

Managing Curriculum Design Practices on the Teaching of Agricultural Sciences in the General Education and Training Band

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ABSTRACT

This study investigates how curriculum design management influences the teaching of Agricultural Sciences in South Africa's General Education and Training (GET) band. The integration of Agricultural Sciences into the Natural Sciences curriculum after 1994 has resulted in loss of subject identity, challenges in implementation, and inadequate teacher preparation. A mixed-methods approach was used, involving sixty (60) teacher questionnaires and interviews with three (3) curriculum advisors and three (3) principals. Findings reveal misalignment between curriculum intentions and classroom practice, limited professional development, shortages of qualified teachers, and outdated teaching methods. Strengthening curriculum management, improving teacher training, and reconsidering the subject's structural placement are essential for effective implementation. The study recommends targeted professional development, improved deployment policies, and reinstating Agricultural Sciences as a distinct subject in the GET band.

Key Concepts: Agricultural Sciences, Curriculum Design, Curriculum Management, General Education and Training Band, Pedagogical Practices, Curriculum and Assessment Policy Statement, South Africa.

INTRODUCTION

Agricultural Sciences is a key subject in the South African curriculum because it contributes to food security, youth employment, and STEM skills development (DBE, 2011; AgriSETA, 2023). Within the GET band (Grades 7–9), learners are expected to gain foundational agricultural knowledge; however, since the post-1994 integration of Agricultural Sciences into Natural Sciences, the subject's identity and practical focus have been weakened. Many teachers lack agricultural specialisation, resulting in a gap between the CAPS curriculum and actual classroom implementation (Kgothlang & Teane, 2021).

This challenge reflects broader issues of curriculum design management. Effective design requires clear alignment between learning objectives, assessments, and teaching methods, as emphasised in the Understanding by Design (UbD) framework (Wiggins & McTighe, 2005). Strong management from district officials and school-level leadership is crucial for proper curriculum interpretation and planning, yet weak coordination often leads to inconsistencies between policy intentions and practice (Fullan, 2007).

International comparisons highlight similar concerns. Developed nations such as the United States and Japan prioritise experiential, technology-rich agricultural education supported by continuous teacher development (UNESCO, 2021; FAO, 2020). Conversely, many developing countries including Kenya, India, Malawi, and Zambia struggle with teacher shortages, inadequate training, and limited resources (FAO, 2020). South Africa faces similar constraints, with insufficient practical resources and limited teacher capacity (Mukundi & Maile, 2019). Across contexts, effective curriculum management not curriculum content alone emerges as the key determinant of successful implementation.

Problem Statement

The core problem in South African GET band schools is the ineffective management of curriculum design for Agricultural Sciences following its integration into Natural Sciences. This integration has created a clear gap between the intended CAPS curriculum and classroom practice. Inadequate teacher specialisation limited professional development, weak collaborative planning, and insufficient practical resources prevent effective implementation. As a result, Agricultural Sciences is taught in a largely theoretical manner that fails to build practical skills, reducing the subject's ability to meet its goals of supporting food security, agricultural literacy, and STEM development.

Aim of the Study

The study aimed to assess the effectiveness of curriculum design management in supporting the teaching and implementation of Agricultural Sciences in the GET band, with a specific focus on how planning, teacher preparation, and resource allocation influence classroom practice.

LITERATURE REVIEW

Effective management of curriculum design in Agricultural Sciences requires balancing theory with practical application and involving teachers in adapting content to local contexts. Key challenges include limited resources, inadequate teacher training, and weak support systems. Scholars advocate for continuous professional development, collaboration, and curriculum review to align Agricultural Sciences education with food security, sustainability, and STEM goals.

Qualified Agricultural Sciences Teachers

A critical shortage of qualified Agricultural Sciences teachers—acknowledged by 68.5% of stakeholders reflects systemic failures in teacher supply and deployment. Hiring practices favor Natural Sciences over Agricultural Sciences expertise, reducing subject integrity and practical learning (Mutshinya, 2018; Msimanga, 2019). The closure of teacher training colleges worsened this gap, leaving educators without agriculture-specific pedagogical knowledge. Consistent with Darling-Hammond (2017), subject-specific preparation is the most influential in-school factor affecting achievement. Without restoring specialised training pipelines and aligning hiring policies, curriculum implementation will remain compromised.

Professional Development

Professional development (PD) programs fail to integrate Agricultural Sciences, leaving teachers underprepared (Desimone & Garet, 2015). Current PD lacks subject-specific focus, forcing reliance on indigenous knowledge, which cannot cover modern curriculum demands. Effective PD must be sustained, content-focused, and coherent with classroom contexts (Darling-Hammond et al., 2017). The Department of Education should design PD that bridges gaps between Natural Sciences frameworks and Agricultural Sciences requirements to improve curriculum fidelity and instructional quality.

