CONSUMER SCIENCE TEACHERS' EXPERIENCES IN EMBEDDING SUSTAINABILITY WITHIN COMPETENCY-BASED EDUCATION: EXPLORING POLICY AND PRACTICE

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Abstract
The integration of sustainability into competency-based education has become a global imperative, yet significant gaps persist between policy intentions and classroom realities. This study explores the lived experiences of Consumer Science teachers in Eswatini as they go through the complex process of embedding sustainability within competency-based curricula in secondary education. Despite policy frameworks emphasizing sustainability education, limited research examines the subject-specific challenges teachers encounter in translating these mandates into meaningful pedagogical practice. Guided by four research questions, this qualitative descriptive research explores the practical barriers, innovative strategies and enabling factors that shape Consumer Science teachers' implementation of sustainability competencies. The population for this study comprises all the 48 Consumer Science teachers in secondary schools within the Manzini region. A sample of 15 Consumer Science teachers was selected using purposive sampling technique to ensure participants had experience in teaching sustainability-related content within competency-based frameworks. Data were collected through in-depth semi-structured interviews and document analysis to capture rich, contextual insights into teachers' experiences. Data were analysed using thematic analysis, facilitated by the NVivo software. Findings reveal how teachers adapt existing resources, utilize household materials for practical exercises, and employ collaborative learning approaches to overcome resource constraints. The study highlights the critical role of teacher agency and innovation in bridging the policy-practice gap, including the integration of sustainability into daily school routines through waste management initiatives and school gardens, as well as professional networking for resource sharing. The study recommends context-sensitive approaches that acknowledge resource realities while empowering teachers as key agents of transformative sustainability education.

Keywords: sustainability competencies, competency-based education, Consumer Science, teacher experiences, policy-practice gap, secondary education, pedagogical innovation

Introduction

The 21st century has witnessed an unprecedented global focus on sustainability as nations grapple with environmental degradation, climate change, resource depletion and social inequalities. In response to these pressing challenges, international frameworks such as the United Nations' Sustainable Development Goals (SDGs), particularly SDG 4.7, have emphasized the critical role of education in fostering sustainable development. Education for Sustainable Development (ESD) has emerged as a transformative approach that equips learners with the knowledge, skills, values and attitudes necessary to contribute to a more sustainable future (Entang, Utama, Liliawati, Sohn, & Wahyudi, 2024). Central to this vision is the development of sustainability competencies integrated capabilities that enable individuals to think critically, act responsibly, and engage collaboratively in addressing complex sustainability challenges.

The Shift to Competency-Based Education

Globally, educational systems have been transitioning from traditional content-focused curricula to competency-based education (CBE) frameworks that emphasize the application of knowledge and skills in real-world contexts (Sangwa, 2015). Competency-based education prioritizes learning

outcomes that demonstrate what students can do with their knowledge, rather than merely what they know. This pedagogical shift aligns well with the goals of sustainability education, which requires learners to develop practical competencies such as systems thinking, anticipatory thinking, normative competence, strategic thinking, and collaborative problem-solving. The integration of sustainability competencies within CBE frameworks represents a promising approach to preparing students for the complexities of sustainable living and responsible citizenship.

Consumer Science as a Context for Sustainability Education

Consumer Science, as a subject discipline in secondary education, occupies a unique and strategic position for embedding sustainability competencies. The subject encompasses critical areas such as nutrition, food security, textile and clothing management, household resource management, consumer rights and responsibilities, and family well-being. These content areas naturally intersect with sustainability principles, including responsible consumption and production (SDG 12), zero hunger (SDG 2), good health and well-being (SDG 3), and sustainable communities (Kayyali & Noori, 2026). Consumer Science education provides authentic contexts for students to explore the environmental, social and economic dimensions of their daily choices and practices, making it an ideal vehicle for developing sustainability competencies.

Despite this natural alignment, the practical implementation of sustainability within Consumer Science curricula remains underexplored. Teachers are positioned at the frontline of curriculum implementation, yet their experiences, challenges and innovative practices in embedding sustainability competencies within competency-based frameworks have received limited scholarly attention.

