STRENGTHENING CHRISTIAN RELIGIOUS STUDIES EDUCATORS TO INSTITUTIONALIZE SCIENCE, TECHNOLOGY, ENGINEERING, AND MATHEMATICS (STEM) EDUCATION FOR INCLUSIVE ECONOMIC GROWTH AND DEVELOPMENT

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Abstract

This study examined the roles of Christian Religious Studies (CRS) teachers towards facilitating Science, Technology, Engineering, and Mathematics (STEM) education to become a mean through which Nigeria will achieve inclusive economic growth and development. Based on Constructivist Learning Theory and Human Capital Theory, the study utilized a descriptive survey design with 80 CRS teachers selected from tertiary institutions in Abuja who were randomly sampled using simple random sampling. Data were collected through structured questionnaire and were analyzed using descriptive statistics. The results indicated that moderately computer tools and web-based platforms related to STEM activities are used by CRS instructors while interdisciplinary and problem-solving activities do not occur. Principal barriers that emerged are insufficient training, low institutional support, and lack of access to technological facilities, in addition to workload limitations and negative peer perception. Despite these challenges, CRS teachers strongly favored the following approaches: professional development workshops, collaborative efforts with STEM colleagues, inclusion of ICTs, curriculum reform, and government support in the form of grants. The study concluded that CRS teachers' strengthening is required to inspire ethically based STEM education to effectively drive human capital formation and sustainable development. It urges focused investment in policy assistance, professional growth, and infrastructure to capitalize on CRS teachers as drivers of inclusive economic development and moral innovation.

Keywords: Christian Religious Studies (CRS), STEM,institutionalization, ethical innovation. human capital development, inclusive economic growth

Introduction

STEM (Science, Technology, Engineering, and Mathematics) education is recognized globally as a fundamental driver of inclusive economic growth and development. STEM education fosters critical thinking, problem-solving, and innovation, which are essential for addressing complex global challenges and enhancing a nation's competitiveness (Ukwu et al., 2025). Nations that prioritize STEM education are better positioned to adapt to technological advancements, promote entrepreneurship, and achieve sustainable economic progress (Ewim, 2023). The integration of STEM principles in education systems is crucial for preparing students to navigate the demands of the 21st-century workforce and contribute to long-term economic prosperity (AlAli et al., 2023).

In many developing countries such as Nigeria, STEM education is viewed as a pathway to technological advancement and economic diversification. Revitalizing STEM education is seen as essential for Nigeria to overcome its dependence on natural resources and build a knowledge-based economy (Ukwu et al., 2025). However, the effective implementation of STEM education faces significant challenges, including inadequate infrastructure, outdated curricula, and a shortage of qualified educators (Ukwu et al., 2025). These challenges hinder the development of a robust STEM ecosystem and limit the potential for inclusive economic growth (Akudo et al., 2024).

Christian Religious Studies (CRS) educators can play a vital role in complementing STEM education by shaping values, ethical reasoning, and critical thinking skills (Ogbodo et al., 2025). CRS, by its very nature, deals

with questions of morality, ethics, and the application of values in daily life (Ogbodo et al., 2025). Integrating religious and moral values into STEM education can help address the ethical dilemmas that arise from technological advancements and ensure that innovations are used for the betterment of the society (Tawiah et al., 2024). Furthermore, CRS educators are uniquely positioned to foster a holistic understanding of knowledge by bridging the gap between scientific inquiry and ethical considerations (Rini et al., 2024). This interdisciplinary approach can enhance students' ability to think critically about the broader implications of STEM-related innovations.

Despite the potential benefits of integrating CRS and STEM, a persistent gap exists between humanities/religious education and STEM disciplines in Nigeria and other developing contexts (Tawiah et al., 2024). This divide is often reinforced by rigid curriculum frameworks, limited interdisciplinary collaboration, and a lack of recognition for the contributions that CRS educators can make to STEM education (Joseph and Uzondu, 2024). While STEM education focuses on scientific and technological skills, CRS provides a foundation for ethical decision-making and social responsibility. A balanced approach that integrates both domains is essential for nurturing well-rounded individuals who can drive inclusive economic growth and sustainable development (Chaikin, 2021).

