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Students' In-Service Training and the Academic Performance of Environmental Education and Management Undergraduates in Public Universities across the South-South, Nigeria

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Abstract: **Original Research**

The study investigated students' in-service training and the academic performance of environmental education and management undergraduates in public universities across the south-south geo-political zone of Nigeria. The research adopted a descriptive and correlational survey designs. The population of the study comprised all 300-level and 400-level environmental education students across public universities within the South-South geopolitical zone of Nigeria. A sample size of 684 students was selected using a stratified sampling approach. The stratified random sampling technique was applied based on institutional representation and academic level. The instrument for data collection was researchers self-structured questionnaire titled "Students' In-Service Training and Academic Performance of EE and Management Undergraduates Questionnaire" (SISTAPEEMUQ), constructed using a modified four-point Likert scale ranging from Very Low Extent (VLE = 1) to Very High Extent (VHE = 4). The face and content validity of the instrument were established by three experts: one in measurement and evaluation, and two in curriculum and instruction. The reliability of the instrument was ascertained using Cronbach's Alpha method, which yielded a coefficient value of .863, indicating high internal consistency. Out of the 684 administered questionnaires, 661 valid responses were retrieved and analyzed. Descriptive statistics (mean and standard deviation) were used to answer the research questions, while Pearson Product Moment Correlation (PPMC) was used to test the hypotheses at a .05 level of significance using SPSS version 28. The findings of the study revealed a statistically significant relationship between students' level of participation, duration, and challenges encountered during in-service training and their academic performance, which emphasizes the vital role of experiential learning opportunities. The study concluded that well-structured and properly supervised in-service training enhances students' academic engagement and learning outcomes in environmental education and management undergraduates in public universities across the south-south geo-political zone of Nigeria. It was recommended that university authorities and stakeholders should emphasize the planning, funding, and monitoring of students' in-service training to promote academic excellence.

Keywords: Students, In-service Training, Academic Performance, Environmental Education Students, Experiential Learning, Undergraduates, Public Universities, South-South Nigeria.

INTRODUCTION

In the evolving landscape of higher education, particularly within fields that intersect with scientific inquiry and community engagement, there has been an increasing demand for pedagogical strategies that extend beyond

theoretical instruction. Among such strategies, in-service training has emerged as a pivotal mechanism for bridging academic instruction and real-world practice. This approach has gained prominence especially in disciplines like environmental education (EE) and management, where the complexity of ecological challenges necessitates hands-on exposure and context-sensitive learning. In the context of environmental education in South-South Nigeria, in-service training constitutes a critical component of the undergraduate learning experience, offering students the opportunity to internalize, apply, and evaluate environmental knowledge within the scope of practical challenges observed in the field.

Students in-service training in the context of this study provides undergraduates of EE and management with structured opportunities to interact with professionals, engage in field-based observations, and contribute meaningfully to environmental problem-solving under guided supervision. It is typically carried out through internships, industrial placements, practicum, and other work-integrated learning (WIL) schemes that are embedded within the university academic structure. These engagements often occur in Ministries of Environment, oil and gas firms, climate advocacy NGOs, and community-based conservation programs, where students are exposed to pressing environmental issues such as oil spillage, deforestation, climate adaptation, waste management, and biodiversity preservation.

The South-South region of Nigeria offers a particularly instructive context for such training owing to its dense ecological landscape, oil-dependent economy, and a history of environmental degradation. States such as Rivers, Bayelsa, Delta, and Akwa Ibom are frequently at the centre of national and international discussions on environmental injustice, ecosystem vulnerability, and pollution-induced displacement. According to Ardoin *et al*. (2020), EE students who undergo in-service training in this region are more likely to encounter real-time environmental dilemmas that challenge their academic knowledge and stimulate critical reasoning and innovation. This intersection between education and practical exposure is expected to enhance their cognitive engagement, deepen their analytical perspectives, and broaden their ecological consciousness hallmarks of an effective EE framework.

Academic performance in this context is not merely a reflection of examination scores or grade point averages. It encapsulates a wider range of educational outcomes including students' ability to apply theoretical knowledge in solving real-world problems, the quality of their research outputs, their communication of scientific ideas, and their ability to propose and implement sustainable environmental practices. Nyika and Mwema (2021) opined that when students are provided with opportunities to interact with field realities that are gotten through structured in-service programs showed that their learning outcomes are likely to be more holistic, impactful, and aligned with societal needs. Hence, the value of in-service training is not confined to knowledge acquisition alone, but also includes the development of competencies that support academic excellence and environmental stewardship.

Furthermore, with increasing global and national emphasis on employability, green economy transitions, and sustainable development goals (SDGs), universities in Nigeria are being urged to produce graduates who are not only academically competent but also professionally adaptable. This makes in-service training an indispensable educational strategy, particularly in disciplines that seek to address environmental sustainability (Ololube & Wome, 2025). According to Numbere (2021), the integration of in-service training into undergraduate programs equips students with practical insights and contextual knowledge that enrich their academic experiences and promotes deeper connection between learning and societal transformation. This dual role of training as a tool for both academic enhancement and civic responsibility positions it as a critical area of inquiry in the field of EE.

Therefore, this study aims to explore how students' in-service training impacts their academic performance, with a specific focus

on EE students across tertiary institutions in South-South Nigeria. It seeks to examine the extent to which these training programs contribute to students' cognitive growth, practical competence, and academic outcomes. The study will also investigate challenges inherent in these training processes, variations across institutions, and the theoretical frameworks that underpin experiential learning in higher education.

Statement of the Problem

Despite the increasing integration of in-service training into undergraduate EE programs in Nigeria, there remains a persistent concern regarding its actual impact on students' academic performance, particularly within the ecologically sensitive and socioeconomically diverse region of South-South Nigeria. While structured field placements and internships are intended to reinforce theoretical learning and promote practical competence, many students continue to exhibit gaps in cognitive engagement, academic achievement, and environmental problem-solving capacity. This disconnects raises critical questions about the quality, consistency, and contextual relevance of the in-service training experiences provided to students across various institutions in the region. Furthermore, variations in institutional support, inadequate supervision, and mismatch between field activities and academic curricula, and environmental complexities in training locations may hinder students from deriving the full academic benefits of such programs. Consequently, the extent to which in-service training enhances students' academic performance in EE remains insufficiently explored and poorly documented. It is against this backdrop that this study sought to examine the influence of students' in-service training on academic performance among EE undergraduates in public universities across the south-south geo-political zone of Nigeria, with a view to generating empirical evidences that can guide curriculum improvement, policy formulation, and effective pedagogical practices.

Purpose of the Study

The purpose of this study is to explore the impact of student's in-service training on the academic performance of EE and management undergraduates in public universities across the south-south geo-political zone of Nigeria. The study is specifically guided by four objectives:

- To examine the extent of students' participation in in-service training programs among environmental education and management undergraduates in public universities across the south-south geo-political zone of Nigeria.
- To assess the impact of in-service training on the academic performance of environmental education and management undergraduates in public universities across the south-south geo-political zone of Nigeria.
- To investigate the extent of the impact of the duration of in-service training and environmental education and management undergraduate academic performance in public universities across the south-south geo-political zone of Nigeria.
- To identify the challenges environmental education and management students face during in-service training and how these challenges affect their academic performance in public universities across the south-south geo-political zone of Nigeria.

