foundation for actionable solutions, recognizing risks, and outcomes of climate change. According a report of a study by Statista (2021), 74% of adults in the US have a clue of climate change, two thirds consider

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it a global threat yet, a few are making considerable action. The studies recommended increasing international debates, global warming campaigns, as well as climate change education for all in schools

1.4.2 Principals' incorporation of climate change education into curriculum

Joda & Olowoselu (2016) views school principal position as a position of dominance and prestige with ability to direct, motivate, and create a culture that support teachers and students to achieve specified objectives. McHugh (2025) observed that at the heart of principal's mandate is the responsibility to lead teaching and learning focused on improving quality of education. Kariuki et al., (2016) noted that in Kenya, principals are tasked instructional supervision to ensure effective curriculum implementation. While, Cunha (2018) defined principal management practices as procedures, strategies and instructional techniques deployed by school principals to manage students and learning. Effective principals' management practices create a conducive environment teaching and learning. In addressing climate change knowledge gap in school, Fahey, S. J. (2019)) noted that infusion of climate change education into taught curriculum is effective in enhancing awareness for environmental conservation. Cunha (2018) further noted that instructional management role of the principal focusses on monitoring and evaluation, structuring daily routines and allocating materials and learning resources as well as supporting innovation and creativity. Technological advancement witnessed in the revolutionary role of the AI, obtaining climate change literatures has been made easy and exciting (Anderson, 2012). Through effective leadership, the school principal may leverage on the information technology to narrow literature-based gaps. However, inadequate resources, climate change policy and other competing responsibilities continue to impede the incorporation of CCE into school curriculum.

1.4.3 Theoretical framework

Role theory was advanced by Gatzels and Elton (1975). Role theory in educational management focuses on how individuals' behavior is shaped by the roles assigned and the expectations associated with them. It also provides rationale to understand the dynamics within an educational organization including how administrators, teachers, students and the entire human resource in the school ecosystem perceive and undertake responsibilities, interaction, and the organizational culture. School principals are mandated by the Teacher Service Commission to provide functional management and leadership, supervision and curriculum instruction, teaching and financial obligations. Teachers on the other hand have the responsibility to implement curriculum innovatively and creatively. Role theory examines specific expectations about these responsibilities, actions and behaviors and how the expectations influence individual actions and interaction in a school environment.

2.0 MATERIALS AND METHODS

Descriptive research design was employed since it allows the investigator to describe the characteristics of an individual (Kothari, 2019). The study targeted public secondary schools with 29 public school principals, 460 teachers and 1438 students in Westland Subcounty, Nairobi County, Kenya. Stratified sampling was used to select the schools. A sample of 30% was used with consideration since it's representative of the population as suggested by (Best & Kahn, 2001) whereas 15 school principals were interviewed, 70 teachers and 460 students were issued with self-administered questionnaires. To enhance content validity of the instruments of study, instruments pre-test was carried out. Piloting aimed at testing the clarity of the of the test items, appropriateness of language used and feasibility of the study. The instruments' reliability was determined using the test-retest technique. Pearson product moment correlation was used to compute reliability the reliability coefficient (Best and Kahn, 2001). Descriptive statistics were used in the analyses of the collected data.

Table 1. Shows the distribution of Principal by the incorporation of climate change awareness into curriculum on the Likert scale (SD=strongly agree, D= disagree, N= neutral, A=agree and SA= strongly agree)

Table 1: Distribution of principals by incorporation of climate change education into curriculum.

	SA		A		N		D		SD			
Statements	**F**	**%**	**F**	**%**	**F**	**%**	**F**	**%**	**F**	**%**	**Mean**	**Stdv**
Principal has encouraged the incorporation of environmental education into curriculum (CCE)	43	39	25	23	17	16	21	19	3	3	3.77	1.23

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Principal has provided adequate teaching and learning resources for CCE	24	22	18	17	39	36	17	16	11	10	3.24	1.24
Teachers are able to design required materials	24	22	22	20	37	34	23	21	3	3	3.37	1.13
The principal has developed supervisory strategies	22	20	24	22	24	22	16	15	23	21	3.05	1.43
There is consistent review of CCE curriculum	37	34	36	33	27	25	-	34	9	8.3	3.84	1.14
(n=109, Average Mean=3.45)												