CRS educators, though potential change agents, face several barriers that hinder their ability to effectively engage with STEM concepts (Ogbodo et al., 2025). Limited training in STEM-related fields, inadequate ICT infrastructure, and a lack of resources for interdisciplinary projects are significant obstacles (Akpanke et al., 2024). Many CRS educators may not have the necessary pedagogical skills to integrate STEM practices into their teaching effectively. Also, the perception that CRS is unrelated to STEM can discourage educators from exploring potential synergies between the two fields. Overcoming these barriers requires a concerted effort to provide CRS educators with the necessary training, resources, and support to institutionalize STEM education (Agyei, 2020).

The current landscape of education in Nigeria and other developing countries reveals a critical gap in the integration of Christian Religious Studies (CRS) and STEM education (Tawiah et al., 2024). While STEM is recognized as a key driver of economic growth and technological advancement, the potential contributions of CRS educators in shaping ethical reasoning, values, and critical thinking skills are often overlooked (Ukwu et al., 2025). This disconnect is further exacerbated by the challenges faced by CRS educators, including limited training in STEM-related fields, inadequate ICT infrastructure, and rigid curriculum frameworks that hinder interdisciplinary collaboration (Akpanke et al., 2024). The lack of empirical research on the specific role of CRS educators in STEM institutionalization underscores the need for a comprehensive investigation into this area.

Objectives

The objectives of the study are:

1. To examine the extent to which CRS educators integrate STEM-related practices in their teaching
2. To identify barriers faced by CRS educators in engaging with STEM concepts
3. To propose strategies for strengthening CRS educators for STEM institutionalization.

Research Questions

The following research questions were raised to guide the study:

1. To what extent do Christian Religious Studies (CRS) educators integrate STEM-related practices in their teaching?
2. What barriers do CRS educators encounter in engaging with STEM concepts?
3. What strategies are perceived as most effective in strengthening CRS educators for STEM institutionalization?

Theoretical Framework

This study is grounded on two key theoretical frameworks: Constructivist Learning Theory and Human Capital Theory. Constructivist Learning Theory, pioneered by Piaget and Vygotsky, posits that learners actively construct knowledge through experience and interaction with their environment (Joseph and Uzondu, 2024). In this framework, the teacher serves as a facilitator, guiding students to explore, question, and discover new concepts (Joseph and Uzondu, 2024). This approach is particularly relevant to STEM education, where hands-on activities, problem-based learning, and collaborative projects are essential for fostering deep understanding and critical thinking (AlAli et al., 2023). By creating a student-centered learning environment, educators can empower students to take ownership of their learning and develop the skills necessary to succeed in STEM fields.

Human Capital Theory, developed by Becker (1964), views education as an investment that enhances individuals' skills, productivity, and economic growth (Ewim, 2023). According to this theory, investments in education lead to improved human capital, which in turn drives economic development and societal progress (Ewim, 2023). This framework highlights the importance of STEM education in equipping individuals with the knowledge and skills demanded by the modern workforce (Akpanke et al., 2024). By strengthening STEM education, nations can enhance their human capital base, attract investment, and promote innovation-driven economic growth (Ukwu et al., 2025). Furthermore, Human Capital Theory underscores the need for equitable access to quality education, ensuring that all individuals have the opportunity to develop their potential and contribute to society.

Empirical Review

Recent studies on teacher preparedness for STEM reveal a mixed landscape of successes and persistent challenges, both in Africa and globally. Several initiatives have shown promise in enhancing teacher capacity through targeted training programs, mentoring, and collaborative networks. For example, a study by Smith (2022) found that providing teachers with ongoing professional development in STEM-related pedagogy significantly improved their ability to engage students in hands-on activities and problem-based learning. However, challenges remain in terms of scalability, sustainability, and equitable access to professional development opportunities. In many African countries, limited resources, inadequate infrastructure, and a shortage of qualified trainers continue to hinder efforts to enhance teacher preparedness for STEM.

Evidence also suggests that there are significant gaps in the integration of non-STEM disciplines, particularly CRS, into STEM-related education (Nazari et al., 2024). Many teachers view STEM subjects as separate from the humanities and religious education, leading to a lack of interdisciplinary collaboration and curriculum integration (Uroko, 2023). This divide is often reinforced by rigid curriculum frameworks, standardized testing, and a lack of recognition for the contributions that non-STEM disciplines can make to STEM education. Overcoming these gaps requires a shift in mindset, promoting a more holistic and integrated approach to education that values the contributions of all disciplines.

