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TEACHERS' PERCEPTIONS OF THE IMPLEMENTATION AND PERCEIVED IMPACT OF WEBB'S DEPTH OF KNOWLEDGE IN SENIOR HIGH SCHOOLS IN GHANA

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Abstract:
This research focused on determining the perception of senior high school teachers toward Webb's Depth of Knowledge (DOK) in terms of its application and impact. The key focus was on how beneficial DOK is when planning lessons; teachers' perceptions of its contribution to student engagement and academic learning; and what obstacles teachers encounter in using the model. This research used a descriptive survey design, employing a stratified random sampling technique, to select a total of 528 participants. A quantitative analysis of the data was conducted using SPSS version 26. The results indicated that although many participants felt that they needed to do a better job of implementing each DOK level, the majority believed that DOK was a good source for helping them develop appropriate levels of complexity in their assessments and instructional tasks, and to develop skills in critical thinking. Participants additionally believed that teachers perceived DOK as supportive of students' reasoning, problem-solving and participation in classroom discussions. Nevertheless, some major obstacles to the successful implementation were noted as very large class sizes, test-driven instruction, too few resources, and a lack of professional development. The findings indicated that teachers perceived that while teachers perceived DOK as a useful framework for instructional planning and student engagement, more institutional support, along with targeted teacher training, is required to effectively implement DOK.

Keywords: Webb's Depth of Knowledge, teachers' perceptions, assessment, higher-order thinking

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1. Introduction

1.1 Background to the Study

Problem-solving, critical thinking, and cognitive rigor are emphasized in education in the 21st century. Therefore, many educators are required to create lesson plans and assessments that teach these skills. Consequently, it is important to have a framework for how the curriculum, instruction, and assessment will be aligned. A popular example of this type of framework is Webb's Depth of Knowledge (DOK), developed by Norman Webb in 1997. The DOK framework has four levels of cognitive demand; they are: extended thinking, skills and concepts, strategic thinking, and recall. In countries like the United States, this framework is utilized to ensure that learning objectives from the curriculum are aligned with assessment tasks and to promote higher-level thinking.

The Ghanaian high school curriculum can now give more emphasis to the development of competence and critical thinking. While progress has been made, there continue to be obstacles to teachers implementing policy in the classroom. In senior high schools, teachers face challenges such as large class sizes, limited access to instructional resources, a culture that prioritizes factual memorization and is driven by exams. While many educators are familiar with Bloom's Taxonomy as a tool to evaluate how students learn, Webb's DOK will soon be used as an alternative tool.

It is consequently essential to comprehend how SHS teachers view DOK, including how it is used and how beneficial it is for class planning and instruction. Understanding the experiences of teachers can help to clarify how well the framework fosters the growth of higher-order thinking skills, pinpoint difficulties in implementing it in the classroom, and guide the development of teaching and learning practices to enhance learning outcomes under the revised curriculum. Although Ghana's SHS curriculum promotes critical thinking and problem-solving, the extent to which teachers understand and apply Webb's Depth of Knowledge as a practical framework for planning cognitively demanding instruction remains unclear.

Even though some educators claim to have a positive opinion about Webb's Depth of Knowledge (DOK), a good opinion by itself does nothing to lead to effective use within the classroom. The effective use of DOK depends on many factors, including teacher understanding of the cognitive demand level, the ability of teachers to develop lesson tasks, questions and assessment items that meet the standards established for DOK and the conditions of the school, such as professional development, instructional time, resources for teaching and learning, class size and high-stakes testing pressures. Therefore, this research study examines both teachers' opinions about DOK but also how DOK has been implemented in practice, along with the perceived impact of DOK on teaching and learning in Senior High Schools in Ghana.

1.2 Statement of the Problem

Several substantial changes have been made to the Senior High School (SHS) Curriculum with the aim of fostering higher-order thinking skills (e.g., assessment; problem-solving)

and critical thinking among students compared to the former curriculum, which focused more heavily on the use of memory and recall. The redesigned SHS curriculum will provide students with new opportunities to not only look at the information they have learned but also to apply that information in real contexts and develop deeper levels of cognitive engagement with their learning resources. As a result, teachers are also required to modify their current instructional practices and assessment methods to assist students in developing higher-order cognitive skills (GES, 2024).

Webb's DOK Framework offers educators a systematic approach for evaluating the level of cognitive complexity in tasks used in the instruction and performance assessment process. It supports teachers in creating learning tasks and assessments that advance learners from merely recalling information to using higher-order thinking skills (specifically, critical thinking, problem-solving, and analytical reasoning; NaCCA, 2024). Although Webb's DOK Framework is an important tool, little is currently known about how secondary school (SHS) teachers interpret, understand, and employ the DOK Framework in the context of teaching and assessment.

According to initial findings, various instructors continue to emphasize initial-level cognitive processes (such as recalling and reproducing information) due to their historical tendency towards these practices in teaching, due to testing pressures, and due to minimal levels of DOK professional development. This causes concerns regarding the appropriate level of alignment between the higher-level cognitive demands of the higher complexity goal of the new SHS curriculum and classroom instruction and assessments.

As a consequence, learners may not have enough access to opportunities at each of the cognitive processes identified within the curriculum (GES & NaCCA, 2024).

Few studies have been done to show how SHS teachers believe that teachers perceive DOK as supporting critical thinking, problem-solving, engagement and academic learning. Without having a good understanding of what SHS teachers think about DOK and what they say they implement, and their challenges, the effectiveness of their efforts to improve alignment of curriculum and quality of instruction will be limited.

This study investigates how secondary school teachers perceive and apply Webb's DOK framework in their classrooms. Findings from this study will provide evidence regarding how often teachers use DOK in their classrooms, what kind of challenges they face when using DOK, and what kind of assistance they need to improve their curricular and instructional practices in compliance with the new secondary school curriculum.

In many high school (HS) classrooms, the current assessment practices may remain focused on the recollection, factual reproduction, and preparation for exams, while Webb's Depth of Knowledge (DOK) levels require teachers to design and assess learning activities that support different levels of cognitive complexity. Even if teachers have positive comments about DOK, those comments or perceptions do not automatically translate into classroom examples without a clear understanding of cognitive demand and institutional support for the use of DOK. This indicates a potential gap between teachers' perceptions of DOK and their reported classroom use of the framework in lesson planning, questioning, assessment design and feedback.