Research Questions

Four research questions guided the study:

- What is the extent of the impact of the level of participation of environmental education and management undergraduates in in-service training programs their academic performance in public universities across the south-south geo-political zone of Nigeria?
- What is the extent of the impact of in-service training on academic performance of environmental education and management undergraduates in public universities across the south-south geo-political zone of Nigeria?

- What is the extent of the impact of the duration of in-service training on environmental education and management undergraduates' academic performance in public universities across the south-south geo-political zone of Nigeria?
- What is the extent of the impact of the challenges environmental education and management undergraduates face during in-service training, and how do these challenges impact their academic performance in public universities across the south-south geo-political zone of Nigeria?

Research Hypotheses

The following hypotheses further guided the study:

- **H_{01}:** There is no significant relationship between environmental education and management undergraduates' participation in in-service training and their academic performance in public universities across the south-south geo-political zone of Nigeria.
- **H_{02}:** In-service training has no significant impact on the academic performance of environmental education and management undergraduates in public universities across the south-south geo-political zone of Nigeria.
- **H_{03}:** There is no significant relationship between the duration of in-service training and academic performance of environmental education and management undergraduates in public universities across the south-south geo-political zone of Nigeria.
- **H_{04}:** The challenges environmental education and management undergraduates encounter during in-service training does not significantly affect their academic performance in public universities across the south-south geo-political zone of Nigeria.

Theoretical Framework

The theoretical foundation of any educational research provides a critical lens through which the study's variables and constructs are examined, interpreted, and contextualized. For a study focused on in-service training and academic performance among EE students in South-South Nigeria, Experiential Learning Theory (ELT) as propounded by David A. Kolb remains central. This theory emphasizes the indispensable role of experience in the learning process and provides a philosophical and pedagogical grounding for understanding how practical training influences students' academic outcomes (Kolb, 1984; Adekoya, 2018).

Kolb's Experiential Learning Theory is anchored on the idea that learning is a process whereby knowledge is created through the transformation of experience. It is built around a cyclical model of learning that comprises four distinct but interrelated stages: concrete experience, reflective observation, abstract conceptualization, and active experimentation. According to Kolb, effective learning occurs when a learner progresses through this cycle, beginning with an actual experience and subsequently reflecting on it, conceptualizing the reflections, and finally testing the new ideas in practice. This sequence allows for deep internalization of knowledge and promotes both cognitive and non-cognitive development.

Eneji *et al*. (2019) contends that EE and waste management behavior among undergraduate students of the University of Calabar, Nigeria, experiential study is especially significant given the nature of the discipline, which combines ecological knowledge, sustainability practices, and field-based applications. In-service training such as internships, teaching practice, environmental field studies, and work-integrated learning constitute concrete experiences that allow students to engage directly with environmental challenges and sustainability frameworks in real-world settings. For example, when students undertake internships with environmental agencies or engage in community-based ecological restoration

projects, they participate in authentic learning scenarios that test and refine their theoretical understanding.

Moreover, through reflective observation, students assess their field experiences and begin to interrogate environmental theories vis-à-vis actual occurrences in the South-South Nigerian ecological and socio-political contexts. Amanchukwu *et al*. (2015) added that this phase is crucial for developing critical thinking skills, particularly when learners are exposed to challenges such as poor waste management, oil spillage, and biodiversity degradation that characterize many areas in the region. As they move to abstract conceptualization, students synthesize their reflections into structured environmental knowledge and educational concepts, linking theory with practice and expanding their intellectual engagement with environmental systems.

Therefore, the active experimentation phase of the experiential learning cycle allows students to translate their conceptual insights into action, often through problem-solving projects, seminar presentations, policy advocacy simulations, or school-based EE campaigns. It is within this cyclical and iterative process that the academic performance of EE students is enhanced not merely in terms of grades but in the development of competencies, environmental consciousness, and professional readiness (Nwachukwu, 2016). Applying experiential learning theory to the current study, it becomes evident that in-service training is not just a supplementary activity; rather, it is a pedagogical imperative that integrates with the curriculum to support holistic academic development.

Ekpeyoung and Etim (2021) posited that students who participate in these practical experiences tend to show improved understanding of environmental concepts, greater academic motivation, and heightened capacity for independent inquiry all of which are indicators of academic performance. This theoretical perspective also justifies the empirical inquiry into how in-service training duration, quality, supervision, and institutional support affect learning outcomes. Furthermore, experiential learning theory underscores the need for institutional structures that support the full learning cycle, namely: placement opportunities, mentoring, reflective supervision, and evaluative feedback systems. In many south-south Nigerian universities, however, the absence of robust internship policies or irregular coordination of field training programs disrupts this cycle, thereby limiting undergraduates experiential learning potential (Amanchkwu *et al*., 2015).

Thus, Kolb's theory not only aligns with the philosophical orientation of the study but also serves as a diagnostic tool for identifying pedagogical gaps in current in-service training practices. In sum, the application of experiential learning theory to this study provides a coherent explanation of the process through which in-service training influences academic performance. It also advocates for a reformative approach to environmental education in South-South Nigeria by emphasizing experience-based, context-specific, and reflective learning practices as key to achieving academic excellence among undergraduate of EE.

REVIEW OF RELATED LITERATURE

The Concept of Students' In-Service Training in Universities

In-service training, in the context of university education, represents a critical instructional strategy aimed at bridging the gap between theoretical knowledge and practical applications. Within Nigerian universities, particularly in programs like EE and management, in-service training serves as a pedagogical component that immerses students in real-world contexts where they can apply academic theories, environmental policies, and research techniques to solve pressing ecological problems. According to Tamunotonye (2016) and Agbor *et al*. (2025), noted that in-service training includes

supervised and structured field experiences that help students internalize classroom teachings by engaging in professional practices. The term "in-service" in the educational framework is often associated with continuing professional development; however, in the undergraduate setting, it also denotes pre-graduation practical engagements such as industrial training, internships, fieldwork, and teaching practice. These forms of experiential learning enable students to develop essential competencies that may not be fully cultivated within the confines of lecture halls.

Work-integrated learning (WIL) has emerged as a transformative educational approach and is commonly associated with students' in-service training in higher institutions. WIL models encompass activities such as student industrial work experience schemes (SIWES), internships, cooperative education, and community service projects. In Nigeria, the SIWES program, established by the Industrial Training Fund (ITF), represents a federal initiative tailored to ensure that students acquire practical skills aligned with their disciplines. Ebiware (2017) noted that SIWES remains particularly impactful for EE students as it offers structured placements in environmental protection agencies, research institutes, and community-based organizations. Through such placements, students observe, engage, and contribute to solving ecological challenges ranging from climate change adaptation to urban waste management. These activities are not isolated practicals; rather, they are embedded in academic frameworks and assessed as part of students' academic requirements, thus forming a critical nexus between learning and performance.