Despite the growing recognition of the importance of STEM education and the potential contributions of CRS educators, there is limited empirical work on how CRS educators can be strengthened to promote STEM institutionalization for inclusive economic growth and development. While studies have explored the integration of the humanities and arts into STEM education, few have specifically focused on the role of CRS educators in this process (Uroko, 2023). This gap in the literature highlights the need for further research to investigate the unique challenges and opportunities faced by CRS educators in engaging with STEM concepts and to identify effective strategies for strengthening their capacity to promote STEM institutionalization (Ewim, 2023).

This study aims to address this gap by examining the extent to which CRS educators integrate STEM-related practices in their

teaching, identifying the barriers they face in engaging with STEM concepts, and proposing strategies for strengthening CRS educators for STEM institutionalization. By providing empirical evidence and actionable recommendations, this research can contribute to a more holistic and integrated approach to education that leverages the strengths of both CRS and STEM disciplines for inclusive economic growth and development.

STEM Education as a Catalyst for Inclusive Economic Growth and Devlopment

STEM education is widely recognized as a catalyst for inclusive economic growth, particularly in developing contexts (Campbell and Speldewinde, 2022). By fostering critical thinking, problem-solving, and innovation, STEM education equips individuals with the skills necessary to drive technological advancements and economic diversification (AlAli et al., 2023). In developing countries, STEM education can help bridge the technological gap, promote entrepreneurship, and create new opportunities for economic. Studies have shown that nations with a strong STEM workforce are more likely to attract foreign investment, develop high-tech industries, and achieve sustainable economic growth (Akpanke et al., 2024). However, realizing the full potential of STEM education requires addressing systemic challenges such as inadequate infrastructure, outdated curricula, and a shortage of qualified educators (Joseph and Uzondu, 2024).

The humanities and religious education play a crucial role in shaping ethics, values, and attitudes that complement science and innovation (Uroko, 2023). While STEM education focuses on developing technical skills and scientific knowledge, the humanities and religious education provide a foundation for ethical decision-making and social responsibility (Ogbodo et al., 2025). Exploration of moral dilemmas, philosophical concepts, and religious teachings, can help students develop a strong sense of values and learn to apply ethical principles to complex issues (Rini et al., 2024). This is particularly important in the context of rapid technological advancements, where ethical considerations are often at the forefront. Integrating the humanities and religious education into STEM education can help ensure that innovations are used for the betterment of society and that scientific advancements are guided by ethical principles.

Teacher capacity and cross-disciplinary pedagogy are critical enablers of curriculum integration in STEM education. Effective STEM education requires teachers who are not only knowledgeable in their respective disciplines but also skilled in integrating concepts across different subjects. Cross-disciplinary pedagogy involves creating learning experiences that connect STEM subjects with other fields such as the humanities, arts, and social sciences. This approach can enhance students' understanding of the real-world applications of STEM concepts and foster a more holistic and integrated view of knowledge. However, many teachers lack the training and resources necessary to effectively implement cross-disciplinary pedagogy. Strengthening teacher capacity through professional development programs, collaborative planning, and access to high-quality instructional materials is essential for promoting curriculum integration and enhancing student learning in STEM.

Research Methodology

This study employed a **descriptive survey research design** to generate quantitative data on how Christian Religious Studies (CRS) educators contribute to institutionalizing STEM education for inclusive growth and development. The population comprised CRS educators in tertiary institutions within FCT-Abuja, from which a sample of **80 respondents** was selected using a simple random sampling technique to ensure representativeness. Data were collected through a structured questionnaire designed around the study's research questions. The instrument contained four sections: demographic information; integration of STEM practices in CRS teaching; barriers to CRS educators' engagement with STEM concepts; and strategies for strengthening CRS educators'

capacity to promote STEM education. Items were structured on a five-point Likert scale. Administration was conducted both physically and electronically to maximize participation, and informed consent was obtained from all respondents. Data gathered were analyzed using **descriptive statistics** such as means, and standard deviations, which provided clear answers to the research questions. Results were presented in **tables** to enhance clarity and interpretation.