1.3 Purpose of the Study

The purpose of this study was to examine senior high school teachers' perceptions of the usefulness, implementation challenges, and perceived instructional impact of Webb's Depth of Knowledge framework in Ghanaian Senior High Schools.

1.4 Research Objectives

- Examine teachers' perceptions of the usefulness and practicality of Webb's Depth of Knowledge framework in lesson planning and classroom practice.
- Explore teachers' views on the perceived impact of DOK on student engagement and academic learning.
- Identify challenges teachers encounter in applying the DOK framework in SHS classrooms.

1.5 Research Questions

- What are teachers' perceptions of the usefulness and practicality of Webb's Depth of Knowledge framework in instructional practices?
- What are teachers' views on the perceived impact of DOK on student engagement and academic learning?
- What challenges do teachers encounter in applying the DOK framework in SHS classrooms?

1.6 Significance of the Study

- It provides empirical data on how Ghanaian SHS teachers perceive DOK, filling a gap in local literature.
- Findings will guide policymakers and education authorities in integrating cognitive rigor tools into teacher training programs.
- School leaders may use the results to support teachers with professional development and resources.
- Teachers themselves will gain insights into practical strategies for using DOK in classrooms.

2. Literature Review

A shift from a theoretical idea of deepened learning to more emphasis on it in the context of reform efforts in curriculum, teacher development and testing has occurred as students in current high schools should be developed as competent, justifying their claims and applying knowledge in new contexts, solving problems, and critically thinking rather than simply recalling facts. The Ghanaian SHS curriculum is currently headed towards this direction through a focus on critical and creative thinking, collaboration, communicating, self-directed learning, continuing education, the workplace and being a citizen (National Council for Curriculum & Assessment 10/2021). The policy is grounded in strong language, but the ultimate test of this reform is implementation at the classroom

level. While there may be theoretical aspects of curricula that focus on higher-order thinking, classroom activities, teacher questioning, and school-based assessments may predominantly use recalling or routinized procedures.

The Depth of Knowledge (DOK) developed by Webb provides an important tool for understanding the gap between the curriculum and teaching. Originally developed as part of an alignment effort in the creation of curriculum (Webb, 1997, 1999, 2002), DOK provides a way to classify educational tasks based on the level of complexity of the thought needed to accomplish them, rather than based on only the subject matter, action verbs used, or amount of time required. In general, the DOK Framework has four levels, which include: Level 1, Recall and Reproduce; Level 2, Skills and Concepts; Level 3, Strategic Thinking; and Level 4, Extended Thinking. The value of the DOK Framework is that it provides a means by which content standards, instructional activities, and assessment tasks can all be aligned by both content and cognitive demand. Thus, DOK is particularly applicable to SHS classrooms when educators translate curriculum expectations into teachable and assessable experiences for students.

This research investigates how teachers believe Webb's DOK is being implemented and its impact on Senior High Schools (SHS) in Ghana. Since DOK implementation is very reliant on teacher input, it is very important to examine teacher understanding of DOK and how teachers use DOK in their lessons to determine if DOK is a legitimate educational tool for pedagogical advancement or simply a term added to lesson plans without a change in classroom practice. As such, the recommendations made in the review of literature are based on how DOK cannot be viewed in isolation from the greater relationship between teacher cognition, assessment literacy, alignment of curriculum, professional development, context of schools, and cultures of assessment.

2.1 Conceptual Review

2.1.1 Teachers' Perceptions of Webb's Depth of Knowledge

Teachers' perceptions refer to the beliefs, interpretations, attitudes and professional judgements teachers hold about an educational idea, innovation or practice. In the context of Webb's DOK, perceptions include teachers' awareness of the framework, their understanding of its four levels, their judgement of its usefulness, their confidence in applying it, and their views about its relevance to lesson planning, classroom questioning, assessment design and student learning. Perception is not a soft or peripheral variable. In curriculum implementation, teachers' beliefs and interpretations operate as filters through which policy is translated into practice. A framework that teachers do not understand, value or trust is unlikely to influence classroom behaviour in any serious way.

The reason DOK is so easily misunderstood is the fact that people often confuse or conflate DOK with Bloom's Taxonomy or think of it simply as a list of verbs. This confusion is important. Bloom's revised taxonomy identifies six categories of cognitive processes: remembering, understanding, applying, analysing, evaluating, and creating (Anderson & Krathwohl, 2001). In contrast, DOK addresses the depth and complexity of

the thinking required to complete a particular task. Depending upon its context and the level of intellectual effort associated with completing the task, the same verb can appear at different DOK levels. The use of the example "explain" can be used at the DOK level 1 to mean that the student needs to regurgitate a definition they have been (taught/homework) and could be used at the DOK level 3 to mean that the student has to use strategic reasoning to use evidence to support a conclusion and then identify other possibilities. Hess et al. In 2009, the issues associated with an overuse of action verbs since they do not describe the cognitive complexity of tasks in a way that clarifies their true level, and this critique is a key issue in regard to this study, as teachers may report familiarity with DOK, yet apply it in a mechanical manner.

In the context of SHS classes in Ghana, teachers' beliefs about DOK will vary based on a number of external factors, such as how much examination pressure they feel, how far along in the course they are, how big their classes are, what kind of PD they have received, and the extent to which they have access to curriculum materials. Teachers who think that DOK can help them prepare their students for exams may use DOK to assist students in developing their reasoning, problem-solving, and written skills. Conversely, those teachers who think DOK is too time-consuming to be worthwhile will shy away from using higher-level DOK tasks because of their large class size and their limited class time. Consequently, the study of teachers' beliefs provides more than just a means of measuring attitude; It provides insight into the conditions that will provide opportunities to implement DOK; those conditions determine whether a DOK task will be implemented successfully, distorted, or abandoned altogether.

2.1.2 Implementation of DOK in Instructional Practice

DOK implementation means using this Framework intentionally to design, implement and assess instructional practices. DOK implementation involves designing learning goals and objectives; determining questions for classroom activities; creating assignments; and creating assessments that require students to use higher-level cognitive processes in their thinking. Just because a lesson may not be a Level 4 DOK, does not mean that DOK Implementation is incorrect. Students still need foundational knowledge of concepts, vocabulary and procedures from lower DOK levels; however, the issue arises because teachers only provide instructional opportunities at the recall and reproduction level (DOK Level 1) and simply measure the completion of instruction as understanding.