Field attachments and industrial internships in Nigerian universities are embedded within institutional curriculum structures, especially in applied science and education disciplines. EE, being inherently practical, depends significantly on such attachments to cultivate environmental consciousness and applied technical knowledge. Okpobiri (2019) emphasized that field experiences provide avenues for students to interact with environmental tools and technologies such as Geographic Information Systems (GIS), biodiversity mapping, and pollution assessment tools, which are often underrepresented in theoretical courses. This hands-on exposure enhances the student's capacity to connect theoretical content to practical outcomes, thereby reinforcing learning. Moreover, Nigerian universities increasingly partner with environmental NGOs and government bodies to ensure that in-service training placements are aligned with students' areas of specialization. However, the effectiveness of these partnerships often varies due to factors such as regional disparities in institutional commitment, funding availability, and infrastructural readiness.

Internship models in Nigerian higher education differ across institutions and faculties, yet they share a common objective of promoting employability and competence development. For students of EE in South-South Nigeria, internship programs are structured to provide them with guided experiences in forestry departments, waste recycling plants, environmental sanitation boards, and water management projects. Ereke (2020) conducted an evaluative study that revealed how students who actively engaged in structured internships reported enhanced cognitive retention, improved research project performance, and greater readiness for postgraduate studies. The university's role is to ensure such internships are relevant, supervised, and evaluated in accordance with set academic benchmarks. Unfortunately, the lack of standardization and insufficient collaboration with the host institutions often undermines the value of these programs. Where properly implemented, however, internships become more than mere requirements; they evolve into transformative learning processes with long-term academic and professional implications.

Furthermore, the concept of students' in-service training must be understood not just as a one-time event, but as an integral part of a holistic academic journey that shapes students' professional identity. As observed by Boma (2021), who examined experiential learning in Rivers State University, in-service training contributes significantly to the intellectual maturity of students by nurturing independent thinking, collaborative learning, and adaptive reasoning in complex environmental contexts. These attributes are vital for students of EE, who are expected to address multifaceted environmental issues in their future careers. In-service training, therefore, is not merely an academic add-on but a strategic pedagogical practice that equips students with the necessary tools to synthesize, analyze, and respond to the dynamic demands of environmental sustainability within and beyond the university system.

Level and Extent of EE Students' Participation in In-Service Training Programs

The level and extent of students' participation in in-service training programs, particularly within EE in South-South Nigerian universities, remain a pivotal component in understanding the practical readiness of undergraduates. Participation in structured work experiences such as internships, industrial attachments, and field placements varies significantly based on institutional policies, program requirements, and student-driven initiatives. In many Nigerian universities, EE departments often mandate a certain period of industrial or community-based training to expose students to hands-on environmental work. However, Erekosima (2019) argued that the degree of compliance with such mandates fluctuates, with some institutions ensuring strict enforcement while others allow flexibility or even leave participation optional, thereby influencing the overall level of engagement among students. This inconsistency in enforcement often results in disparities in learning outcomes and professional development among students of similar academic backgrounds.

Furthermore, the level of student engagement in in-service training is heavily influenced by institutional arrangements and support structures. As noted by Owei (2020), some universities provide logistical support, such as transportation and supervision, while others leave the burden of securing placements and accommodation entirely on the students. These institutional gaps have a direct bearing on the quality and extent of participation, particularly for students from low-income backgrounds who may find it difficult to afford the costs associated with training. Moreover, the academic calendar sometimes conflicts with the duration of training programs, forcing some students to opt for shorter or less impactful placements. Alabo and Oboko (2018) observed that many students participate in training just to fulfill graduation requirements, often without adequate orientation or alignment with their academic focus, which significantly dilutes the benefits of such experiential engagements.

Gender and geographical location also play a critical role in influencing the extent of student participation. In a study by Numbere (2021), it was revealed that female students were less likely to participate in extended in-service training programs due to security concerns, cultural restrictions, and parental control, particularly in rural or riverine areas of South-South Nigeria. This trend contributes to unequal exposure and skill acquisition between male and female students within the same academic program. Similarly, students from universities located in urban centers like Port Harcourt and Uyo are more likely to secure placements in reputable environmental agencies and NGOs compared to those in rural institutions, who face logistical and infrastructural challenges (Tamunotonye, 2020). These geographical disparities in access and opportunity significantly affect students' engagement levels and subsequent academic development.

The extent of participation is also shaped by student preparedness and motivation. Students who exhibit high levels of academic engagement, career orientation, and personal initiative are more likely to proactively seek quality training experiences and take full advantage of them. Ebiware and Okoloba (2022) emphasized that self-efficacy and perceived value of in-service training play a vital role in shaping students' willingness to commit fully to the demands of the program. In cases where students view in-service training as merely a statutory requirement rather than an opportunity for learning and growth, participation becomes superficial, and the intended educational gains are lost. Therefore, the psychological readiness of students must be factored in when assessing the overall effectiveness of in-service training programs.

In light of these dynamics, a multidimensional understanding of participation levels becomes necessary. Stakeholders in EE must not only consider enrollment numbers but also evaluate the quality of placements, the duration of exposure, the institutional support mechanisms in place, and student attitudes toward experiential learning. Participation should be understood not just as physical presence at training locations but as an immersive engagement with real-world environmental problems, professional mentorship, and reflective practice. As articulated by Ereke (2019), enhancing participation in in-service training calls for systemic reforms in policy, curriculum planning, and student development programs to ensure equitable access and meaningful engagement across gender, location, and institutional differences.

The Impact of In-Service Training on Environmental Education Undergraduates

In-service training constitutes a crucial component in the preparation of students of EE, particularly in the South-South geopolitical zone of Nigeria where environmental concerns are both pressing and complex. The integration of structured field-based training such as internships, environmental outreach programs, and work-study schemes into EE curricula has increasingly been recognized as indispensable in shaping students' cognitive, technical, and affective competencies. According to Ebiware (2018), EE is essentially an applied discipline that necessitates hands-on engagement with ecological systems, community-based conservation efforts, and sustainability practices. In-service training serves as a practical bridge between the classroom and the environment, allowing students to directly interact with environmental challenges such as oil pollution, biodiversity loss, coastal erosion, and urban waste management. Through participation in these real-world experiences, students not only observe theoretical principles at play but also engage with institutional practices, thereby gaining first-hand insight into environmental management dynamics (Tamunotonye, 2020).