Teaching methodology

Outdated chalk-and-talk methods dominate Agricultural Sciences teaching, limiting experiential learning and student engagement. Shulman's (1986) concept of pedagogical content knowledge (PCK) and Kolb's (1984) experiential learning theory highlight the need for strategies that connect abstract concepts to real-life applications. Without modern, inquiry-based approaches, learners fail to develop critical thinking and problem-solving skills essential for addressing agricultural challenges.

Learner Attitudes

Negative learner attitudes reported by 66.7% of stakeholders stem from limited exposure and uninspiring

teaching experiences (Garwe, 2015). Early, engaging exposure is crucial for shaping interest and career trajectories. Constructivist approaches and authentic tasks, such as hands-on soil creation, can transform perceptions and foster higher-order thinking (Loyens & Gijbels, 2008). Investing in practical, well-resourced curricula from an early age is essential to build agricultural literacy and future professional pipelines. The literature emphasises that effective management of curriculum design in Agricultural Sciences definite quantity balancing theory with practical application and involving teachers as active participants in adapting content to local contexts. Key challenges include limited resources, inadequate teacher training, and weak support systems. Scholars therefore advocate for continuous professional development, collaboration, and curriculum review to improve teaching quality and line up Agricultural Sciences education with goals of food security, sustainability, and STEM development.

Theoretical Framework

To understand the gap in implementation, it's essential to adopt a theoretical framework. Constructivist learning theories underpinned this study. Constructivist theory advanced by Vygotsky (1978) and Piaget (1970), emphasise that learners actively construct knowledge through experience and social interaction rather than passively receiving information. This perspective supports a shift from rote learning to inquiry-based, experiential approaches—critical for practical subjects like Agricultural Sciences. Understanding by Design (UbD) by Wiggins and McTighe (2005) provides a systematic model for curriculum development through backward design: starting with clear learning objectives, identifying evidence of achievement, and planning aligned learning experiences. This approach ensures coherence between goals, assessments, and instruction.

Curriculum misalignment occurs when assessments focus solely on theory while objectives target practical skills, creating gaps in implementation. Addressing these challenges requires integrating constructivist principles and UbD strategies to balance theoretical knowledge with hands-on learning, directly responding to issues identified in this study.

METHODOLOGY

A mixed-methods research design was employed, integrating quantitative and qualitative approaches. The sample consisted of sixty (60) Agricultural Sciences teachers selected through stratified random sampling from seven public schools, while three (3) curriculum advisors and three (3) principals were purposively selected for qualitative insights. Quantitative data were collected using structured questionnaires, and qualitative data were gathered through semi-structured interviews. Quantitative data were analysed using SPSS (version 26) to generate descriptive statistics. Qualitative data were analysed thematically to identify patterns related to curriculum design management. Reliability and trustworthiness were ensured through triangulation of data sources and verification of emerging themes. Ethical procedures included informed consent, confidentiality of participants, voluntary participation, and secure handling of data.

DISCUSSION OF MAJOR FINDINGS

This section presents the main findings in relation to the study's aim, which focused on evaluating how curriculum design management influences the teaching of Agricultural Sciences in the GET band. The discussion is structured around four key themes that emerged from the data: teacher qualifications, professional development, teaching methodology, and learner attitudes.

Qualified Teachers for Agricultural Sciences

The findings show a significant shortage of qualified Agricultural Sciences teachers. Table 1 indicates that most teachers are trained in Natural Sciences rather than Agricultural Sciences, creating a mismatch between teacher preparation and curriculum requirements.

	Frequency	Percentage
Strongly agree	10	17.6
Agree	29	50.9
Not sure	12	21.1
Strongly disagree	5	8.8
Disagree	1	1.8
TOTAL	57	100

Table 1: Qualified Teachers for Agricultural Sciences

Responses from curriculum advisors and principals confirm that hiring practices prioritise FET band needs, leaving the GET band under-resourced. This issue was emphasised by curriculum advisors who indicated that:

Agricultural Sciences is frequently taught by Natural Sciences-qualified teachers (CA1)

One of the principals said that:

A principal corroborated this, noting the lack of Agricultural Sciences-trained teachers due to hiring practices focused on the FET band (P3)

These gaps weaken the implementation of Agricultural Sciences, as teachers without subject expertise struggle to interpret and deliver curriculum content effectively. This directly undermines the study's aim, which emphasises the role of curriculum design management in ensuring proper teacher deployment and curriculum alignment. The findings support Darling-Hammond et al. (2017) and Mutshinya (2018), who link inadequate teacher preparation to weak curriculum implementation.

Professional Development (PD) for Agricultural Sciences Teachers

Table 2 shows that most participants disagreed that teachers receive adequate professional development in Agricultural Sciences. Interviews further reveal that existing PD programmes do not integrate Agricultural Sciences content, leaving teachers reliant on indigenous knowledge or outdated strategies.