Level 1 is where students recall facts, definitions, formulas, names or steps in a process (all of which were taught previously). Level 2 is where students show application of skills/knowledge, organize and compare ideas, interpret basic data or use their skills/knowledge in very basic decision-making procedures. Level 3 is where students use strategic thinking when justifying, using evidence, analyzing complexity, making decisions and solving non-routine problems. Level 4 is when students show long-term thinking through investigation, synthesis, projects that take a long time, interdisciplinary use of skills/knowledge (across different subjects) or sustained inquiry (Webb, 2002). These levels are not designed to be like a ladder that all students must climb as they move

through each lesson; however, these levels are designed to provide a common language for assessing the cognitive demand of tasks and allowing you to find balance in your instruction throughout the unit/course.

When DOK Implementation is implemented in the SHS environment, the quality of classroom questions and tasks should demonstrate this by the types of questions that are asked and tasks that are given to students. In a government lesson, an example of a Level One question might be, "Define democracy," whereas an example of a Level Two task would be to ask students to compare direct and representative democracy, and an example of a Level Three question would be to ask students if a given constitutional arrangement increases or decreases democratic accountability using evidence. In some instances, a Level 4 task would allow students to conduct a small civic inquiry, gather data on how students participate in the school governance process and present recommendations based on the data that they have collected. The differences are not only present in the wording of each task, but also in the intellectual demands that exist for all of the students involved.

2.1.3 DOK-Informed Assessment and Cognitive Demand

A major implementation risk is superficial labelling. Teachers may write "DOK Level 3" beside an activity without modifying the cognitive task. They may also assume that group work, projects, practical activities or lengthy assignments automatically represent higher DOK levels. That assumption is poor scholarship and poor pedagogy. A group activity can remain Level 1 if learners merely copy notes together. A project can remain cognitively shallow if learners compile information without analysis. Authentic DOK implementation requires task analysis: What must learners know? What must they do with that knowledge? What evidence must they use? What judgement must they make? What explanation or product must they construct?

Assessment is one of the strongest drivers of classroom practice. Where assessment rewards recall, teachers tend to teach for recall. Where assessment requires reasoning, justification, transfer and problem solving, teachers are more likely to design instruction that prepares learners for such demands. DOK-informed assessment, therefore, concerns the use of the DOK framework to analyse and construct test items, assignments, projects and performance tasks according to the depth of thinking required. It also concerns the alignment between learning outcomes, classroom instruction and assessment evidence.

The original contribution of Webb is an alignment framework which provides an understanding of how to determine whether standards and assessments are aligned with each other by assessing both content alignment and cognitive complexity within the assessment and standards (Webb, 1997, 1999). For example, if a test assesses the same content area as the curriculum but only tests for recall, it is misaligned if the curriculum anticipates analysis, evaluation and/or application from students. This issue is directly applicable to Ghana's SHS curriculum reforms because the new curriculum places emphasis on innovative pedagogical practices, critical thinking, problem-solving,

development of 21st Century Skills, and alignment of both formative and summative forms of assessment to the learning outcomes (NaCCA, 2024). If there is no cognitive alignment of the assessments with each other, then these required goals of the SHS will only be viewed as policy by the educational community; they will not be actualised in classrooms.

Studies concerning assessment literacy further strengthen this argument. Assessment literacy refers to the teacher's knowledge and skill when it relates to designing, interpreting and utilizing assessment evidence to support student learning (Hull, 2025). Teachers must possess assessment literacy to implement DOK, as they will need to understand the type of cognitive demands associated with tasks and develop items that require more than just the reproduction of information. A teacher may have a positive opinion about DOK but may produce poor quality assessments if they cannot design items that require some reasoning, some evidence and the transfer from one situation to another. Therefore, assessment literacy is not just a related construct but is a vehicle for transforming teacher perception into teacher implementation.

2.1.4 Perceived Impact of DOK on Student Engagement, Reasoning and Academic Learning

The evidence gathered from Ghana strongly indicates that ignoring this issue is not an option. The findings of Armah (2025) show that there is a heavy reliance by (SHS) mathematics teachers on traditional tests that are paper-based and in cursive writing; there is also less reliance on formative or data-driven assessments. The study by Nsowah et al. (2026) indicates that the beliefs of (SHS) mathematics teachers about the purposes of assessment impact their practices of assessment. Although none of these studies have been conducted at the DOK level, they do demonstrate the assessment culture into which the DOK will be introduced. If teachers continue to equate quality assessment only with traditional assessments and exam preparation, then implementing the DOK at a higher level will not occur.

The perceived influence of DOK is the teachers' opinions regarding whether DOK enhances student achievement and/or the quality of instruction. In the current research, these are in relation to perceived effects on student engagement, problem-solving, reasoning, critical thinking skills, and level of academic participation and learning as measured through students' responses to the DOK task. The phrase "perceived" should be used with caution. The perceptions of teachers are useful to note since teachers are in a position to observe responses from their students in the classroom; therefore, they may provide insight into any implementation barriers experienced in a DOK setting. However, perception is not the same as measured impact; an effective study should avoid using the teachers' belief that DOK causes improved student performance as evidence that DOK would improve it.

3. Theoretical Framework

3.1 Webb's Curriculum Alignment and Depth of Knowledge Framework

The main conceptual framework for conducting this research study is based on Webb's alignment of curriculum and depth of knowledge (DOK) framework. In its development, it was designed to assess how curriculum standards are aligned with instruction and assessment, with particular emphasis placed on evaluating cognitive demand (Webb, 1997, 1999, 2002). Webb argues that alignment is incomplete if it is only focused on covering content areas. For example, if a standard requires students to assess evidence using an item that recalls facts instead of using their skills in labeling facts, then it does not provide a valid measure of the achievement of the standard. Similarly, if a curriculum sets forth its outcomes to include promoting critical thinking skills and yet uses only routine, predictable types of instructional tasks, then it will have failed to achieve its intended purpose.

There are four levels of cognitive complexity defined within the DOK framework. The first level is concerned with recalling or reproducing information. The second level is based on using skills and concepts. The third level involves using strategic thought processes. The fourth level incorporates more involved forms of thinking. While several taxonomies appear to be structured hierarchically, DOK levels illustrate how deeply you must understand a topic in order to perform a task. The DOK framework can be used by researchers to analyse if teachers' lesson planning, questioning techniques and assessment methods align with the actual cognitive intent of the curriculum.