The benefit of in-service training to EE also lies in its capacity to promote environmental literacy and civic responsibility among students. Environmental literacy encompasses awareness, understanding, attitudes, and the capacity for informed action concerning environmental issues. In the context of South-South Nigeria, where the environment is often under pressure due to industrial activities, in-service training enables students to develop a nuanced appreciation of environmental justice, sustainable resource use, and public health implications of environmental degradation. Boma (2021) noted that when students actively participate in environmental training activities such as those involving Geographic Information Systems (GIS), environmental health assessments, or conservation projects they cultivate a more critical and action-oriented understanding of sustainability. Furthermore, Ololube and Wome (2025) stressed that the experiential nature of such training encourages them to develop contextually appropriate solutions to environmental problems, thereby nurturing their problem-solving, leadership, and advocacy skills.

Equally important is the acquisition of applied ecological skills that empower students to function effectively in both academic and professional contexts. These skills include field sampling, environmental data analysis, species identification, environmental impact assessment (EIA), and environmental communication. Ereke (2019) observed that EE students who have undergone structured in-service training perform significantly better in their research projects, laboratory assessments, and seminar presentations. The alignment of in-service training with environmental skill sets ensures that students are not only theoretically grounded but also operationally competent. Moreover, exposure to field practices enhances their employability, as they become familiar with workplace standards, technical tools, and collaborative procedures commonly used in environmental agencies, consultancies, and NGOs. This hands-on proficiency is particularly important in a region such as South-South Nigeria, where the demand for environmental professionals with contextual experience is on the rise (Okpobiri, 2021).

In addition, in-service training promotes interdisciplinary integration within EE by allowing students to draw connections across ecological, social, political, and economic dimensions of environmental problems. This holistic exposure is critical in promoting systemic thinking, a skill vital for addressing the interconnected challenges of environmental sustainability. For example, a student engaged in a coastal zone management project may be required to understand marine ecology, community engagement strategies, economic implications of tourism, and policy frameworks for environmental governance. Tamunotonye (2016) argued that in-service training programs that are well-designed and properly supervised encourage students to synthesize knowledge across disciplines, enhancing their critical thinking and academic depth. This integration reinforces theoretical content taught in lecture rooms and promotes deeper learning, ultimately influencing students' academic performance and intellectual maturity.

In-service training plays a motivational role in strengthening students' commitment to their field of study. EE like many other disciplines, can become abstract and disengaging if not anchored in practical relevance. However, when students are placed in meaningful training environments where they witness the implications of environmental neglect or the triumphs of restoration efforts, they are likely to develop a stronger sense of purpose and motivation. According to Ebiware and Okoloba (2022), students who undergo impactful in-service training often return to the classroom with heightened enthusiasm, new ideas for research, and a clearer understanding of their career path. This motivational effect contributes to greater academic engagement, persistence, and performance. Therefore, the role of in-service training in enhancing EE extends beyond skill acquisition to include affective outcomes such as self-efficacy, discipline, and professional identity formation, all of which are critical in shaping successful graduates of EE programs in South-South Nigeria.

Duration of Environmental Education In-Service Training and Academic Outcomes

In-service training for students, particularly in professional and technical disciplines such as EE (EE), has increasingly been recognized as a critical factor influencing academic outcomes. Among the various elements of in-service training, the duration of such programs plays a significant role in determining their effectiveness and impact on students' academic performance and professional preparedness. In the context of Nigerian public universities, especially in the South-South geo-political zone, the relationship between the length of EE in-service training and students' academic success is of growing concern to educators, policymakers, and curriculum developers.

The duration of in-service training refers to the amount of time a student is

engaged in a structured, supervised, real-world learning experience outside the traditional classroom setting. In EE, such experiences typically include fieldwork, internships with environmental agencies, teaching practice in secondary schools, or participation in community-based environmental projects (Agbor *et al*., 2025). The expectation is that longer durations provide more opportunities for experiential learning, skill development, and knowledge application (Kolb, 1984). These, in turn, can contribute to improved academic outcomes such as higher grades, better project work, enhanced research skills, and overall academic motivation.

Research suggests (e.g., Adeyemi & Ige, 2019) that longer in-service training periods allow students to gain deeper insight into environmental challenges, develop problem-solving skills, and build professional networks that may later influence their academic motivation and career direction. For instance, students who spend six months or more in practical EE settings often report better integration of theory and practice than those with shorter exposures. This alignment between practice and academic learning contributes positively to their understanding of complex environmental systems, thereby improving academic performance (Okebukola, 2015).

However, the benefits of extended in-service training are not automatic. Several studies indicate that the quality of supervision, relevance of placement, and alignment with academic objectives significantly mediate the relationship between training duration and academic outcomes (Ugwoke *et al*., 2020). If students are placed in irrelevant institutions or poorly structured programs, even a long training period may yield minimal academic benefits. Therefore, effective program design that clearly defines learning objectives and assessment criteria is crucial to maximizing the gains from extended in-service periods.

Furthermore, the duration must be considered in relation to students' cognitive load and academic calendar. Overly long training periods, if not well-integrated into the academic schedule, may lead to fatigue or disconnect from ongoing academic coursework. This risk is especially high in regions where institutional support for in-service training is weak or inconsistent. According to Nwankwo (2021), some students in South-South Nigeria experience academic stress when in-service training overlaps with coursework or examinations, which can adversely affect academic outcomes.

Interestingly, studies in similar educational contexts have shown that an optimal duration often ranging between 3 to 6 months yields the most consistent positive outcomes (Obi & Ndoma, 2017). This duration allows sufficient time for skill acquisition without overwhelming the student or causing undue interruption to academic progress. Institutions that regularly evaluate and adjust the duration and structures of in-service programs based on student feedback and performance metrics tend to report higher levels of academic success among EE undergraduates.

Thus, the duration of EE in-service training is a significant determinant of academic outcomes for undergraduate students in Nigeria's South-South region. While longer durations generally offer more learning opportunities, their success depends heavily on the quality, relevance, and timing of the training. Universities that are aiming at enhancing their student performance through in-service experiences must have a balanced approach that considers both the length and the educational value of training placements is essential.

Challenges Faced by Environmental Education and Management Students in In-Service Training

A major obstacle facing EE students is the scarcity of appropriate training placements, particularly in rural and ecologically sensitive areas. These regions, though often most affected by environmental

degradation, lack structured organizations capable of hosting student trainees. The absence of strong institutional partnerships with environmental agencies or NGOs in such localities restricts students from gaining relevant field exposure. Achor and Ebiowei (2021) noted that many community-based organizations in rural areas lack the administrative framework or accreditation to support formal student placement. This imbalance leads to over-concentration of students in urban centers, which not only limits the diversity of training experiences but also deprives rural-origin students of the opportunity to address local environmental issues firsthand.

Another significant challenge is the lack of adequate financial and institutional support. Many students are required to self-fund essential aspects of their training, including transportation, accommodation, and daily subsistence, often with limited personal or familial financial capacity. Bello and Iyagba (2020) reported that most universities do not provide structured financial assistance such as stipends or grants, placing undue financial strain on students. In some cases, this has led to inconsistent participation or even total withdrawal from the program. Furthermore, funding allocated to faculties or departments for program coordination, staff supervision, and logistical support is frequently insufficient, weakening the institutional framework necessary for effective training delivery.

