CURRICULUM RESPONSIVENESS TO SUSTAINABLE DEVELOPMENT GOALS (SDGS): ASSESSING MATHEMATICS AND ECONOMICS IN SECONDARY SCHOOLS IN IMO STATE, NIGERIA

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Abstract

This study examines the responsiveness of Mathematics and Economics curriculum in relation to the SDGs in secondary schools in Imo State, Nigeria. This particular study emanated from the awareness that there was a pressing need to integrate sustainable competences into curricula to ensure that learners were prepared adequately with knowledge, skills, and values needed to tackle new social, economic, and environmental challenges. More precisely, the aim was to evaluate the extent of integration of sustainable competences, the pedagogy adopted, and challenges faced in their adoption. A descriptive survey methodological approach was adopted in this present study. The population of the study was composed of 7,458 Senior Secondary School students in government secondary schools in Imo State out of which 400 were sampled using the proportionate stratified random sampling technique. The tool used for data collection was a researcher-constructed Curriculum Responsiveness to SDGs Questionnaire (CRSDGQ) which had a reliability index of 0.82. Sustainability competencies are highly embedded in

the teaching of Mathematics ($\bar{x}$=2.69) and the teaching of Economics ($\bar{x}$=2.67). Teachers adopt different instructional approaches like discussion, inquiry, cooperative/collaborative learning, and projects to promote sustainability competencies. It was found out, however, that issues such as inability to build teacher capacities, inadequacy in terms of availability of learning materials, large class size, and curriculum that revolves around examinations are some of the challenges that have been encountered in incorporating SDG competencies in the teaching of Mathematics and Economics. Conclusion As can be seen from this study, there is relatively high incorporation of SDG competencies in Mathematics and Economics despite the challenges associated with the same. There is a need to enhance teachers' capacities, learning materials, curriculum, and other issues so as to ensure sustainability in this area of education.

Keywords: Curriculum, Curriculum responsiveness, Sustainable development

Introduction

The Sustainable Development Goals (SDGs), adopted by the United Nations in 2015, constitute a global framework aimed at promoting social inclusion, economic prosperity, environmental sustainability, and equitable development by the year 2030. Achieving these goals requires a transformative educational system that equips learners with the knowledge, values, attitudes, and competencies needed to address complex global and local challenges such as poverty, inequality, climate change, unemployment, and resource depletion. Consequently, education has been recognized as both a standalone goal (SDG 4) and a critical enabler for the realization of all other SDGs. Education for Sustainable Development (ESD) emphasizes the development of sustainability competencies, including critical thinking, problem-solving, decision-making, collaboration, and responsible citizenship. These competencies enable learners to

understand the interconnections among social, economic, and environmental issues and to actively contribute to sustainable development. Within the secondary school curriculum, Mathematics and Economics occupy strategic positions in fostering these competencies. Mathematics develops analytical reasoning, logical thinking, data interpretation, and problem-solving skills, which are essential for understanding and addressing sustainability challenges. Similarly, Economics equips learners with knowledge of resource allocation, economic development, poverty reduction, financial literacy, and sustainable consumption patterns, all of which are central to the achievement of several SDGs.

Globally, educational systems are increasingly revising curricula to integrate sustainability principles across subject disciplines. UNESCO (2020) advocates for the infusion of SDG-related content and competencies into all areas of learning to ensure that students are adequately prepared for the demands of sustainable societies. In Mathematics, sustainability-oriented learning may involve environmental modelling, statistical analysis of development indicators, and the application of quantitative reasoning to societal challenges. Likewise, Economics education can promote understanding of sustainable economic growth, responsible resource management, and socio-economic equity. Despite these global efforts, evidence suggests that the integration of SDG-related competencies into school curricula remains limited in many developing countries, including Nigeria. Although sustainability concepts are reflected in some educational policies and curriculum frameworks, their practical implementation in classroom instruction often falls short of expectations. Studies have shown that many teachers lack adequate professional preparation, instructional resources, and pedagogical guidance required for effective integration of sustainability principles into subject teaching (Emanghe et al., 2021). Furthermore, Mathematics instruction in many secondary schools continues to be examination-oriented, with limited connection to real-world sustainability issues (Awofala& Lawani, 2020). Similarly, Economics curricula have been criticized for insufficient emphasis on contemporary global sustainability challenges and emerging economic realities (Gbadamosi &Omosunlade, 2020).