The Policy-Practice Gap

Educational policies worldwide have increasingly mandated the integration of sustainability across curricula (Azmi, 2025). However, a significant gap often exists between policy intentions and classroom realities. Research indicates that teachers face numerous challenges in translating sustainability policies into effective pedagogical practice, including inadequate resources, limited professional development, curriculum overload, insufficient teaching materials and lack of contextual guidance for subject-specific implementation (Cheruiyot, 2024). This policy-practice gap is particularly pronounced in resource-constrained contexts where teachers must navigate systemic barriers while striving to fulfill curriculum mandates.

In the context of Consumer Science, teachers are expected to develop students' sustainability competencies while working within the constraints of existing infrastructure, limited budgets, and prescribed curriculum timelines. The practical challenges of sourcing appropriate materials, designing authentic learning experiences, and assessing competency development in sustainability remain significant obstacles. Yet, despite these challenges, many teachers demonstrate remarkable innovation and resilience, adapting resources, collaborating with colleagues, and integrating sustainability into daily school routines.

The Need for Subject-Specific Research

While existing studies highlight the significance of competency-based education and sustainability in curricula, they largely focus on policy frameworks, competency development, and student outcomes. There is a notable limited research on examining the practical challenges teachers encounter when embedding sustainability into competency-based teaching in subject-specific contexts such as Consumer Science (Ferunika Pahrudin, Yuberti, Rinaldi, & Fradito, 2026)**.** This gap is particularly evident in under-researched contexts, where classroom realities, resource constraints and teacher preparedness shape implementation. Consumer Science, with its direct relevance to sustainable living practices, represents a critical yet under-researched context. Understanding the lived experiences of Consumer Science teachers, their challenges, strategies and enabling factors is essential for developing

targeted support mechanisms, informing teacher education programs, and creating realistic policy frameworks that bridge the gap between aspirations and implementation realities.

Research Questions

The following research questions guided the study:

1. What specific practical challenges do Consumer Science teachers encounter when attempting to embed sustainability competencies into their teaching?
2. How do these challenges interact with the core principles of competency-based education?
3. What contextual factors influence these challenges?
4. What support strategies do teachers perceive as most effective for successful integration?

Theoretical Framework

This study is anchored in an integrated theoretical framework comprising three complementary theories. First, Competency-Based Education (CBE) theory, propounded by Morcke, Dornan and Eika (2013), argues that education should be organised around demonstrable outcomes rather than content coverage. This theory holds that learners must be able to apply knowledge and skills in real-world contexts, making it directly relevant to understanding how Consumer Science teachers structure sustainability learning within outcome-oriented curricula. Second, Education for Sustainable Development (ESD), advanced by UNESCO (2017), conceptualises sustainability as encompassing environmental, social and economic responsibility. ESD proposes that education must cultivate the knowledge, skills, values and attitudes that enable learners to contribute to sustainable futures. Its relevance to this study lies in its provision of a lens through which sustainability competencies in Consumer Science can be understood as holistic and transformative rather than merely content-focused. Third, Street-Level Bureaucracy Theory, originally propounded by Lipsky (1980) and applied to education through Fullan's (2007) Curriculum Implementation Theory, explains how frontline implementers such as teachers interpret, adapt and enact policies within the constraints of their specific working contexts. Fullan (2007) argues that the meaning teachers assign to curriculum reforms determines the enacted curriculum in classrooms, irrespective of policy intentions. This is highly relevant to the present study as it explains the policy-practice gap encountered by Consumer Science teachers when implementing sustainability mandates under resource constraints. Together, these three theories enable a nuanced exploration of how Consumer Science teachers experience, interpret and enact sustainability within competency-based education, and how contextual realities mediate policy intentions.

Methods

This study is grounded in the interpretivist paradigm, which is particularly suitable for exploring teachers' experiences with implementing sustainability in competency-based Consumer Science education, as it allows for a detailed examination of perceptions, practices, and contextual influences within classroom settings. A qualitative research approach was adopted to enable the exploration of teachers' lived experiences, pedagogical strategies and the contextual factors influencing their practice. This approach allows the study to go beyond theoretical and policy-level discussions to focus on the realities of classroom implementation.

The study employed a descriptive case study design, which facilitates in-depth exploration of teachers' understanding, practices and challenges in embedding sustainability within competency-based teaching. This design is appropriate for examining complex social processes, capturing educators' perspectives, and understanding how curriculum intentions are translated into classroom practice.