For this study, Webb's framework explains the relationship between DOK knowledge, implementation and perceived instructional impact. It also provides a standard for evaluating whether teacher perceptions are grounded in an accurate understanding. A teacher may say DOK promotes critical thinking, but if the teacher interprets Level 3 merely as "hard questions," implementation will be weak. Webb's framework, therefore, sharpens the study's conceptual focus by distinguishing cognitive complexity from difficulty, time spent, task format and action verbs.

3.2 Constructivist Learning Theory

Constructivist learning theory provides the second theoretical lens. Constructivism argues that learners actively build understanding through interaction with ideas, materials, social contexts and prior knowledge rather than passively receiving information (Vygotsky, 1978). Learning becomes more meaningful when students explain, question, apply, justify and connect ideas. This aligns well with DOK because higher DOK levels require students to work with knowledge rather than merely reproduce it.

DOK can be viewed as a practical structure for strengthening constructivist instruction. Constructivist language is often used loosely in education. A lesson may be described as learner-centred simply because students sit in groups, answer questions orally or complete an activity. This is weak. Learner-centred pedagogy has little value if

the cognitive demand remains low. DOK helps expose this problem by asking whether the task requires genuine reasoning, evidence use, decision-making or extended inquiry. In this way, DOK gives operational clarity to constructivist ideals.

3.3 Teacher Cognition Theory

In Ghanaian SHS classrooms, constructivist theory supports the argument that students should engage actively with concepts, not only memorise notes for examinations. However, constructivist pedagogy requires conditions that allow dialogue, feedback, guided practice and meaningful task design. Large classes, limited instructional materials and examination pressure can reduce the space for these practices. The theory is therefore useful, but it must be interpreted realistically within the local school context.

Teacher cognition theory focuses on what teachers know, believe and think, and how these mental constructs shape classroom practice (Borg, 2003; Pajares, 1992). It is highly relevant to this study because DOK implementation is shaped by teacher interpretation. Teachers do not apply curriculum frameworks exactly as policymakers or researchers intend. They filter reforms through experience, subject culture, workload, school expectations, assessment pressure and beliefs about learners.

4. Empirical Review

4.1 Global Studies

The existing body of global literature regarding DOK has primarily focused on the areas of assessment alignment, item development, cognitive rigor, and classroom task analysis. The foundational studies by Webb demonstrate the need to have both content and cognitive rigor aligned for standards-based assessments (Webb 1997, 1999, 2002). This alignment has been an influence on the evaluation of curriculum and development of large-scale assessments, particularly in regard to their use within standards-based assessment systems. Webb has created strength in his work by moving rigor from generic statements to concrete, analytically identifiable task demands.

The Cognitive Rigor Matrix was developed by Hess et al. (2009), based on their earlier work and provides a unified way to combine Bloom's Taxonomy and Webb's DOK. Their research demonstrated that Bloom's and DOK have different purposes: Bloom's focuses on types of thinking, while DOK focuses on levels of difficulty in thinking. Since that time, the matrix has been used extensively for lesson planning, curriculum revisions and assessment design. In addition, the matrix is helpful to this study because it warns against using only the verb in classifying tasks as high-level. A task cannot be classified as high level because it has a verb such as analyze, evaluate or create, but rather, it must be based on the actual level of cognitive demand required.

Wyse & Viger (2011) researched how writers understand DOK and found that even trained writers had trouble using DOK consistently in items. They have introduced doubt to many who believe that DOK will be easy to implement once given to item writers. If professional item writers with various levels of expertise struggle to use DOK

consistently to classify items, it is likely that teachers have even more difficulty using DOK since they have much less experience than trained item writers. Likewise, Patterson, Musselman, & Rowlett (2013) showed that creating high-quality mathematics assessments using DOK requires training and careful analysis of tasks. Therefore, a teacher's self-reported level of familiarity with DOK should be viewed with skepticism.

Recent conversations have pointed toward the misinterpretation of Levels of Complexity (DOK). According to Wine and Hoffman (2023), DOK needs to be viewed in terms of students' ability to learn as well as the level of complexity of the task or verb being used and should not just be a verb's or task's constant characteristic (i.e., DOK). This is significant because there are cases of a cognitively demanding task being a routine task for numerous students, as each student has varying levels of background knowledge or expertise. The conclusion that teachers have to make a subjective and useless decision regarding DOK is incorrect; instead, teachers will need to use their professional judgement in assessing the DOK of a task according to the task difficulty, the learner's previous knowledge of the content and level of preparation/readiness for the task.

The research indicates that DOK is beneficial for ensuring that both curricula are aligned and that the quality of the assessments is high. However, it also shows that implementing DOK requires extensive technical expertise. Teachers require far more than just a 4-level DOK chart; they also need concrete examples, collaborative calibration, practice with designing assessments, and timely feedback. While the research from other countries can be helpful, it is of limited use to Ghanaians because most of it comes from financially supported systems, subject-specific settings or from developing new assessments, instead of providing real-life examples typical of classes in the SHS educational system within West African countries.

4.2 African Studies

Direct African studies on Webb's DOK remain limited. However, studies on competence-based curriculum implementation, teacher perceptions and assessment practice provide relevant evidence. Across several African contexts, reforms emphasise learner-centred pedagogy, higher-order thinking, skills development and competency-based outcomes. Yet implementation often faces barriers such as insufficient teacher preparation, large class sizes, limited resources, unclear assessment models and examination pressure.

Nsengimana, Mugabo, Ozawa and Nkundabakura (2023) examined Rwandan science teachers' knowledge, understanding and perceptions of competence-based curriculum implementation. Their qualitative case study found that teachers showed some understanding and positive perceptions, but also displayed knowledge gaps and negative perceptions. This finding is directly relevant to DOK implementation because both competence-based curriculum and DOK require teachers to move beyond content transmission toward task design, inquiry and assessment for deeper learning. The Rwandan evidence suggests that positive policy intent does not guarantee consistent classroom understanding.

