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SUBJECT CONTENT KNOWLEDGE AND CLASSROOM EFFICIENCY IN PRIMARY SCHOOLS IN KIBUKU TOWN COUNCIL, UGANDA

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ABSTRACT

This study examined how teachers' subject content knowledge affects classroom efficiency in primary schools in Kibuku Town Council, Uganda. Cross sectional research design guided by quantitative and qualitative approaches was employed with 126 respondents comprising 88 teachers, 13 head teachers, 13 deputy head teachers, and 12 directors of studies from 13 primary schools. Data were collected using structured questionnaires (Cronbach's α = .82) and semi-structured interviews. Quantitative data were analyzed using descriptive statistics, Pearson's correlation, and simple linear regression. Qualitative data were analyzed thematically. Teachers demonstrated high levels of subject content knowledge with an aggregate mean score of 3.94 out of 5.00. Strengths were found in understanding of subjects taught (M = 4.21), integration of curriculum requirements (M = 4.15), and ability to answer learner questions accurately (M = 4.08). However, regular updating of knowledge received a moderate rating (M = 3.41). Subject content knowledge showed a strong positive correlation with classroom efficiency ($r = .71$, $p < .001$) and explained 50 percent of its variance ($R^2 = .50$). Qualitative findings revealed four mechanisms through which content knowledge affects efficiency: accuracy and confidence in instruction, ability to address learner questions and misconceptions, capacity to make connections and provide examples, and interplay with pedagogical skills and classroom management. Major challenges included knowledge gaps in new curriculum content, over reliance on textbooks, and limited ongoing professional development. Teachers' subject content knowledge significantly influences classroom efficiency in rural Ugandan primary schools. While teachers demonstrate strong foundational content knowledge, the limited engagement in regular knowledge updating is a significant concern. Ensuring that teachers possess and continuously update their content knowledge is essential for maintaining classroom efficiency.

Keywords: Subject Content Knowledge, Classroom Efficiency, Primary Schools and Teacher Knowledge

INTRODUCTION

Subject content knowledge is widely recognized as a fundamental component of effective teaching (Shulman, 2021; Hill, Rowan, & Ball, 2021). Teachers cannot effectively teach what they do not fully understand themselves. Content knowledge encompasses the teacher's command of the subject matter itself, including knowledge of key facts, concepts, theories, and the structures of knowledge within the discipline (Shulman, 2021). In the context of primary education, content knowledge is particularly important because teachers are responsible for building foundational understanding that learners will build upon throughout their education.

The relationship between subject content knowledge and classroom outcomes has been theorized through multiple perspectives. Cognitive load theory posits that learning is most efficient when instructional materials are designed to minimize extraneous cognitive load (Sweller, Ayres,

& Kalyuga, 2019). Teachers with strong content knowledge are able to present information efficiently, choosing examples and explanations that convey essential ideas clearly without unnecessary complexity. Teachers with weak content knowledge may provide confusing explanations, use inappropriate examples, or make factual errors that confuse learners and create misconceptions requiring time to correct later.

Knowledge representation theory suggests that teachers with strong content knowledge have more elaborate and interconnected mental representations of their subject matter (Baumert et al., 2020). Because their knowledge is organized around core principles and big ideas rather than isolated facts, they can move flexibly between different representations of the same concept, adapting to learner needs in real time. This flexibility enhances classroom efficiency because teachers can adjust their explanations when learners are confused, try different approaches, and connect new content to previously learned material.

Despite the recognized importance of content knowledge, limited empirical research has examined its relationship with classroom efficiency in sub–Saharan African contexts. Most existing studies have focused on content knowledge and student achievement rather than on classroom efficiency per se. Furthermore, few studies have explored the specific mechanisms through which content knowledge affects efficiency or the challenges teachers face in maintaining and updating their content knowledge in resource limited settings. This study addresses these gaps by examining how teachers' subject content knowledge affects classroom efficiency in primary schools in Kibuku Town Council, Uganda.

Literature Review

According to Shulman's influential framework, content knowledge is distinct from pedagogical content knowledge, though both are important for effective teaching (Akinwumi & Fashina, 2023). Shulman defined content knowledge as the teacher's command of the subject matter itself, including knowledge of key facts, concepts, theories, and the structures of knowledge within the discipline. Building on this foundation, Akinwumi and Fashina (2023) define subject content knowledge as the depth and accuracy of the teacher's understanding of the material they are expected to teach, including the ability to represent concepts accurately, connect ideas within and across topics, and anticipate common learner misconceptions.

Previous research has shown that teachers with stronger subject content knowledge are more efficient in several ways. These teachers ask better questions, respond to learner questions more accurately, choose better examples, and spend less time looking up information or correcting their own errors (Nsengimana, Habimana, & Uwimbabazi, 2024). Several studies have found that content knowledge is particularly important when teaching subjects that build sequentially, such as mathematics, where misunderstandings at one grade level create problems for subsequent learning.