Sample and sampling technique

The study population was 48 Consumer Science educators in selected secondary schools in Eswatini. The sampling technique employed was purposive sampling, which enabled the selection of 15 participants directly engaged in teaching sustainability-related content within the CBE framework.

Instrumentation

Data were collected through two primary methods: (1) semi-structured interviews, which allowed for in-depth exploration of teachers' experiences, challenges and strategies; and (2) document analysis of curriculum documents, syllabi and lesson plans to triangulate interview findings:

Semi-structured Interviews: These interviews allowed participants to describe their experiences, challenges, and strategies in integrating sustainability into competency-based Consumer Science lessons. Open-ended questions facilitated detailed responses and the emergence of unanticipated insights.

Document Analysis: Relevant curriculum documents, Consumer Science (CBE) syllabi, lesson plans and teaching resources were analyzed to triangulate data from interviews and to gain insight into the formal expectations for integrating sustainability within Consumer Science education.

Data Analysis

Data were subsequently analysed using thematic analysis, following the six-phase process outlined by Braun and Clarke (2006): familiarisation with data, initial coding, searching for themes, reviewing themes, defining and naming themes, and producing the report. NVivo software was used to facilitate data organization, coding, and theme development, ensuring a systematic and exhaustive analysis process.

Ethical Considerations

Ethical approval was obtained from relevant institutional authorities. Participants were informed about the study's purpose, their voluntary participation and their right to withdraw at any time. Confidentiality and anonymity were ensured by assigning codes to participants and securely storing data.

Results and Discussion

Theme 1: Integration of Sustainability into the Consumer Science Curriculum

Analysis of interviews and curriculum documents revealed that sustainability is explicitly included in the Consumer Science curriculum, particularly in areas such as food management, clothing and textiles and resource conservation. Teachers reported that while curriculum documents encourage sustainability practices like responsible consumption and waste reduction, the implementation varies significantly across schools. Some schools had integrated practical activities like recycling projects and food preservation lessons, while others rely mainly on theoretical instruction. One teacher observed that:

"*The curriculum mentions sustainability in food management and resource use, but it doesn't guide exactly how to teach it practically."*

Consequently, implementation varied across schools, with some incorporating hands-on activities like recycling projects, while others relied mainly on theoretical discussion due to material and logistical constraints:

"Some schools have practical recycling projects, but in my school, we mostly discuss it theoretically due to lack of materials."

These findings align with international perspectives that while competency-based curricula include sustainability objectives, the translation into classroom practice is inconsistent due to contextual

factors (Tilbury, 2011). The gap between policy and practice underscores the importance of considering teachers' capacity, resource availability and school infrastructure when promoting sustainability education. In line with the conceptual framework, teachers act as mediators between curriculum intentions and classroom reality, but their effectiveness is shaped by environmental and institutional support.

Theme 2: Teachers' Understanding of Competency-Based Education and Sustainability Concepts

Most teachers demonstrated a basic understanding of competency-based education (CBE) and its learner-centred, practical approach. They acknowledged that sustainability education involves not only knowledge acquisition but also promoting responsible behaviours in learners. However, there were variations in depth of understanding, with some educators linking sustainability narrowly to environmental topics, while others embraced a broader social and economic perspective.

Teachers also focused on what students can do with their knowledge:

"*I understand CBE as focusing on what learners can actually do, not just what they know from the book."*

Regarding sustainability, teachers' interpretations varied. Some emphasized environmental concerns, while others adopted a broader perspective encompassing social and economic dimensions:

"*Sustainability to me is mainly about caring for the environment, but I try to also teach students about saving resources at home."*

This variation highlights that teacher knowledge and beliefs shape the depth and approach to sustainability education, reflecting findings from (Darling-Hammond & Cook-Harvey, 2018). Limited professional development in both CBE and sustainability contributes to inconsistencies in pedagogy, emphasizing the need for targeted training to ensure holistic understanding of sustainability principles.

Theme 3: Challenges in Incorporating Sustainability into Competency-Based Teaching

Teachers reported multiple challenges in integrating sustainability into competency-based teaching. Resource constraints were a primary concern, with teachers lacking sufficient materials for practical lessons for example, lack of teaching materials, inadequate laboratory and practical facilities. Then the other concerns were time limitations, as competency-based activities often require longer periods than conventional lessons; learner-related factors, such as varying levels of engagement and motivation and lastly insufficient institutional support, particularly limited guidance from curriculum authorities and lack of structured teacher training programs.