A further challenge arises from the misalignment between training assignments and the academic curriculum (Amanchukwu *et al*., 2015). In many instances, students are deployed to organizations where they are assigned tasks unrelated to EE. This disconnect diminishes the practical relevance of the training and inhibits the development of core competencies. According to Oboko and Ekanem (2022), the absence of coordination between academic departments and host organizations leads to scenarios where students engage in administrative tasks or generic roles that do not reflect their area of study, resulting in a missed opportunity for contextual learning and professional growth.

Logistical issues also affect students' ability to participate effectively in in-service training. Students often face significant challenges securing safe and affordable housing near their training sites. For those assigned to distant or rural locations, transportation difficulties can impede regular attendance and punctuality. Ekpenyong and Ogolo (2019) noted that students placed in remote areas such as coastal or mangrove zones often encounter problems related to poor road infrastructure and flooding, further complicating their participation and limiting their field engagement.

Effective supervision and structured evaluation are essential components of a meaningful in-service training experience. However, many students report inadequate supervision and lack of regular academic follow-up. Supervisors often visit infrequently or not at all, leaving students without the guidance necessary to navigate challenges in their placement environments. Tamunopriye and Alagoa (2020) observed that the absence of clear assessment criteria and mentorship frameworks results in inconsistent evaluation and diminished student motivation. Additionally, overloaded faculty members may be unable to provide timely feedback, contributing to a gap between expected and actual learning outcomes.

METHODOLOGY

This study employed a descriptive and correlation research designs. The target population consisted of all 300-level and final-year (400-level) undergraduates enrolled in EE and management programs in universities located within the South-South geopolitical zone of Nigeria. These institutions were selected due to their academic focus on environmental studies based on official records obtained from the academic planning units of the selected institutions. The 300-level and final-year students were chosen because they are expected to have completed or

engaged in at least one phase of in-service training or internship, which is typically a prerequisite for graduation across six federal and state universities.

A multi-stage sampling technique was adopted to ensure the inclusion of participants across diverse institutional and geographical contexts. In the first stage, six universities offering accredited EE and management programs were purposively selected to reflect institutional and state-level representation across the South-South region. These universities include the University of Port Harcourt (Rivers State), Niger Delta University (Bayelsa State), University of Calabar (Cross River State), University of Delta, Agbor (Delta State), University of Benin (Edo State), and Akwa Ibom State University (Akwa Ibom State). In the second stage, a proportionate stratified random sampling technique was utilized to select respondents from each institution based on their respective class sizes.

This approach ensured that each university contributed to the sample in proportion to its student population. From the overall population, a total of 684 students were selected to constitute the study sample. Data collection was facilitated through a researchers-developed questionnaire titled Student's In-Service Training and Academic Performance of EE and Management Undergraduates Questionnaire (SISTAPEEMUQ). The questionnaire comprised two major sections. Section A focused on demographic variables, including age, gender, institution, and level of study. Section B contained 20 items structured around four key objectives of the study. The items in Section B were structured using a four-point Likert scale, ranging from "Very High Extent (4)" to "Very Low Extent (1)," depending on the nature of each item.

To establish content and face validity, the initial draft of the SISTAPEEMUQ was subjected to expert review by three university lecturers with specialization in EE and management and Educational Measurement and Evaluation, two from the University of Port Harcourt and one from the University of Calabar. The experts assessed the instrument for clarity, relevance, coverage of constructs, and alignment with the study objectives. Based on their recommendations, revisions were made to improve the semantic precision, item distribution, and alignment of constructs, thereby ensuring the instrument's validity for the target population.

Reliability testing was conducted via a pilot study involving 30 final-year EE and management students drawn from a university outside the main sample frame. The internal consistency of the SISTAPEEMUQ was determined using Cronbach's Alpha reliability coefficient, which yielded a value of .886, indicating a high degree of reliability and internal coherence among the questionnaire items. Data collection was executed through direct administration of the SISTAPEEMUQ at the selected institutions. The researcher, aided by trained research assistants familiar with the university environment, coordinated the distribution and retrieval of the questionnaires. Prior to distribution, participants were briefed on the purpose and confidentiality of the study and provided informed consent. Out of the 684 questionnaires administered, 661 valid responses were retrieved, resulting in a response rate of 95.3%, which is deemed sufficient for statistical analysis and generalizability within the sampled population.

The data collected were subjected to descriptive and inferential statistical analysis using the Statistical Package for the Social Sciences (SPSS, Version 28). Descriptive statistics such as means and standard deviations were used to address the research questions; while the hypotheses were tested using Pearson Product Moment Correlation (PPMC) set at a .05 level of significance, allowing for the examination of differences in academic performance as influenced by exposure to in-service training across institutions. These

analytical methods provided robust insights into the patterns, associations, and implications embedded within the dataset.

RESULTS

The following research questions were answered using mean and standard deviation responses. Where mean scores of 2.5 and above was considered a high extent, mean scores of 2.49 or lower was regarded as a low extent in this research questions interpretations.

RQ1: What is the extent of the impact of the level of participation of EE and management undergraduates in in-service training programs their academic performance in public universities across the south-south geo-political zone of Nigeria?

Table 1: Summary of mean and standard deviation responses on the level of participation of EE and management students in in-service training programs in South-South Nigeria

S/N	Level of Participation	Mean	SD.	Remark
1.	I fully participate in the in-service training program organized by my department or faculty.	2.7194	1.01374	High Extent
2.	I was actively involved in fieldwork and hands-on training during my in-service training period.	2.6660	1.14669	Low Extent
3.	I completed the entire duration of my assigned in-service training without interruption.	2.6433	1.13342	High Extent
4.	My participation in the in-service training was guided by clear learning objectives and supervision.	2.4320	1.11982	Low Extent
	Grand Mean	**2.6151**	**1.10341**	**High Extent**

Research Question 1 examined the level of participation of EE students in in-service training programs in South-South Nigeria. The responses presented in Table 1 revealed that three of the items recorded mean values around the 2.5 benchmark, with three items slightly above and one below. For instance, students affirmed that they fully participated in the in-service training organized by their faculty (Mean = 2.7194, SD = 1.01374) and completed the training without interruption (Mean = 2.6433, SD = 1.13342), which were both rated as high extent, and their active involvement in fieldwork (Mean = 2.6660, SD = 1.14669) while participation guided by learning objectives and supervision (Mean = 2.4320, SD = 1.11982) was rated low. With a grand mean of 2.6151 and a standard deviation of 1.10341, the result suggests that the level of participation in in-service training among EE students is generally high. This level of participation contributes to building students' familiarity with practical field experiences, although the lower ratings on supervision point to potential gaps that may affect the quality of the training experience and, by extension, their academic performance.

RQ2: What is the extent of the impact of in-service training on academic performance of environmental education undergraduates in public universities across the south-south geo-political zone of Nigeria?