In addition, teaching approaches commonly employed in Nigerian secondary schools remain largely teacher-centred, reducing opportunities for learners to develop sustainability competencies through inquiry, collaboration, and problem-based learning experiences (Oribhabor, 2020). This situation raises concerns regarding the responsiveness of the curriculum to the aspirations of the SDGs and the extent to which learners are being prepared to contribute meaningfully to sustainable development. Although considerable scholarly attention has been devoted to Education for Sustainable Development and curriculum reform, there remains a paucity of empirical studies examining how specific school subjects respond to the SDGs. Existing studies have largely focused on science education, environmental education, and general curriculum issues, with limited attention given to subject-specific analyses of Mathematics and Economics. Furthermore, there is a noticeable lack of comparative evidence on the integration of sustainability competencies within these subjects in particular states of Nigeria, including Imo State. Empirical information regarding teachers' instructional strategies and the challenges associated with implementing sustainability-oriented curricula also remains inadequate.

It is against this background that this study seeks to assess the responsiveness of Mathematics and Economics curricula to the Sustainable Development Goals in secondary schools in Imo State, Nigeria. Specifically, the study examines the extent of integration of sustainability competencies within the two subjects, investigates the instructional strategies adopted by teachers, and identifies the challenges affecting effective curriculum responsiveness to the SDGs. The findings are expected to provide empirical evidence that will inform curriculum planners, policymakers, educators, and other stakeholders in strengthening curriculum implementation for sustainable development. The main objective of this study is to assess the responsiveness of the Mathematics and Economics curricula to the Sustainable Development Goals (SDGs) in secondary schools in Imo State, Nigeria. Specifically, the study seeks to:

I. examine the extent to which sustainability competencies are integrated into the teaching of Mathematics in secondary

schools in Imo State;

ii. assess the extent to which sustainability competencies are integrated into the teaching of Economics in secondary schools in Imo State;

iii. identify the instructional strategies employed by teachers in integrating sustainability competencies into Mathematics and Economics teaching; and

iv. determine the challenges affecting curriculum responsiveness to the Sustainable Development Goals in the teaching of Mathematics and Economics in secondary schools in Imo State.

Research Questions

The study is guided by the following research questions:

1. To what extent are sustainability competencies integrated into the teaching of Mathematics in secondary schools in Imo State?
2. To what extent are sustainability competencies integrated into the teaching of Economics in secondary schools in Imo State?
3. What instructional strategies do teachers employ in integrating sustainability competencies into Mathematics and Economics teaching?
4. What challenges affect curriculum responsiveness to the Sustainable Development Goals in the teaching of Mathematics and Economics in secondary schools in Imo State?

Methods

A descriptive survey research design was used in conducting the study; this was viewed as most appropriate since the study aimed at generating systematic information on the extent of responsiveness of the curriculum to Sustainable Development Goals (SDGs) in Mathematics and Economics in secondary schools in Imo State, Nigeria. The population of this study consisted of 7,458 senior secondary school (SS) students selected from public secondary schools in Imo State, Nigeria, from which a sample size of 400 respondents was obtained through the use of proportionate stratified random sampling technique. The data for the study were generated

through the use of structured questionnaire titled "Curriculum Responsiveness to SDGs Questionnaire (CRSDGQ)." The tool was validated by subject matter specialists in curriculum and educational measurement, while its reliability was determined by means of Cronbach's alpha with internal consistency of 0.82, implying a very high degree of reliability. Ethics was ensured by gaining permissions from school management, taking voluntary participation from respondents, ensuring confidentiality, and anonymity. The data collected were subjected to descriptive analysis using mean and standard deviation for answering the research questions while hypothesis testing was done using inferential statistics like t-test.

Results

Research Question One: To what extent are sustainability competencies integrated into Mathematics in secondary schools in Imo State?

Table 1: Mean Scores on the Extent of Integration of Sustainability Competencies in Mathematics in Secondary Schools in Imo State

N = 400

N	Statements	M	S. D.	Decision
	Mathematics teachers relate classroom content to real-life sustainability issues such as environment and resource use.	2.61	0.94	High Extent
	Students are exposed to problem -solving tasks that reflect SDG -related challenges in Mathematics lessons.	2.55	0.97	High Extent
	Mathematics instruction includes application-based learning linked to sustainability concepts.	2.48	0.92	Moderate Extent
	Teachers use real -world data to demonstrate sustainability -related mathematical concepts.	2.52	0.95	High Extent
	Sectional Mean	**2.69**	**0.995**	**High Extent**

Source: Field Survey 20, 2026

As depicted in Table 1, it is apparent that competency in sustainability is highly emphasized within the teaching of Mathematics at the secondary school level in Imo State, owing to the fact that the sectional mean for this indicator is 2.69. This implies that Mathematics educators in Imo are constantly relating classwork with practical sustainable development problems.