African curriculum implementation studies also show that teacher preparedness cannot be separated from the school context. Competency-based reforms often demand activities that require materials, time, smaller groups, feedback and flexible assessment. Where classrooms are overcrowded and resources are limited, teachers may revert to lecture, note-giving and examination rehearsal. This pattern is not simply teacher resistance. It reflects the mismatch between reform expectations and implementation conditions. For DOK, this means that higher-level tasks such as extended inquiry, project work and evidence-based argumentation may be difficult to sustain without structural support.

African evidence, therefore, provides a caution. Importing a framework such as DOK without contextual adaptation may create compliance rather than change. Teachers may learn the terminology but continue to design low-demand tasks because the examination system, timetable, class size and resource conditions reward conventional practice. A Ghanaian SHS study must therefore investigate both perception and implementation constraints rather than assume that DOK has automatic pedagogical value.

4.3 Ghanaian and Local Studies

Ghanaian literature provides a strong policy rationale for studying DOK in SHS, even though direct DOK studies remain scarce. The new SHS curriculum emphasises critical thinking, problem solving, innovation, creativity, collaboration, communication and alignment of assessment with learning outcomes (NaCCA, 2024). The curriculum also recognises that memorisation of facts does not adequately develop analytical and practical skills. These priorities are consistent with DOK because the framework helps teachers judge whether classroom tasks and assessments require the kind of thinking the curriculum claims to promote.

Assessment studies in Ghana reveal why DOK is needed. Armah's (2025) national survey of 516 SHS mathematics teachers reported strong dependence on traditional paper-and-pencil tests and less frequent use of formative and data-driven assessment practices. This suggests that many teachers may still operate within a conventional assessment culture even under reform conditions. Nsowah et al. (2026), in a mixed-method study of SHS mathematics teachers in Ghana, found that teachers' beliefs about assessment purposes influence classroom assessment practices. This supports the theoretical argument that teachers' perceptions of DOK will likely affect whether and how they use it in instruction and assessment.

Earlier Ghana-related evidence also points to the dominance of lower cognitive demand in high-stakes assessment. Dogbey and Dogbey (2018) analysed the Depth of Knowledge and contextual characteristics of the WAEC core mathematics assessment in Ghana and found heavy emphasis on lower DOK levels. This is highly relevant because SHS teachers work in an examination-driven environment. If external assessment remains weighted toward lower-level tasks, teachers may have limited incentive to

devote time to extended inquiry and strategic reasoning, even when curriculum documents endorse higher-order learning.

The evidence from Ghana indicates that there is a tension with regard to implementation. There is an emphasis on developing deeper competencies within the curriculum, whereas assessments, examination pressures, and school routines may support only recall and procedural skills. Teachers are at the centre of this tension. Their views regarding DOK will help determine whether they see this as a practical tool for improving instruction or as just another requirement placed on already overburdened classrooms. This highlights the need for the current study.

4.4 Synthesis of Existing Literature

There are multiple key areas of agreement amongst the literature; there are three areas we will highlight. To begin with, in order to achieve depth of learning, there must be more than exposure to content. Students must be involved in tasks that require them to apply, reason, justify, interpret, and transfer their understanding. This belief has been both supported by the existing literature related to Webb's DOK structure (Hess et al., 2009), Constructivist Theory (Vygotsky, 1978), and cognitive-rigor literature (Webb, 2002). Secondly, when developing a curriculum, it must take into account cognitive demand. For example, it is insufficient for an assessment item to be from the same unit of study as the curriculum; it is equally important to develop assessments that reflect the levels of cognitive demand identified in the respective curriculum standards. Finally, teachers are critical to successful DOK implementation; teacher perceptions of DOK, teacher assessment literacies, and teachers' professional judgments will determine whether DOK processes are applied meaningfully or superficially.

It has been widely recognized that professional development is essential in order to be able to implement DOK properly; both classification of DOK as well as task design require practice, examples and calibration to be effective within a given school setting. Studies have demonstrated that even though teachers may receive a short introduction to it, they will not be able to implement DOK on an everyday basis if they come from a previous history in an assessment-driven system that focused on rote memory and fluency of procedures for a long period of time.

4.5 Areas of Disagreement

There are differences in the literature regarding the use and effectiveness of implementing DOK in assessments. Some literature suggests DOK is a useful tool for improving both questioning and the assessment of students. However, others report that teachers frequently misclassify tasks and incorrectly relate DOK to verbs, degree of difficulty, or time taken (Hess et al., 2009; Wyse & Viger, 2011). Additionally, there is no consensus on how much the use of DOK affects the achievement of students. Theoretical arguments for the influence of DOK on student learning are robust; however, direct evidence remains scant. Most studies do an analysis of the tasks, examine teacher

perceptions, and assess the alignment of the assessment to what students learned, rather than providing experimental evidence of increased learning.

A different area of tension is the level 4 (extended thinking) cognitive demand. While extended inquiry, interdisciplinary projects and sustained investigations represent the highest degree of cognitive demand, many secondary classrooms lack sufficient time and materials to engage in any activities at that level. The issue is not whether Level 4 is to be desired; rather, the challenge is the potential feasibility of implementing it as often as essential content must be covered.

4.6 Methodological Weaknesses

Self-reporting is a methodological issue that exists mostly in the research area of education. Teachers often give positive responses concerning their self-perceptions and/or perceived use of higher-order thinking tasks; however, the results may be different when we compare actual classroom activities or when we analyze items on assessments. While self-report will help researchers to understand perceptions of teachers, self-reporting alone does not allow researchers to determine if higher-order thinking was implemented with quality. In order for research to be stronger, researchers should triangulate questionnaire data with interviews, an examination of lesson plans, an evaluation of assessment items, and/or observational data gathered in the classroom.

A limitation of the existing research is the small number of longitudinal studies. Most studies measure perceptions or practices at a single point in time and do not demonstrate the change in teachers' understanding of Depth of Knowledge (DOK) understanding before and following training, whether implementation varies over the course of the year, or the effect of DOK-aligned tasks on students' ability to reason after extended exposure to DOK tasks. Without longitudinal data, it is impossible to determine the long-term impact of DOK.

4.7 Research Gaps

The six gaps identified form the basis of this research. Firstly, there is a lack of DOK research conducted in relation to the way that cognitive demand is conceptualised through curriculum alignment and classroom assessment in SHS in Ghana. Secondly, there is also a contextual gap as the majority of DOK studies exist outside of Ghana in comparison to the specific conditions in which Ghanaian SHS teachers work; i.e., criteria used, examination methods/criteria, resources available, class sizes, etc.