Table 2: Summary of mean and standard deviation responses on the extent in-service training influence the academic performance of EE and management students in South-South Nigeria

S/N	The influence of Students' in-service training	Mean	SD.	Remark
5	The knowledge gained during in-service training improved my understanding of course-related topics.	2.8666	1.11399	High Extent
6	My performance in assessments improved after participating in in-service training.	2.6728	1.08483	High Extent
7	In-service training enhanced my ability to apply theoretical knowledge to real-life problems.	2.7205	1.10451	High Extent
8	The experience from in-service training positively affected my project or final year research.	2.5351	1.09025	High Extent
	Grand Mean	**2.6987**	**1. 09839**	**High Extent**

Research Question 2 assessed the extent to which in-service training influences the academic performance of EE students in South-South Nigeria. Table 2 showed that all the items recorded mean values above the 2.5 threshold, suggesting that students perceived in-service training to have a high influence on their academic performance. Specifically, knowledge gained during in-service training enhanced understanding of course-related topics (Mean = 2.8666, SD = 1.11399), improved assessment outcomes (Mean = 2.6728, SD = 1.08483), and supported the application of theory to real-world issues (Mean = 2.7205, SD = 1.10451). Furthermore, the experience from in-service training positively contributed to project or final year research (Mean = 2.5351, SD = 1.09025). The grand mean of 2.6987 and standard deviation of 1.09839 signify a strong perception that in-service training positively shapes students' academic engagement and outcomes. This finding indicated that exposure to practical environments during training significantly complements formal learning and reinforces student performance in their academic pursuits.

RQ3: What is the extent of the impact of the duration of in-service training on environmental education undergraduates' academic performance in public universities across the south-south geo-political zone of Nigeria?

Table 3: Summary of mean and standard deviation responses on the significant relationship between the duration of in-service training and EE and management students' academic performance in South-South Nigeria

S/N	Duration of In-Service Training	Mean	SD.	Remark
9	The length of my in-service training was sufficient to gain practical experience relevant to my field.	2.4180	1.13386	Low extent
10	A longer duration of in-service training enhanced my academic confidence and knowledge retention.	2.6390	1.15970	High Extent
11	I believe the duration of my in-service training directly influenced my academic achievement.	2.5197	1.09321	High Extent
12	The time spent during in-service training contributed to better performance in course assignments and exams.	2.6264	1.10911	High Extent
	Grand Mean	**2.5507**	**1.12397**	**High Extent**

Research Question 3 explored the extent of the duration of in-service training and the academic performance of EE students in South-South Nigeria. As illustrated in Table 3, most items recorded mean values above 2.5, indicating a high extent of perceived impact between training duration and academic performance. For example, respondents agreed that a longer duration improved their academic confidence and knowledge retention (Mean = 2.6390, SD = 1.15970), supported their academic achievement (Mean = 2.5197, SD = 1.09321), and enhanced performance in course assignments and exams (Mean = 2.6264, SD = 1.10911). However, the perception that the training duration was sufficient to gain relevant practical experience was rated low (Mean = 2.4180, SD = 1.13386). The grand mean of 2.7713 and standard deviation of 1.12397 indicated a generally strong perceived impact between the time spent on in-service training and students' academic productivity. These responses imply that longer and well-structured training sessions are likely to promote academic readiness and reinforce practical learning outcomes among students.

RQ4: What is the extent of the impact of the challenges environmental education and management undergraduates face during in-service training, and how do these challenges impact their academic performance in public universities across the south-south geo-political zone of Nigeria?

Table 4: Summary of mean and standard deviation responses on the challenges EE and management students face during in-service training, and how do these challenges impact their academic performance in South-South Nigeria

S/N	Challenges Faced During In-Service Training	Mean	SD.	Remark
13	Lack of adequate supervision during in-service training affected my learning experience.	2.8587	1.12763	High Extent
14	Financial constraints made it difficult for me to complete my in-service training effectively.	2.7414	1.12934	High Extent
15	Poor accommodation and logistical support during in-service training impacted my academic focus.	2.8253	1.12355	High Extent
16	Challenges experienced during in-service training affected my performance in school assessments.	2.9478	1.10132	High Extent
	Grand Mean	**2.8433**	**1.12046**	**High Extent**

Research Question 4 focused on identifying the challenges faced by EE students during in-service training and their impact on academic performance in South-South Nigeria. From Table 4, it was observed that all items had mean values above 2.5, indicating that respondents experienced a high extent of challenges that negatively impacted their academic performance. Specifically, inadequate supervision (Mean = 2.8587, SD = 1.12763), financial constraints (Mean = 2.7414, SD = 1.12934), and poor accommodation and logistics (Mean = 2.8253, SD = 1.12355) were highlighted as notable challenges. Additionally, students admitted that these difficulties affected their academic assessments (Mean = 2.9478, SD = 1.10132). The grand mean of 2.8433 and standard deviation of 1.102436 underscore the overall impact of these challenges on student learning outcomes. This finding revealed that despite the benefits of in-service training, the presence of critical hindrances during the training period may disrupt learning engagement and academic performance.

Research Hypotheses

HO_1: There is no significant relationship between environmental education and management undergraduates' participation in in-service training and their academic performance in public universities across the south-south geo-political zone of Nigeria.

Table 5: Summary of Pearson's Product Moment Correlation Coefficient (PPMC) on the relationship between EE and management students' participation in in-service training and their academic performance in South-South Nigeria

		Level of Participation in In-service Training	Academic Performance of EE Students
Level of Participation in In-service Training	Pearson Correlation	1	.817
	Sig. (2-tailed)		.000
	N	661	661
Academic Performance of EE Students	Pearson Correlation	.817	1
	Sig. (2-tailed)	.000	
	N	661	661

Table 5 presents the Pearson correlation coefficient and the significance level of the relationship between EE and management students' level of participation in in-service training and their academic performance in South-South Nigeria. The Pearson correlation coefficient of .817 reveals a strong positive relationship between students' participation in in-service training and their academic performance. The significance level (Sig. 2-tailed) of .000 is less than .05, thus, null hypothesis one was rejected. This indicates that there is a significant relationship between the level of participation in in-service training and the academic performance of EE students in South-South Nigeria. This finding highlighted the importance of students' active engagement in in-service training as a factor that enhances their academic performance.

HO_2: In-service training has no significant impact on the academic performance of environmental education and management undergraduates in public universities across the south-south geo-political zone of Nigeria.

Table 6: Summary of Pearson's Product Moment Correlation Coefficient (PPMC) on the impact of In-service training on the academic performance of EE and management students in South-South Nigeria

		Impact of In-Service Training	Academic Performance of EE Students
Impact of In-Service Training	Pearson Correlation	1	.712
	Sig. (2-tailed)		.000
	N	661	661
Academic Performance of EE Students	Pearson Correlation	.712	1
	Sig. (2-tailed)	.000	
	N	661	661

Table 6 shows the Pearson correlation coefficient and the significance level concerning the impact of in-service training on the academic performance of EE students in South-South Nigeria. The Pearson correlation coefficient of .712 indicates a positive and significant relationship between the impact of in-service training and students' academic performance. With a significance level (Sig. 2-tailed) of .000, which is less than .05. Consequently, null hypothesis two was rejected. This result implies that in-service training significantly impacts the academic performance of EE students in the region. It suggested that effective and relevant in-service training contributes meaningfully to improved academic outcomes for EE students.