Research Question Two: To what extent are sustainability competencies integrated into Economics in secondary schools in Imo State?

Table 2: Mean Scores on the Extent of Integration of Sustainability Competencies in Economics in Secondary Schools in Imo State

N = 400

S/N	Statements	M	S. D.	Decision
5	Economics teachers integrate SDG concepts such as poverty reduction and economic growth into lessons.	2.70	0.91	High Extent
6	Students are taught how economic decisions affect sustainable development outcomes.	2.66	0.93	High Extent
7	Instruction in Economics includes discussions on sustainable resource allocation and development.	2.58	0.96	High Extent
8	Teachers use current economic issues to illustrate sustainability concepts in class.	2.72	0.89	High Extent
	Sectional Mean	**2.67**	**0.92**	**High Extent**

Source: Field Survey 20, 2026

According to Table 2, the inclusion of sustainability skills within Economics lessons in secondary schools in Imo State is highly practiced, with a mean score of 2.67 in terms of sections. This means that the teachers are quite effective in including the relevant knowledge of SDGs in their teaching methods through topics like

reduction of poverty, sustainable growth of economy, resource allocation, and current issues in economics.

Research Question Three: What instructional strategies are used by teachers in integrating SDG-related competencies into Mathematics and Economics in secondary schools in Imo State?

Table 3: Mean Scores on Instructional Strategies Used in Integrating SDG-Related Competencies in Mathematics and Economics

N = 400

S/N	Statements	M	S. D.	Decision
9	Teachers use discussion method to connect lessons with real -world sustainability issues.	2.73	0.88	Agreed
10	Problem-solving and inquiry -based learning strategies are used in teaching SDG-related topics.	2.69	0.91	Agreed
11	Teachers employ collaborative learning activities to promote sustainability understanding.	2.60	0.94	Agreed
12	Teachers use project -based assignments linked to real -life economic and environmental issues.	2.57	0.96	Agreed
	Sectional Mean	**2.65**	**0.92**	**Agreed**

Source: Field Survey June20, 2026

As shown in Table 3, the use of different instructional approaches among teachers when implementing sustainable development goals (SDGs) competencies in the teaching of Mathematics and Economics is evident from the section mean score of 2.65. This implies that strategies such as discussions, problem-solving, inquiries, cooperation, and project work are frequently used.

Research Question Four: What challenges affect the effective integration of SDG-related competencies in Mathematics and

Economics in secondary schools in Imo State?

Table 4: Mean Scores on Challenges Affecting Integration of SDG-Related Competencies in Mathematics and Economics

N = 400

S/N	Statements	Mean	Std. Dev.	Decision
13	Lack of adequate teacher training on SDG integration affects effective teaching.	2.78	0.90	Agreed
14	Inadequate instructional materials hinder the integration of sustainability concepts.	2.81	0.88	Agreed
15	Large class sizes make it difficult to apply student-centered learning approaches.	2.76	0.92	Agreed
16	Examination-oriented curriculum limits the teaching of SDG-related content.	2.83	0.87	Agreed
	Sectional Mean	**2.80**	**0.89**	**Agreed**

Source: Field Survey 20, 2026

As indicated in Table 4 below, the respondents were of the opinion that a number of challenges existed that would impede the successful incorporation of competencies of SDG within Mathematics and Economics subjects, from the sectional mean score of 2.80. This means that inadequate capacity building for teachers, lack of instructional resources, large class sizes, and examination-driven curriculum are among the key challenges.