	Frequency	Percentage
Strongly agree	4	7.9
Agree	4	7.9
Not sure	9	15.8
Strongly disagree	22	38.6
Disagree	18	31.6
TOTAL	57	100

Table 2: Professional Development (PD) for Agricultural Sciences Teachers

Teachers, Curriculum advisors, and principals identified a gap in PD programs that integrate Agricultural Sciences into Natural Sciences. A curriculum advisor noted that:

Teachers receive inadequate training on Agricultural Sciences content during curriculum implementation CA3

Principals echoed this by saying that:

PD programs from the DoE do not incorporate Agricultural Sciences (P3).

The lack of targeted PD limits teachers' ability to implement the curriculum with fidelity and contributes to inconsistencies in teaching practices. This finding relates directly to the study's aim by showing that ineffective curriculum design management results in insufficient PD support, which in turn limits teaching quality. This aligns with Desimone & Garet (2015) and Darling-Hammond et al. (2017), who emphasise the importance of sustained, content-focused professional development.

Teaching Methodology

As shown in Table 3, a significant proportion of teachers lack the methodological competence needed for practical, learner-centred Agricultural Sciences teaching. Curriculum advisors and principals confirm that most teachers still rely on traditional, theoretical methods due to limited training and resource constraints.

	Frequency	Percentage
Strongly agree	9	15.8
Agree	6	12.3
Not sure	14	24.6
Strongly disagree	15	26.3
Disagree	12	21.1
TOTAL	57	100

Table 3:Teaching Methodology

The finding is supported by Curriculum advisors and principals, who indicated that primary school teachers lack the capacity to use modern teaching methods to incorporate Agricultural Sciences into Natural Sciences. A curriculum advisor noted that:

Some teachers still use traditional methods (CA3)

a sentiment supported by a principal who remarked that:

Agricultural Sciences teaching still relies on outdated methodologies (P3)

This finding highlights a direct curriculum design management challenge: without proper capacity-building and resource allocation, teachers cannot implement experiential learning approaches aligned with CAPS intentions. The results resonate with Shulman's (1986) concept of pedagogical content knowledge and Kolb's (1984) experiential learning theory, both of which stress the importance of practical engagement in mastery of subject content.

Learners' Attitudes toward Agricultural Sciences

Table 4 reveals low learner interest in Agricultural Sciences, with most respondents indicating limited engagement. Interviews attribute this to insufficient early exposure and the dominance of theoretical, unengaging lessons. Learners often perceive the subject as lacking relevance or career value.

	Frequency	Percentage
Strongly agree	2	3.6
Agree	5	8.8
Not sure	12	21.1
Strongly disagree	25	43.9
Disagree	13	22.8
TOTAL	57	100

Table 3:Teaching Methodology

Curriculum advisors, principals, and teachers indicated that students in South African schools lack early exposure to Agricultural Sciences, impacting their interest in the subject. A curriculum advisor noted that:

students are generally uninterested due to limited exposure at primary levels (CA3).

Principals and teachers concurred, observing that:

students only identify with Natural Sciences and are often unaware of Agricultural Sciences content within it, leading to disinterest at the FET level (P1 & T4).

This finding aligns with the study's aim as it reflects how curriculum design management specifically teacher deployment, teaching methods, and PD affects learner outcomes and perceptions. Weak implementation reduces subject visibility and diminishes learners' motivation, echoing Garwe's (2015) findings on subject prestige and career orientation.

CONCLUSION

The study's findings demonstrate that curriculum design management significantly influences the effective teaching of Agricultural Sciences in the GET band. The shortage of qualified teachers, limited subject-specific professional development, reliance on outdated teaching methodologies, and low learner interest collectively weaken curriculum implementation. These challenges reflect gaps in teacher deployment, capacity-building, and practical resource provision, which hinder the development of agricultural literacy and reduce learner engagement. Strengthening curriculum management through improved teacher preparation, targeted professional development, and enhanced instructional support is essential for aligning classroom practice with curriculum intentions and promoting meaningful learning in Agricultural Sciences.

RECOMMENDATIONS

To address these challenges, the study recommends:

- Reinstate specialised teacher training pathways for Agricultural Sciences at primary and GET levels
- Align teacher hiring and deployment policies with curriculum needs.
- Develop targeted, content-specific professional development for Agricultural Sciences.
- Integrate practical agricultural activities within the Natural Sciences curriculum.
- Strengthen collaboration among teacher education institutions, curriculum advisors, and agricultural stakeholders.
- Consider reinstating Agricultural Sciences as a standalone subject in the GET band.

Concluding remarks

Strengthening curriculum design management, enhancing teacher preparation, and improving early exposure to Agricultural Sciences are essential for rebuilding learner interest and improving instructional quality. Addressing these areas will support agricultural literacy and contribute to national development priorities.

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