HO_3: There is no significant relationship between the duration of in-service training and academic performance of environmental education and management undergraduates in public universities across the south-south geo-political zone of Nigeria.

Table 7: Summary of Pearson's Product Moment Correlation Coefficient (PPMC) on the relationship between duration of in-service training and academic performance of EE and management students in South-South Nigeria

		Duration of In-Service Training	Academic Performance of EE Students
Duration of In-Service Training	Pearson Correlation	1	.679
	Sig. (2-tailed)		.000
	N	661	661
Academic Performance of EE Students	Pearson Correlation	.679	1
	Sig. (2-tailed)	.000	
	N	661	661

Table 7 displays the Pearson correlation coefficient and the significance level regarding the relationship between the duration of in-service training and the academic performance of EE students in South-South Nigeria. The Pearson correlation coefficient of .679 signifies a moderately strong positive relationship between the duration of in-service training and students' academic performance. The significance level (Sig. 2-tailed) of .000 is below the .05. Therefore, null hypothesis three was rejected. This indicates that there is a significant relationship between how long EE students are exposed to in-service training the better for their academic performance.

HO_4: The challenges environmental education undergraduates encounter during in-service training does not significantly affect their academic performance in public universities across the south-south geo-political zone of Nigeria.

Table 8: Pearson's Product Moment Correlation Coefficient (PPMC) on the relationship challenges EE and management students' encounter and academic performance in South-South Nigeria

		Challenges Faced by EE students	Academic Performance of EE Students
Challenges Faced by EE Students	Pearson Correlation	1	.815
	Sig. (2-tailed)		.000
	N	661	661
Academic Performance of EE Students	Pearson Correlation	.815	1
	Sig. (2-tailed)	.000	
	N	661	661

Table 8 outlined the Pearson correlation coefficient and significance level for the relationship between the challenges faced by EE and management students during in-service training and their academic performance in South-South Nigeria. The Pearson correlation coefficient of .815 shows a strong positive relationship between the challenges encountered and academic performance. The significance level (Sig. 2-tailed) of .000 is less than .05. Accordingly, null hypothesis four was rejected. This implies that the challenges students face during in-service training significantly affect EE undergraduates' academic performance.

DISCUSSION OF FINDINGS

Level of Participation in In-Service Training and Academic Performance of Environmental Education and management Students

This study investigated the extent to which the level of participation in in-service training relates to the academic performance of EE students in South-South Nigeria. The findings revealed a strong positive relationship, as indicated by a Pearson correlation coefficient of .817 and a p-value of .000 ($p < .05$). This statistically significant result led to the rejection of the null hypothesis (HO1), which had proposed that there is no significant relationship between students' level of participation in in-service training and their academic performance. The implication of this result is that higher levels of participation in in-service training correspond to better academic outcomes among EE and management students. The study thus demonstrates that students who consistently attend, engage in, and contribute to in-service training programs tend to show improved academic performance, possibly due to the experiential knowledge, practical exposure, and increased motivation these trainings offer.

This finding is consistent with the empirical research carried out by Erekosima (2019), who examined professional development engagement among undergraduate students in Cross River State. His study reported that students who actively participated in academic enhancement workshops, career-related seminars, and teaching-practice related activities tended to achieve higher levels of academic success. Owei (2020) further emphasized that these students gained practical exposure, built confidence, and developed academic interest, which together contributed to their outstanding performance. This aligns with the current findings by suggesting that participation in training not only transfers knowledge but also shapes students' academic mindset and readiness to apply concepts in real-time learning environments.

Similarly, Alabo and Oboko (2018) found that frequent engagement with practical-oriented training exercises significantly contributed to students' academic development. They emphasized that through regular participation in skill-based training, students were better able to understand and contextualize theoretical concepts learned in class, thereby recording improved grades and academic confidence. Their conclusion echoes the current study's assertion that consistent participation in in-service training enhances students' retention, application of knowledge, and overall academic performance.

To further support this argument, Numbere (2021) confirmed that students who showed active commitment to various in-service training sessions, particularly those embedded in their academic curriculum, demonstrated marked improvement in their academic assessments. Numbere noted that this improvement was due to the consistent reinforcement of academic concepts

during training sessions, alongside enhanced cognitive engagement, improved study skills, and exposure to real-world problems related to EE. These dimensions validate the current study's conclusion that the level of participation is a determining factor in EE and management students' academic achievements.

Taken together, Ebiware and Okoloba (2022) study emphasized the critical importance of encouraging high levels of student participation in in-service training programs, particularly in EE where experiential learning plays a major role. The outcomes reveal that consistent participation promotes practical skill acquisition, academic motivation, and application of knowledge, which in turn enhances overall academic performance. These insights are valuable to educational planners, university administrators, and curriculum developers seeking to design in-service training programs that not only complement academic instruction but also deepen student engagement and achievement in the South-South Nigerian context.

Influence of In-Service Training on Academic Performance of Environmental Education and Management Students

This study explored the extent to which in-service training exerts influence on the academic performance of EE students in South-South Nigeria. The statistical analysis revealed a significant positive influence, with a Pearson correlation coefficient of .719 and a p-value of .000 ($p < .05$). These findings led to the rejection of the second null hypothesis (HO2), which proposed that there is no significant influence of in-service training on students' academic performance. The results clearly suggest that in-service training plays a pivotal role in enhancing students' academic performance by bridging the gap between theoretical learning and practical application. It highlighted that students who are exposed to well-structured in-service training environments tend to develop deeper understanding of environmental concepts, critical thinking skills, and hands-on experiences that collectively enhance their academic outcomes.

The results of this study resonate with those of Ebiware (2018), who investigated capacity development programs in tertiary institutions in Rivers State. Tamuno's findings indicated that students exposed to structured training activities such as field work, laboratory demonstrations, and community-based environmental projects exhibited superior academic performance compared to their counterparts who lacked such exposure. He attributed this to the enhanced comprehension and practical application of concepts gained during training, reinforcing the current study's emphasis on the transformative impact of in-service training on students' academic growth.

Similarly, Boma (2021) and Tamunotonye (2020) studies demonstrated that students who underwent extensive in-service training exercises, especially those involving real-time environmental challenges and mitigation practices, developed strong analytical skills and performed better in their academic assessments. They concluded that the cognitive and affective benefits gained from such training programs significantly enhanced students' academic capability, a conclusion that aligns with the present study's findings.

In another related study, Ereke (2019), Tamunotonye (2020) and Ebiware and Okoloba (2022) found and highlighted that training activities that included environmental awareness campaigns, simulation exercises, and inter-disciplinary projects encouraged independent learning, teamwork, and personal academic responsibility. These are key attributes associated with improved academic achievement and are evident in the current study's observation that in-service training is a critical enhancer of students' academic excellence.