Akinwumi and Fashina (2023) investigated primary school teachers' mathematics content knowledge and instructional efficiency in 110 primary schools in Oyo State, Nigeria. Using a correlational design involving teacher content knowledge tests and classroom observation, the researchers found a moderate positive correlation of .49 between mathematics content knowledge and instructional efficiency. Teachers who demonstrated strong conceptual understanding of mathematics concepts had classrooms where learners made fewer errors during independent practice and required less reteaching.

Methodology

Research Design

The study adopted across sectional research design guided by quantitative and qualitative approaches. This enabled the systematic description and analysis of subject content knowledge and classroom efficiency as they existed at the time of the study (Creswell & Creswell, 2023).

Study Population and Sample

The study population comprised 162 respondents from 13 primary schools. A sample of 131 respondents was selected using purposive sampling for administrators (13 head teachers, 13 deputy head teachers, 13 directors of studies) and simple random sampling for teachers (n = 92 based on Krejcie & Morgan, 1970). The response rate was 96.2 percent, yielding 126 respondents comprising 88 teachers, 13 head teachers, 13 deputy head teachers, and 12 directors of studies.

Data Collection Instruments

Structured questionnaires measured teachers' subject content knowledge using six Likert scale items ranging from 1 (never) to 5 (always). The items covered understanding of subjects taught, ability to answer learner questions, relating content to real life examples, integrating curriculum requirements, simplifying complex topics, and updating knowledge regularly. Classroom efficiency was measured using five indicators including learner engagement, achievement of lesson objectives, organization of learning activities, minimal disruptions, and learners' ability to apply learning. The reliability of the questionnaire was confirmed with Cronbach's alpha of .82.

Semistructured interview guides were used to collect qualitative data from head teachers, deputy head teachers, and directors of studies. Content validity was established with a Scale Level Content Validity Index of .92.

Data Analysis

Quantitative data were analyzed using descriptive statistics including frequencies, percentages, means, and standard deviations. Pearson's correlation analysis was conducted to determine the relationship between subject content knowledge and classroom efficiency. Simple linear regression analysis was performed to examine the predictive influence of subject content knowledge on classroom efficiency. Qualitative data were analyzed thematically following Braun and Clarke's (2022) six phase framework.

Results

Descriptive Statistics on Teachers' Subject Content Knowledge

Table 1 presents the descriptive statistics for teachers' subject content knowledge. The aggregate mean score of 3.94 (SD = 0.78) indicates high levels of subject content knowledge among teachers in Kibuku Town Council.

Table 1

Descriptive Statistics on Teachers' Subject Content Knowledge (N = 126)

Statement	M	SD	Interpretation
I have a strong understanding of the subjects I teach	4.21	0.69	Very High
I can answer learners' questions accurately and confidently	4.08	0.74	High
I relate subject content to real-life examples	3.92	0.81	High
I integrate curriculum requirements into my lesson plans	4.15	0.70	High
I simplify complex topics for better learner understanding	3.85	0.83	High
I update my knowledge regularly in my subject area	3.41	0.92	Moderate
Aggregate Mean Score	**3.94**	**0.78**	**High**

Note. Scale: 1.00–1.79 = Very Low; 1.80–2.59 = Low; 2.60–3.39 = Moderate; 3.40–4.19 = High; 4.20–5.00 = Very High.

The highest rated items were strong understanding of subjects taught (M = 4.21, SD = 0.69, very high), integration of curriculum requirements (M = 4.15, SD = 0.70), and ability to answer learner questions accurately (M = 4.08, SD = 0.74). The lowest rated item was regular updating of knowledge (M = 3.41, SD = 0.92, moderate).

Correlation between Subject Content Knowledge and Classroom Efficiency

Table 2 presents the Pearson correlation analysis between teachers' subject content knowledge and classroom efficiency. The results reveal a strong positive

correlation, r(124) = .71, p < .001. This correlation falls between that observed for pedagogical skills (r = .68) and classroom management skills (r = .74).

Table 2

Correlation between Teachers' Subject Content Knowledge and Classroom Efficiency (N = 126)

Variable	M	SD	r	p
Subject Content Knowledge	3.94	0.78	.71	< .001
Classroom Efficiency	3.72	0.79		

Regression Analysis

Table 3 presents the simple linear regression analysis examining the predictive influence of subject content knowledge on classroom efficiency. The regression results show that teachers' subject content knowledge significantly predicts classroom efficiency, β = .71, t(124) = 9.71, p < .001. The R^2 value of .50 indicates that subject content knowledge explains 50 percent of the variance in classroom efficiency.

Table 3

Regression Analysis of Subject Content Knowledge on Classroom Efficiency (N = 126)

Model	B	SE	β	t	p
(Constant)	1.12	0.26		4.31	< .001
Subject Content Knowledge	0.68	0.07	.71	9.71	< .001

Note. R = .71, R^2 = .50, Adjusted R^2 = .50, SE = 0.56.

Qualitative Findings

Four main themes emerged from thematic analysis of interview data regarding subject content knowledge and classroom efficiency.