Discussions

Based on the findings of this research work, it can be concluded that sustainability skills have been adopted by Mathematics and Economics teachers at the secondary school level in Imo State to a very great extent. This was evident based on the high sectional means obtained for Mathematics and Economics classes, which imply that

more and more teachers are incorporating class lectures with sustainability concerns such as environmental management, poverty alleviation, economic growth, resource allocation, and sustainable development goals. Moreover, the findings further support UNESCO (2021), which posited that Mathematics is crucial to sustainable development in relation to modeling of the environment, interpretation of data, and resource management. Additionally, the findings resonate well with the assertion by Bello (2020) that the importance of Economics lies in its contribution to providing students with skills needed to comprehend poverty reduction, economic development, and sustainable resource management. Thus, it can be concluded that there is a growing tendency among secondary school teachers in Imo State to incorporate curriculum approaches geared towards meeting the sustainability goals of the SDGs. Contrary to the above, the findings of the study are inconsistent with the findings of Awofala and Lawani (2020), who asserted that mathematics in many Nigerian schools is mainly exam-focused and does not consider real-world sustainability issues. In addition, the findings are contrary to the views held by Gbadamosi and Omosunlade (2020), who argued that the economics curriculum lacks the current global sustainability issues.

Another discovery from the research is that teachers make use of a wide range of teaching methods in the incorporation of competencies relating to SDGs in Mathematics and Economics lessons. According to the results, it can be seen that discussion, problem-solving techniques, inquiry-based learning, collaborative learning, and project-based activities are some of the common methods used by teachers to enable students understand issues related to sustainable development. This outcome is in agreement with the ideas of UNESCO (2020) concerning the importance of employing participative approaches in ESD.

Similarly, using approaches such as inquiry and problem solving aligns with the recommendation by UNESCO (2021) that learners should be presented with real-life situations where critical thinking skills are applied. The findings are further supported by the studies conducted by Emanghe et al. (2021), which highlighted the role of

innovative instructional methods in fostering sustainability capabilities among learners. Using the application of collaborative and project-based learning techniques, it appears that teachers are providing learners an opportunity to connect theory with practice. Even as the extent of integration and the application of innovative teaching methods were promising, there are still substantial obstacles which inhibit the effectiveness of curricular responsiveness to the SDGs. According to Table 4, among the problems which inhibit curricular responsiveness include inadequacies in teacher training, inadequate instructional materials, large classes, and a curriculum dominated by examination orientation. These results align with the observations of Emanghe et al. (2021) that most teachers do not have sufficient professional development programs which would make it possible for them to integrate sustainability issues into classroom instruction. Also, the findings reinforce the views of Awofala and Lawani (2020) about the limitations inherent in examination-oriented instruction.

Moreover, the result supports the observation by Oribhabor (2020), who observes that overcrowded classrooms and lack of instructional materials impede the use of learner-centered teaching techniques. In this respect, the current study corroborates the findings of the literature that have identified the continued existence of a gap between the intention of the curriculum and actual integration of SDGs in the classroom in developing countries. As such, despite the high level of sensitivity of the curriculum to SDGs, issues such as teacher training, instructional materials, adaptability, and classroom dynamics are critical.

Conclusion

This research evaluated the responsiveness of Mathematics and Economics curriculum to the Sustainable Development Goals (SDGs). It was found out that there is a high level of integration of sustainability competences in these courses where the instructors apply different kinds of learner-centered teaching methods like discussions, inquiry-based methods, cooperative learning, and project-based learning in order to raise sustainability awareness among learners. On the other hand, several problems that hamper

implementation were also highlighted. These included poor instructor training, lack of resources, overcrowded classes, and exam-oriented curriculum. Thus, it can be concluded that although there is great potential in these fields in realizing SDGs, further actions are still needed.

Recommendations

Based on the findings of this study, it is recommended that government agencies, educational authorities, and other key stakeholders should organize regular capacity-building programmes and professional development workshops to equip Mathematics and Economics teachers with the knowledge and pedagogical skills required to effectively integrate Sustainable Development Goals (SDGs) into classroom instruction. Educational authorities should also ensure the provision of adequate teaching and learning resources that facilitate the incorporation of sustainability concepts into the teaching and learning of both subjects.

Furthermore, curriculum planners should undertake periodic reviews of the secondary school curriculum to deliberately embed sustainability competencies, values, and real-world applications that align with the objectives of the SDGs. School administrators and policymakers should promote learner-centred instructional approaches, such as project-based learning, inquiry-based learning, collaborative learning, and problem-solving activities, to foster students' active engagement with sustainability issues.

In addition, efforts should be intensified to address classroom overcrowding through the recruitment of qualified teachers and the expansion of learning facilities, thereby creating a more conducive environment for effective learner-centred instruction. Finally, examination bodies should redesign assessment practices to emphasize critical thinking, creativity, problem-solving, and the practical application of knowledge, as this would encourage both teachers and students to prioritize the development of sustainability competencies that are essential for achieving the Sustainable Development Goals.

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