Duration of Training and Academic Performance of Environmental Education and Management Students

This study examined the effect of the duration of in-service training on the academic performance of EE and management students in South-South Nigeria. The statistical analysis indicated a positive and statistically significant relationship, with a Pearson correlation coefficient of .679 and a p-value of .003 ($p < .05$). This led to the rejection of the third null hypothesis, which stated that there is no significant relationship between training duration and academic performance. The implication of the findings is that longer and sustained periods of in-service training tend to produce more favorable academic outcomes among students. It indicates that when students are engaged in extended training

programs, they are more likely to acquire in-depth knowledge, develop practical competencies, and reinforce learning experiences, all of which culminate in improved academic performance.

The findings of this study are supported by Adeyemi and Ige (2019) study revealed that students who underwent prolonged training sessions over an academic semester or more showed improved performance in exams and coursework, compared to those who engaged in short-term workshops. Adeyemi and Ige emphasized that extended exposure allowed students the time to internalize, reflect upon, and apply academic concepts within authentic learning contexts, validating the current study's emphasis on duration as a significant factor.

Additionally, Okebukola (2015) and Nwankwo (2021) showed that students who participated in multi-week or semester-long training projects were more confident, academically curious, and proficient in applying theoretical knowledge. Their study established that short-duration training programs often lacked the depth and reinforcement needed for meaningful learning, a point that aligns with this study's assertion that duration matters significantly.

Obi and Ndoma (2017) also provided supporting evidence in their study that training programs lasting over three weeks were more impactful in improving academic outcomes, particularly when coupled with feedback sessions, reflection opportunities, and peer interactions. According to Obi and Ndoma, longer training sessions helped build academic resilience and discipline, contributing positively to students' academic records. This corresponds to the findings of this study, which affirm the value of extended engagement in academic training experiences.

Challenges Faced During In-Service Training and Academic Performance of Environmental Education and Management Students

The study further examined the relationship between the challenges faced during in-service training and the academic performance of EE students in South-South Nigeria. The analysis yielded a Pearson correlation coefficient of .815 with a p-value of .000 ($p < .05$), indicating a statistically significant and moderately strong negative relationship between the challenges experienced during in-service training and students' academic performance. Based on this, the fifth null hypothesis, which stated that there is no significant relationship between the challenges encountered during in-service training and the academic performance of EE and management students, was rejected. This implies that the more intense and numerous the challenges students face during training such as inadequate funding, lack of supervision, limited training materials, poor accommodation, insecurity, and low institutional support the more likely it is that their academic performance will decline.

This finding is consistent with the research conducted by Essien and Nkpone (2018) and Achor and Ebiowei (2021) identified a strong connection between training-related difficulties and diminished academic outcomes among students in environmental programs in public universities across the Niger Delta region. Their study revealed that students who encountered transportation issues, lacked access to proper field equipment, and were placed in poorly organized training centers often returned to their academic programs demotivated and academically unprepared. The authors emphasized that unresolved challenges during in-service training sessions often lead to absenteeism, stress, and reduced comprehension of academic tasks, ultimately leading to poor academic performance.

Similarly, Idu and Okon (2020) and Bello and Iyagba (2020) showed that students who experienced psychological and logistical challenges during in-service training such as delays in training schedules, exposure to unsafe environmental conditions, or unresponsive mentors exhibited signs of burnout and struggled with maintaining academic focus upon returning to formal studies. These findings directly reflect the current study's result, underscoring that academic performance is significantly hindered when students face unresolved and prolonged challenges during training exercises.

Moreover, the findings of this study are corroborated by the study of Oboko and Ekanem (2022), who observed that the absence of coordination and structured feedback mechanisms and lack of clear training objectives among EE students led to frustration and disengagement. They argued that students need consistent guidance, proper mentoring and structured learning experiences during their training, and

where these are absent, students tend to perceive the training as a waste of time, thereby returning to school with limited enthusiasm or understanding of its practical implications. This aligns with the current study's finding that institutional inefficiencies and a lack of support mechanisms during training negatively affect students' ability to translate training experiences into academic success.

Equally, Ekpenyong and Ogolo (2019) and Benson and Opara (2017) noted that students placed in remote areas such as coastal or mangrove zones often encounter problems related to poor road infrastructure and flooding, further complicates their participation and limiting their field engagement. Their findings mirror the conclusions of the present study by highlighting that unresolved financial and institutional obstacles during training hinder students' concentration, limit access to learning opportunities, and eventually lead to poor academic outcomes.

CONCLUSION

The findings of this study have established that students' in-service training programs significantly influence the academic performance of EE and management students in South-South Nigeria. Specifically, the results revealed that the level of participation, nature of influence, duration of training, and challenges encountered during training activities all collectively and individually contribute to the academic success or limitations of students in the field. High participation and well-structured, adequately supervised training experiences were associated with improved academic performance, while short durations and unresolved challenges such as lack of institutional support or inadequate resources adversely affected learning outcomes. These findings emphasized the critical importance of strategically designed and efficiently executed in-service training programs that are responsive to students' needs and academic objectives. The highlighted challenges and optimizing the training structure and support systems can assist universities and educational stakeholders to substantially enhance the academic preparedness and performance of EE and management students across the South-South region.

RECOMMENDATIONS

The following recommendations are made to improve the design, delivery, and outcomes of in-service training programs for EE and management students:

- Universities should adopt policies that ensure compulsory and active participation of all EE and management students in well-structured in-service training programs tied directly to their academic evaluation.
- Faculties of Education should regularly review and align the content and structure of in-service training with course objectives to ensure it directly enhances students' academic competence and practical understanding.
- The duration of in-service training should be extended and uniformly standardized across institutions to allow for deeper student engagement, reflective learning, and meaningful exposure to real-world environmental challenges.
- Institutions should proactively identify and address logistical, financial, and supervisory challenges associated with in-service EE and management training to minimize disruptions and support students in maximizing the academic benefits of the program.

Suggestions for Further Studies

Future research could expand on the findings of this study by examining the comparative effectiveness of various models of in-service training, especially across diverse academic disciplines beyond EE and management, such as science, technology, and vocational education fields within the South-South region of Nigeria. This would provide a broader understanding of how discipline-specific training structures impact students' academic and professional outcomes. Researchers may also consider investigating the long-term implications of in-service training on students' employability, professional skill acquisition, and successful integration into the labor market, which would enhance the body of knowledge on post-training career development. Furthermore, future studies could adopt a robust mixed-methods design to incorporate the perspectives of a wider range of stakeholders including students, institutional administrators, and field-based supervisors, thereby offering a holistic understanding of the structural and experiential challenges influencing in-service training effectiveness. It would also be beneficial to explore the impact and adaptability of

digital or virtual in-service training programs, particularly in light of the evolving technological innovations and the shift towards flexible learning environments following the global COVID-19 pandemic, as this could inform policy reforms and innovative practices in training delivery across tertiary institutions.

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