Results and Analysis

Table 1: Extent of CRS Educators' Integration of STEM-related Practices in Teaching

S/N	Item	SA	A	U	D	SD	$\bar{x}$		Remark
1	I incorporate digital tools (e.g., projectors, simulations) into my CRS teaching.	18	28	12	15	7	3.53	1.21	High extent
2	I relate CRS concepts to scientific or technological innovations.	15	25	10	20	10	3.23	1.29	Moderate extent
3	I encourag e students to use online platforms to explore religious and STEM-related issues.	20	22	13	17	8	3.41	1.27	High extent
4	I design problem - solving activities that reflect both values and STEM reasoning.	12	24	18	16	10	3.05	1.28	Moderate extent
5	I collaborate with colleagues in STEM fields to enrich my CRS lessons.	10	18	15	25	12	2.78	1.29	Low extent

The results suggest a variable extent of STEM-related methods practiced by CRS teachers. The use of digital materials ($x̄ = 3.53$, $\sigma = 1.21$) and encouragement of students to use online platforms to explore religious and STEM-related issues ($x̄ = 3.41$, $\sigma = 1.27$) featured relatively high mean values, reflecting that teachers apply technology to their teaching practice to a moderate and uniform extent. The moderate-mean responses for linking CRS and technical developments ($x̄ = 3.23$, $\sigma = 1.29$) and design of STEM-based problem-solving activities ($x̄ = 3.05$, $\sigma = 1.28$) suggest an extent of linking that has not yet thoroughly become a staple for all learning contexts. Interdisciplinary learning ($x̄ = 2.78$, $\sigma = 1.29$) registered the lowest-mean score, and this suggests that interdisciplinarity is seldom practiced. The standard deviations for the different items (1.21-1.29) reveal a significant extent of variability in teachers' responses and of inconsistencies in the practices related to STEM integration.

Table 2: Barriers Encountered by CRS Educators in Engaging with STEM Concepts

S/N	Item	SA	A	U	D	SD	$\bar{x}$	σ	Remark
1	Lack of adequate training in STEM integration hinders my teaching.	30	25	8	10	7	3.81	1.22	Major barrier
2	Insufficient institutional support affects my ability to use STEM tools.	25	28	9	12	6	3.74	1.18	Major barrier
3	Limited access to technological facilities reduces integration efforts.	27	26	7	12	8	3.70	1.27	Major barrier
4	Workload and time constraints hinder my involvement in STEM initiatives.	20	24	11	16	9	3.35	1.29	Moderate barrier
5	Negative attitudes of some colleagues discourage CRS-STEM collaboration.	18	22	15	17fdsa	8	3.29	1.25	Moderate barrier

The findings indicate that there are a lot of issues among CRS educators in utilizing STEM-related practices. The largest concerns were inadequate training ($\bar{x}$ = 3.81, σ = 1.22) and insufficient support from their institutions ($\bar{x}$ = 3.74, σ = 1.18), and these are considered significant challenges. Insufficient access to technology also emerged as a significant challenge ($\bar{x}$ = 3.70, σ = 1.27). Compared to this, having too much work and not sufficient time ($\bar{x}$ = 3.35, σ = 1.29) and colleagues having negative attitudes ($\bar{x}$ = 3.29, σ = 1.25) had a moderate score, thus indicating that while significant, these are less serious concerns. The relatively high standard deviation values (1.18–1.29) also indicate that educators experience varied difficulties, and while some experience significant difficulties, some educators might experience fewer challenges.

Table 3: Strategies for Strengthening CRS Educators in STEM Institutionalization

S/N	Item	SA	A	U	D	SD	$\bar{x}$	σ	Remark
1	Regular professional development workshops on STEM for CRS educators are necessary.	32	30	7	6	5	3.98	1.07	Effective
2	Collaborative projects b etween CRS and STEM educators should be promoted.	28	29	10	8	5	3.84	1.10	Effective
3	Integration of ICT facilities into CRS classrooms should be prioritized.	30	27	9	8	6	3.80	1.15	Effective
4	Curriculum review to include STEM relevant content in CRS is essential.	26	25	11	10	8	3.61	1.24	Effective
5	Government and institutions should provide grants for CRS - STEM innovation.	24	28	12	9	7	3.63	1.20	Effective