Table 1, 23% and 39% of teachers agreed and strongly agreed that the principals have incorporated climate change education into curriculum while (19%) and (3%) disagreed and strongly disagreed respectively. The majority (61%) agreed that the school principals have incorporated CCE into curriculum while minority (22%) disagreed. This was supported by Cunha (2025) who unearthed that incorporation of CCE into curriculum help engrain climate change knowledge in learners at an earlier stage contributing to environmental consciousness. It further helps the students examine and appreciate their contribution to environmental management. On the principals' provision of teaching learning resources and materials, 17% and 22% agreed and strongly agreed while minority 10% and 16% agreed and disagreed respectively. This was in sharp contrast with McHugh, (2016) who found out that climate change resources and materials that aid teaching and learning were limited and sometimes missing in schools. This was partly blamed on inadequate financing due competitive expenditures as well as lack of climate change education budget. On instructional supervision roles of the principals, (20%) and (22%) agreed and disagreed while (15%) and (21%) disagreed and disagreed strongly. This implies that majority of the respondents (42%) agreed there is instructional supervision. Joda & Olowoselu, (2016) argued that instructional supervision role of the principal provides rational for assessments & monitoring providing feedback that is instrumental in bolstering and mainstreaming the role of CCE in climate change awareness. Instructional supervision makes teachers view CCE as an integral part of school curriculum.

On constant CCE curriculum review, 34% and 33% strongly agreed and agreed that there is constant review of CCE curriculum. Afrianto, (2017), agreed that constant review of the curriculum is important to allow curriculum adopt emerging trends in the management of environmental. The review should accommodate the views of teachers and students are concerned aiming to make the subject easier, related and learner centered. Lack of national curriculum for the CCE has seen into fragmented knowledge, implementation based on school administration good will. There is need to nationalize CCE set out with defined objectives and outcomes. While Kariuki (2017) unearthed a significant gap pointing to lack of comprehensive details that clearly places CCE as a priority in the school curriculum.

Table 2 shows Chi square test results on testing this hypothesis.

Table 2: Chi Square Test between principals involving teachers in decision making and teachers job satisfaction

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	79.826[a]	16	.000
Likelihood Ratio	74.419	16	.000
Linear-by-Linear Association	44.041	1	.000
N of Valid Cases	300		

The chi-square (x^2) test of 79.826 (p=0.005) indicated that there was significant relationship between principals' incorporation of climate change education into curriculum and climate change awareness. This implies that when principals incorporate of CCE into curriculum effectively, there is an increase in climate change awareness. The results of this study were in consonance with earlier works of Kariuki, (2017) which reported that inclusion of CCE into mainstream curriculum is a bold step towards a culture ingrained

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in environmental protection and management. According to Grechyna, (2025) environmental policy initiative that is short of climate change education is a defeat to the comprehensive and all-inclusive approach to address environmental challenges; curriculum provide the roadmap for the successful implementation.

During interviews one of the principals suggested that:

P_1 *"Children may learn about the impacts of global warming and how to adapt to it at school most conveniently".*

P_2 *"Education empowers all individuals, but it particularly inspires young people to take action"*

P_3. "*Acquiring understanding of the facts helps to alleviate the tension surrounding a topic that is frequently associated with negative in the public sphere*"

P4 "Curriculum targets and empowers everyone unlike other interventions that may target given sectors or areas

By modifying people's behaviour, CCE helps comprehend the implications of climate change, identify its effects and develop appropriate actions. It not only increases people's understanding of climate change but also their motivation and attitude toward the environment. Nations cognizant of the potential of CCE have come to consensus that education is essential in climate change mitigation. Educations transform everyone into a champion for climate change, leading to hastened transformation of the globe-enabling a global fight at a global level. Curriculum moulding generations of climate conscious populations instead of targeting a group due to holistic approach

3. CONCLUSION

From the findings, the study concluded that principal's incorporation of CCE into taught curriculum influenced students' climate change awarenesses. It's evident that by school principals leading in the development of curriculum material and resources, providing supervisory and instruction, promoting use of technology, and motivating teachers and students, become game changers in fight against climate change. This implies that the principals have a responsibility to use curriculum and instruction to enhance climate change awareness.

4. RECOMMENDATION

The study recommends:

1. There is need for national policy that clearly defines the role of principals'/ school administrators in climate change awareness. Mainstreaming it in performance contracting appraisal to ensure administrators consider it as a key area of appraisal hence prioritization.
2. Need to enhance through in-service training, teachers' level of climate change awareness to make the more effective in the dissemination of climate change knowledge, skill and competencies.
3. Need to leverage on information technology to promote exchange of information from global perspective on best practices on addressing climate change.

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