Theme 1: Accuracy and Confidence in Instruction. Respondents consistently emphasized that teachers with strong content knowledge deliver instruction with greater accuracy and confidence. One head teacher explained: "Confidence comes from knowing. When a teacher truly understands the subject, they teach with assurance. They don't stumble over words, they don't give wrong information, and they don't have to keep checking the textbook. The lesson flows smoothly from start to finish" (Head Teacher 8, Private School).

Theme 2: Ability to Address Learner Questions and Misconceptions. Respondents highlighted how content knowledge enables teachers to address learner questions and misconceptions effectively. A head teacher explained: "Children ask many questions. A teacher with good content knowledge can answer most questions on the spot, which keeps the lesson moving and satisfies learners' curiosity. When a teacher cannot answer, they may say 'I'll tell you later,' but often they forget, and learners lose interest" (Head Teacher 2, Government Aided School).

Theme 3: Capacity to Make Connections and Provide Examples. Respondents noted that teachers with strong content knowledge can make connections between concepts and provide relevant examples. One head teacher explained: "Good teachers don't just teach isolated facts. They show learners how different topics connect. For example, when teaching fractions in mathematics, they might connect to sharing food or dividing land. These connections help learners understand that knowledge is not separate compartments but a whole" (Head Teacher 5, Government Aided School).

Theme 4: Challenges Related to Content Knowledge Gaps. Respondents identified several challenges related to content knowledge gaps. A director of studies observed: "Some teachers cannot teach without the textbook in their hand. They read paragraph by paragraph and maybe ask a few questions, but they don't explain. This is not real teaching. It is slow, boring, and inefficient because learners are just listening to someone read" (Director of Studies 12, Government Aided School).

The Interplay between Content Knowledge, Pedagogical Skills, and Classroom Management

Respondents frequently noted that these dimensions work together to produce classroom efficiency. One head teacher explained: "You need all three. Content knowledge without teaching skills means you know the material but cannot help others learn it. Teaching skills without content knowledge means you have methods but nothing to teach. And without classroom management, even the best content and methods will fail because the class is chaotic" (Head Teacher 4, Private School).

Discussion

The finding that teachers demonstrated high levels of subject content knowledge (aggregate M = 3.94) aligns with Shulman's (2021) framework, which identifies content knowledge as essential for effective teaching. The very high rating on strong understanding of subjects taught (M = 4.21) indicates that teachers perceive themselves as having solid mastery of the content they are responsible for teaching. This finding is consistent with Baumert et al.'s (2020) research demonstrating that teachers' content knowledge positively predicts instructional quality.

The high rating on integration of curriculum requirements (M = 4.15) suggests that teachers are mindful of curriculum guidelines and ensure that their lessons align with expected learning outcomes. This finding is important because curriculum alignment ensures that instructional time is focused on the content that learners are expected to master (Fullan, 2022). In the Ugandan context, where the curriculum has recently undergone significant revision with the introduction of the competence-based curriculum, alignment with curriculum requirements is particularly critical (Ministry of Education and Sports, 2023).

The moderate rating on regular updating of knowledge (M = 3.41) is concerning and points to a significant gap in teachers' professional practice. This finding is consistent with Avalos's (2021) observation that many teachers, particularly in developing countries, do not engage in ongoing professional learning after initial training. The qualitative data revealed that limited access to professional development opportunities, inadequate learning resources, and lack of systematic support from the education system contribute to this challenge.

The strong correlation (r = .71) and regression results (R^2 = .50) provide robust evidence that subject content knowledge significantly influences classroom efficiency. This finding is consistent with the World Bank's (2022) study across thirteen education systems, which found that teacher content knowledge matters significantly for student learning, particularly in low-income countries where learners depend almost entirely on their teachers for access to knowledge. However, the present study goes beyond the World Bank's finding by demonstrating that content knowledge matters not only for learning outcomes but also for the efficiency with which instructional time is used.

Conclusion

The study concludes that teachers' subject content knowledge has a significant positive influence on classroom efficiency in primary schools in Kibuku Town Council. Teachers demonstrate strong understanding of the subjects they teach, effectively integrate curriculum requirements, and respond accurately to learner questions. However, the limited engagement in regular knowledge updating is a significant concern that threatens the long-term effectiveness of teaching. The strong correlation (r = .71) and substantial variance explained (50%) confirm that content knowledge is a critical determinant of classroom efficiency. Teachers with strong content knowledge teach with greater confidence and accuracy, address learner questions and misconceptions effectively, and make meaningful connections that deepen understanding. Ensuring that teachers possess and continuously update their content knowledge is essential for maintaining classroom efficiency.

Recommendations

The Ministry of Education and Sports should establish a mandatory continuous professional development framework requiring teachers to update their subject content knowledge through structured programs, distance learning, or annual refresher courses. Directors of studies should organize weekly or monthly content focused workshops where teachers collaboratively study challenging topics, share subject expertise, and prepare to teach new or revised curriculum content, ensuring that knowledge gaps are identified and addressed before they affect classroom instruction. Teachers must dedicate regular time to personal study and professional reading in their subject areas, subscribe to educational publications where available, and actively seek clarification on topics where their understanding is weak, thereby maintaining the content mastery essential for efficient classroom practice.

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