Gap 3 is a population gap; local studies largely focused on maths assessment and broadly on curriculum change, while insufficient research exists to show differences between the perceived impact of DOK in classrooms among SHS teachers across all subject areas. Gap 4 is methodological because most studies rely on survey-based methods and do not triangulate between teachers' perceived values about DOK and lesson plans, assessments or classroom evidence. Gap 5 is theoretical or research-based because DOK studies do not focus on teacher cognition or the literacy of assessment as it relates to teachers' understanding of DOK concepts. Gap 6 is practical because there is no

research data for policymakers and school leaders regarding the exact barriers that SHS teachers face using DOK in the classroom in Ghana.

5. Conceptual Framework

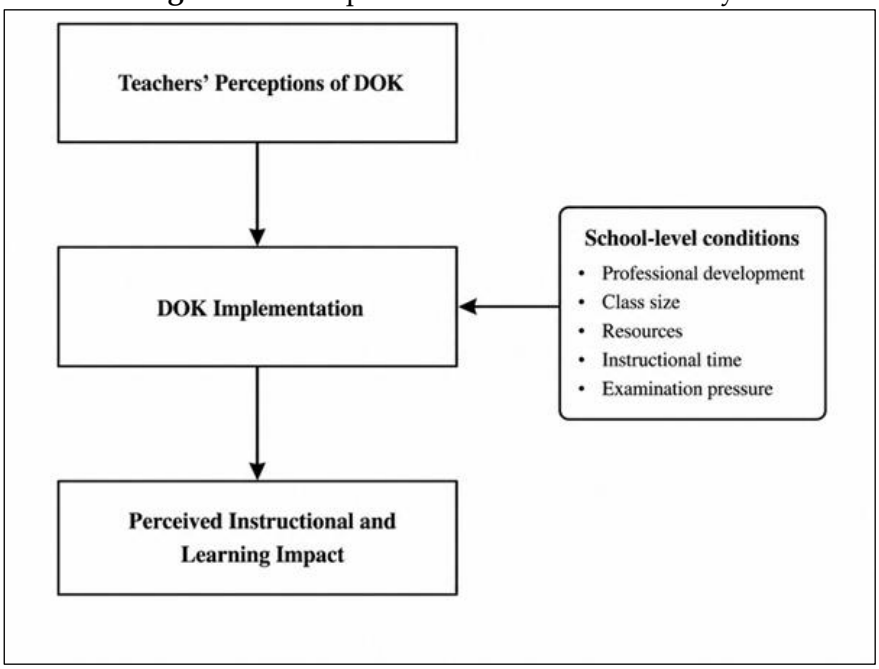
The conceptual framework of the current research centers around the perceptions of teachers toward Webb's Depth of Knowledge. Perceptual constructs include the following: how cognizant teachers are of DOK, their level of comprehension regarding the four levels of DOK, perceived value or utility of DOK and their confidence in implementing DOK, and how teachers view the applicability of DOK relative to lesson planning, questioning students in the classroom, assessment development, and student achievement.

The theoretical basis assumes that the framework considers teachers' understanding of DOK alongside their reported use of the framework in their instructional methods. In other words, the study describes teachers' understanding, perceived value and reported use of DOK as related dimensions of their perceptions during the aforementioned activities.

According to this framework, teachers' use of DOK in their classroom will be influenced by the conditions at the school/ district level (e.g., class sizes, resources for teaching and learning, amount of time for instruction, etc.). For instance, if the school provides high-quality professional development opportunities, smaller classes and high-quality resources, such conditions may provide a more supportive context for teachers' reported use of higher DOK levels in the classroom.

The framework allows for connections between teachers' perception of Depth of Knowledge (DOK), teachers' reported implementation of DOK, perceived effects on instruction and altogether with any implementation challenges teachers may have experienced. Given that the present descriptive survey will only examine teacher perceptions versus investigating potential causal, mediating, or moderating relationships, the use of this framework is appropriate.

Figure 1: Conceptual Framework of the Study



Source: Researcher's construct (2026).

5.1 Proposed Relationships Among the Study Variables

Table 1: Proposed Relationships Among the Study Variables

Variable/Construct	Role in the Framework	Expected Relationship
Teachers' perceptions of DOK	Independent variable	This domain describes teachers' perceptions of the usefulness and practicality of applying DOK in lesson planning, questioning and assessment.
DOK implementation	Dependent variable component	Reflects teachers' reported use of DOK in lesson planning, task sequencing, questioning, assessment design, and feedback.
Perceived instructional and learning impact	Dependent variable component	Reflects teachers' views of DOK's influence on student engagement, reasoning, problem solving and academic learning.

The table shows the key variables in the study and their expected relationships. Teachers' perceptions and reported implementation of DOK are treated as related descriptive domains of the framework, while the framework includes teachers' reported implementation and their perceptions of its instructional and learning contributions. School-level conditions may support or limit this process.

6. Methodology

6.1 Research Design

A descriptive survey design was used in this research study in order to gather data from a large sample of educators about their perceptions of Webb's Depth of Knowledge (DOK) framework, their experiences using the DOK framework in their classrooms and

their self-reported teaching practices in relation to the DOK framework. The design was chosen because the study did not manipulate both the independent and dependent variables to determine how participants perceived the DOK framework and how they reported using the DOK framework to perform their classroom practices. This is common when conducting descriptive research because the main purpose of a descriptive study is to provide an overall view of the demographics, beliefs, and experiences of the individuals participating in the study; to describe the facts of the situation, phenomenon, or area; and a descriptive survey was appropriate because the study sought to describe teachers' perceptions and self-reported experiences without manipulating variables or making causal inferences (Slater & Hasson, 2025). When researchers are conducting a study by using surveys as a valid source for understanding participants' perceptions, past experiences, and usage of an activity without manipulating study conditions or attempting to establish cause-and-effect relationships (Alford & Teater, 2024), it is acceptable to use surveys to gather information about the participants.

6.2 Population

The population comprised all Senior High School teachers in the Asante Akim Central municipality, Ghana. According to Creswell (2014), a population is the entire group of individuals relevant to a research study. Fraenkel, Wallen, and Hyun (2012) support this by stating that the population includes all individuals who share the characteristics the researcher wishes to study, making teachers the most relevant participants for examining the implementation of instructional frameworks such as DOK.