"*We lack practical materials for lessons. Sometimes I have to use old containers or scrap materials for demonstrations."*

Time limitations also affected implementation, as competency-based activities often require extended periods for hands-on learning:

"Competency-based activities take more time, and the timetable doesn't always allow for hands-on projects."

Additionally, learner-related factors, such as low engagement and motivation, and insufficient institutional support, including minimal guidance and training, were frequently mentioned:

"*Some students are not motivated to engage in practical activities like recycling or cooking projects."*

"There is little guidance from the ministry on how to integrate sustainability. Training is minimal."

These challenges mirror findings from similar educational contexts where resource scarcity and systemic constraints hinder competency-based sustainability education (Tilbury, 2011; Filho et al., 2020). In line with the conceptual framework, these contextual factors mediate the effective integration of sustainability, highlighting that curriculum intentions alone are insufficient as practical implementation requires adequate support, materials and teacher preparedness.

Theme 4: Strategies Adopted by Teachers to Address Implementation Challenges

Despite challenges, teachers demonstrated innovative strategies to integrate sustainability in lessons. These approaches included the adaptation of existing resources and household materials for practical exercises, enabling hands-on learning experiences. Teachers also employed collaborative learning approaches such as group projects and peer teaching to engage students more effectively. Furthermore, sustainability was integrated into daily school routines through initiatives like waste management programs and school gardens, making environmental consciousness a lived experience rather than just a theoretical concept. Additionally, teachers strengthened their practice by networking with colleagues to share resources and lesson ideas, creating a supportive community of practice around sustainability education.

Many adapted existing resources for practical demonstrations:

"I use household items for practical lessons to demonstrate sustainability concepts."

Collaborative and learner-centred strategies were also common, including group projects and peer teaching:

"I encourage group projects where students can design solutions for sustainable living at home."

Teachers further integrated sustainability into daily school routines, such as school gardens and recycling clubs:

"We have a school garden and recycling club which reinforces what we teach in class."

Networking and knowledge-sharing among colleagues helped compensate for limited formal support:

"We often share ideas and resources among teachers to make lessons more practical despite limited support."

These strategies reflect teachers' role as mediators between curriculum intentions and classroom practice, confirming the conceptual framework's assertion that teacher practice is central to the successful integration of sustainability. The findings also resonate with research showing that creative, context-specific strategies can enhance the practical enactment of competency-based sustainability education (Açıkgöz, 2021).

Conclusion

This study explored the integration of sustainability principles within a Competency-Based Education (CBE) framework for the Consumer Science Curriculum. At its core lies the critical role of Teacher Understanding with a deep grasp of both CBE methodologies and sustainability concepts which serves as the foundation for effective Teacher Practice, including thoughtful integration strategies and meaningful classroom implementation. The study concluded that successful implementation is shaped by a dynamic interplay of four key factors: resource constraints, time limitations, learner factors and institutional support. While challenges such as limited materials, tight schedules and diverse student needs often act as barriers, strong institutional backing emerges as a powerful enabler that can significantly enhance outcomes. Ultimately, the effective integration of sustainability in CBE has the potential to transform Consumer Science education. It equips learners not only with essential competencies but also with the knowledge, skills, attitudes and values needed to make responsible consumption choices, promote well-being and contribute to the United Nations Sustainable Development Goals (particularly SDG 12: Responsible Consumption and Production, and SDG 3: Good Health and Well-being). By addressing the identified influencing factors and investing in teacher professional development, schools and higher education institutions can move beyond traditional content delivery toward experiential, student-centred and future-oriented learning. This holistic approach fosters sustainable mind-sets that extend beyond the classroom, empowering individuals,

families and communities to create positive environmental, social and economic impact. Hence, the process toward full integration requires on-going commitment, collaboration and adaptation. However, the long-term rewards for more conscious consumers, resilient communities and a healthier planet make this effort worthwhile as well as essential for preparing today's learners for tomorrow's challenges.

Recommendations

1. The Ministry of Education and teacher training institutions should develop targeted professional development programs for teachers
2. Curriculum developers and subject advisors should design practical, low-resource sustainability modules aligned with CBE
3. Government and policy makers should strengthen institutional policies to prioritise sustainability across all curricula

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