The findings show that there is a strong agreement on ways to improve CRS-STEM integration. Regular professional development workshops had the highest average score ($\bar{x}$ = 3.98, σ = 1.07), indicating almost everyone thinks they are effective. Collaborative projects between CRS and STEM teachers ($\bar{x}$ = 3.84, σ = 1.10) and focusing on ICT facilities ($\bar{x}$ = 3.80, σ = 1.15) were also strongly supported. Curriculum review ($\bar{x}$ = 3.61, σ = 1.24) and providing government or institutional grants ($\bar{x}$ = 3.63, σ = 1.20) got good ratings too, but there was a bit more difference in opinions. Compared to the earlier tables, the standard deviation values here are lower (1.07–1.24), showing that educators agree more on the strategies that would work best.

Discussion of Findings

Findings from the study indicated that CRS teachers are applying digital tools and online platforms moderately in practice. This is an indication that they are adopting technology as part of their pedagogy, responding to the increasing need for digital literacy and problem-solving skills in the labor market of the 21st century. Through technological interaction and inquiry among students, CRS teachers enable the development of human capital a driving force for economic growth. AlAli et al. (2023) posited that STEM education develops competencies that are at the heart of national competitiveness and innovation, and if CRS teachers instill such practices, they connect STEM learning to values and moral contexts. Their engagement therefore sensitizes students to prepare them not only for technological involvement but also for ethical involvement in economic development.

Inadequacy of training, institutional incapacity, and limited ICT facilities access echo system inefficiencies, were identified as barriers that limit CRS teachers' ability to ensure maximum contribution toward national development. In the absence of adequate capacity-building and accessible resources, the possibility of promoting improved STEM literacy through CRS classrooms would be lost and therefore detracted from the achievement of a knowledge-based economy. Rini et al., (2024) affirmedthat teacher preparedness is a key to success in STEM, while Ogbodo et al., (2025) noted that institutional culture impacts teachers' inclination towards innovation. Based on this, any blockage experienced by CRS teachers is not only a teaching matter but also an economic factor that hinders the country from being able to produce graduates who have technical ability and ethical foundation.

In spite of these concerns, there is broad agreement from the results on CRS-STEM integration improvement strategies. Professional development workshops, team projects, ICT integration, curriculum review, and innovation grants were all supported across the board. These strategies stretch beyond classroom enhancement; they are policy levers for economic transformation. Investing in teachers' professional development of CRS teachers and equipping them with tools, Nigeria can increase the number of educators contributing to STEM institutionalization, thus enhancing human capital formation and widening the economic participation base. While Joseph and Uzondu (2024) observed that curriculum planning across disciplines enhances the versatility of the workforce, Tawiah et al. (2024) contended that embedding ethical and moral values in STEM ensures responsible innovation. If applied, these strategies could render CRS teachers both ethical models and pedagogy innovations to ensure that technological advancement is aligned with social accountability.

Conclusion

The study established that CRS educators in tertiary institutions demonstrate moderate integration of STEM-related practices, particularly in the use of technology and online engagement. Nevertheless, their roles are still constrained by inadequate training, poor institutional support, as well as access to ICT resources. The limitations affect their ability to improve interdisciplinarity learning and make significant contributions toward institutionalizing STEM. However, CRS teachers validate their high engagement in interventions like professional development, collaboration, ICT integration, curriculum review, and institutional grants, indicating willingness to implement STEM with the right support. Findings warrant that empowering CRS teachers is not only an intellectual exercise but a strategic move toward closing the ethical, moral, and technology gaps in education. Through empowering the CRS teachers, Nigeria is able to facilitate a better education system with the capacity to propel inclusive economic growth and development.

Recommendations

Based on the findings from the study, the following recommendations were made:

1. Continuous training workshops should be organized for CRS educators to build competencies in STEM-related pedagogies, ICT use, and interdisciplinary curriculum design. This will enhance their confidence and effectiveness in integrating STEM into CRS lessons.

2. Government and school administrations should provide adequate ICT infrastructure, supportive policies, and grants for CRS-STEM innovations. These measures are hoped, will address the resource gaps that currently hinder integration.

3. Structured platforms should be established to facilitate joint projects between CRS and STEM educators. Such collaboration will not only enhance teaching and learning but also encourage students to apply ethical reasoning alongside scientific knowledge in solving real-world challenges.

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