6.3 Sample and Sampling Techniques

In order to obtain a sample of teachers for this study, a stratified random sampling method was utilized to carry out a random selection of teachers from the overall population of teachers. Staffelman (2016) describes stratified random sampling as the process of dividing the entire population into separate, homogenous groups or strata and then randomly selecting individuals from within each stratum. By using this method, researchers can ensure that there is adequate representation from each stratum when making comparisons and conducting analyses across different strata. Using the 2 main types of schools - public and private - teachers were randomly selected from each type in proportion to the number that existed within that stratum. The final sample included 528 teachers, which was a sufficiently large enough sample size to allow for analysis of statistical results and representation of varied perspectives. Research has shown that sample size calculations can enhance researchers' credibility and establish the authority and authenticity of their research findings (Althubaiti, 2022).

6.4 Research Instrument

The main instrument was a structured questionnaire. The questionnaire had closed-ended items. It was divided into five sections. Questionnaires are widely used in educational research for collecting standardized data from large populations (McNabb,

2020). They allow researchers to gather information efficiently, especially when the target group is large or dispersed. Questionnaires can include closed-ended items, open-ended items, or a combination, depending on the study's objectives (Singh, 2025).

6.5 Validity and Reliability

In order to prove that the questionnaire has content validity, it was reviewed by experts in curriculum studies. Their feedback helped identify items that were somewhat unclear, leading to the refinement of said items. A pilot test was conducted with a sample of fifteen (15) teachers who were not from the study area. The reliability of the instrument was established using Cronbach's alpha, which produced an obtained coefficient of 0.82. This indicates that the instrument can be considered a reliable measurement in this instance.

6.6 Data Collection Procedures

Approval was first sought from the education directorate and school heads. The researcher then distributed questionnaires to teachers during professional learning communities (PLC). Teachers were assured of confidentiality and voluntary participation. Completed questionnaires were collected within two weeks.

6.7 Data Analysis

The compilation and analysis of quantitative data were performed using SPSS version 26. Analysis of demographic variables and respondent opinions about Webb's Depth of Knowledge (DOK) was conducted using descriptive statistics (frequencies, percentages, means, and standard deviations). Vetter (2017) states that descriptive statistics provide a general understanding of the pattern represented by data rather than focusing on specific observations, which is helpful in describing and summarising data. The results depicting relationships between teacher characteristics and perceptions are provided in tabular form with accompanying text explanations.

6.8 Ethical Considerations

The study complied with ethical guidelines. The goal of the study was explained to the teachers, and their permission was acquired. The questionnaires did not contain any names. Data was safely stored and utilised exclusively for scholarly reasons.

7. Results

This chapter presents data collected from senior high school teachers through a structured questionnaire. The results are organised according to the research questions and analysed using descriptive statistics, mainly frequencies, percentages, means, and standard deviations.

Table 1: Demographic Information of Respondents (n = 528)

Category	Sub-Category	Frequency	Percentage
Gender	Male	132	25.0
	Female	396	75.0
Age	Below 30 years	33	6.3
	30-39 years	297	56.3
	40-49 years	165	31.3
	50 and above	33	6.3
Teaching Experience	Less than 5 years 5-10 years	165 231	31.3 43.8
	11-15 years	33	6.3
	Above 15 years	99	18.8
Departments	Agricultural Science	63	11.9
	Business	32	6.1
	General Arts	190	36.0
	Home Economics Science Visual Arts	32 178 33	6.1 33.7 6.3

Source: Field Data, Adade (2026).

Out of the total number of respondents for this study, 75% identified as female teachers and 25% were male teachers. Most respondents fell in the age range of 30–39 years (56.3%), followed by respondents who were 40–49 years (31.3%). Additionally, relatively few respondents were under 30 years or over 50 years, each making up only 6.3% of all respondents.

Most educators had between five and ten years of teaching experience (43.8%). Educators who have less than five years' experience accounted for 31.3%. A small percentage of educators reported an average of 11-15 years of teaching experience (6.3%), while the remaining group averaged more than 15 years of teaching experience (18.8%).

General arts teachers surveyed, the majority identified as female (36% of total respondents), while the other categories of teachers represented were 33.7% (visual arts), 11.9% (agricultural science), 6.1% (home economics), and 6.1% (business), with only 6.3% being science teachers. Therefore, it appears that the overwhelming majority of respondents were middle-aged women who worked primarily in general arts or visual arts and had moderate teaching experience.

7.1 Teachers' Perceptions of the Usefulness and Practicality of DOK

Table 2: Teachers' Understanding of Webb's DOK

Statements on teachers' understanding of Webb's DOK	M	SD
I am familiar with Webb's Depth of Knowledge (DOK) framework.	3.44	.497
I have received professional development on the use of DOK.	3.50	.500
I find it difficult to explain the four levels of DOK.	2.06	.429
I know how to apply DOK in lesson planning.	3.12	.485
I feel confident using DOK when preparing assessments and tasks.	3.25	.560

Source: Field Data, Adade (2026).

Teachers reported a moderate to high level of understanding. They were familiar with the framework (M=3.44, SD=.497) and had received some professional development (M=3.50, SD=.500). They found it less difficult to explain the four levels (M=2.06, SD=.429). Teachers also indicated fair knowledge of applying DOK in lesson planning (M=3.12, SD=.485) and showed confidence in using DOK for assessments (M=3.25, SD=.560). This suggests that training and awareness exist, but practical application and mastery are not yet strong.

Table 3: Teachers' Perceptions of the Importance of DOK

Statements on teachers' perceptions of the importance of DOK	M	SD
The DOK framework is useful for planning lessons.	3.31	.584
DOK does not add much value to my instructional practices.	1.75	.560
Using DOK helps me design tasks that promote higher-order thinking.	3.44	.610
Bloom's Taxonomy is more practical than DOK for guiding instruction.	1.81	.527
DOK is relevant for preparing students for 21st-century skills.	3.69	.584

Source: Field Data, Adade (2026).

Teachers perceived DOK as useful for lesson planning (M=3.31, SD=.584) and highly relevant for 21st-century skills (M=3.69, SD=.584). They agreed that DOK helps design higher-order tasks (M=3.44, SD=.610). Few supported the view that DOK adds little value (M=1.75, SD=.560) or that Bloom's Taxonomy is more practical (M=1.81, SD=.527). This reflects a strong positive perception of DOK as a relevant and practical tool for improving teaching.

7.2 Teachers' Perceived Impact of DOK on Student Engagement and Academic Learning

Table 4: Perceived Impact of DOK on Teaching and Learning

Statements on the perceived impact of DOK on teaching and learning	M	SD
Applying DOK improves student engagement in classroom activities.	3.31	.584
DOK has little influence on students' academic learning	1.81	.635
DOK enhances students' problem-solving and reasoning abilities.	3.62	.485
Implementing DOK has improved my instructional practices as a teacher.	3.31	.584
Using DOK prepares students better for real-world problem-solving	3.62	.600

Source: Field Data, Adade (2026).

Teachers perceived DOK as supportive of student engagement (M = 3.31, SD = .584) and problem-solving and reasoning abilities (M = 3.62, SD = .485). Teachers believed that DOK could contribute to students' preparation for real-world problem-solving (M = 3.62, SD = .600). Many reported that it had improved their instructional practices (M = 3.31, SD = .584). Teachers generally disagreed with the statement that DOK has little influence on students' academic learning (M = 1.81, SD = .635). This shows that teachers perceived DOK as useful in supporting student engagement, reasoning, problem-solving, and

academic learning. However, the finding reflects teachers' views and should not be interpreted as direct evidence that DOK improves students' academic performance.

7.3 Challenges Teachers Encounter in Applying DOK

Table 5: Challenges in Implementing DOK

Statements on challenges in implementing DOK	M	SD
Large class sizes make it difficult to implement DOK effectively.	2.88	.858
I have enough resources to apply DOK in my classroom.	2.00	.613
Examination pressure makes it difficult to design tasks beyond recall (Level 1)	2.56	.610
Lack of training limits my ability to use DOK in classroom instruction.	2.38	.858
Time constraints prevent me from using higher-level DOK tasks.	2.87	.781

Source: Field Data, Adade (2026).

The main challenges identified were large class sizes (M=2.88, SD=.858) and time constraints (M=2.87, SD=.781). Examination pressure also limited higher-level tasks (M=2.56, SD=.610). Teachers disagreed with having enough resources (M=2.00, SD=.613) and reported lack of training as a challenge (M=2.38, SD=.858). This indicates that structural and resource-related barriers hinder the effective use of DOK in classrooms.

8. Discussion

This section provides an overview of what has been discovered about Webb's Depth of Knowledge, classroom-based evaluation and instruction in relation to study aims and prior research. In judging the quality of any teacher's impression of Webb's Depth of Knowledge, positive teacher opinion of Webb's Depth of Knowledge would be beneficial; however, it will not be sufficient to ensure effective implementation of Webb's Depth of Knowledge. While it is possible for teachers to find value in Webb's Depth of Knowledge, they cannot effectively implement Webb's Depth of Knowledge until they have the skills necessary to convert Webb's Depth of Knowledge into classroom questions, classroom assignments, classroom assessments and classroom feedback practices. This suggests that DOK should not simply be regarded as an assessment methodology; DOK will require: 1) Teacher training in using DOK to design and manage classroom lessons; 2) Time to redesign classroom lessons; 3) Access to quality educational resources to implement DOK; and 4) A reduction in the number of times dedicated to preparing students for high-stakes testing.

8.1 Discussion of Objective One: Teachers' Perceptions of Webb's DOK

The findings of the study are summarised according to the research objectives.

8.2 Discussion of Objective Two: Perceived Impact of DOK

Generally, most teachers believed the Webb DOK framework was both useful and practical for planning lessons and managing instruction within their classrooms. The

framework offered teachers a means to sequence tasks when teaching, assess student achievement based upon their task(s), and develop critical thinking skills in students. At the same time, however, the findings indicated that while teachers had a favorable view toward DOK, their reported level of use indicated that they did not fully utilize all four levels of DOK consistently. This is reflective of Holmes (2011); that teachers often need additional preparation to effectively use DOK.

8.3 Discussion of Objective Three: Challenges in Applying DOK

According to the teachers in the study, they perceive that DOK assists in having students actively engage, reason through and solve problems, as well as facilitate their learning. The teachers also reported that tasks developed according to various DOK levels encourage students to actively participate, think more deeply and interact more with each other in the classroom, but this finding is an interpretation of how teachers perceived the impact DOK had on students and not direct evidence that DOK resulted in improved academic performance. DOK was not included as part of the study's analysis using students' test scores or more scientific means in order to measure actual academic improvement. The results of this finding align with Abosalem (2016), who emphasized the importance of the use of a higher-order thinking framework to promote the development of 21st-century learning skills.

8.4 Overall Interpretation

In the interviews, teachers identified many Barriers to the effective use of DOK within SHS classrooms, including large class sizes, testing-driven instruction, few Teaching / Learning resources, time constraints, and poor professional development. These barriers made it very difficult for the teachers to frequently implement higher-level DOK tasks, particularly those requiring strategic and extended thinking. This is consistent with Norris, Sullivan, Poirot, and Soloway (2003), who stated that weak professional development and limited resources could be barriers to innovation in the classroom.

9. Conclusion

1) Teachers perceived Webb's DOK framework as useful and practical for lesson planning and classroom instruction. Its structured levels helped them organise learning activities, guide classroom questioning, and design assessment tasks. However, teachers' reported mastery and consistent application of all four DOK levels remained uneven.
2) Teachers believed that DOK supports student engagement and academic learning. From the teachers' perspective, DOK-based tasks encouraged critical thinking, deeper reasoning, problem-solving, and active classroom participation. However, this conclusion should be understood as perceived instructional impact, not direct evidence of improved student academic performance.

3) Structural and systemic barriers continued to restrict the effective application of DOK in SHS classrooms. These barriers included large class sizes, limited teaching and learning resources, inadequate professional training, time constraints, and examination-driven instruction.

10. Recommendations

GES and NaCCA need to provide regular professional development using Webb's DOK framework for SHS teachers that includes professional development, awareness of the DOK framework and how to apply the DOK framework with lesson plans and classroom questioning. The training will also provide subject-specific examples, peer mentoring, practical workshops and continual follow-up support.

To facilitate the use of more advanced Depth of Knowledge (DOK) types of tasks, it is important that school systems furnish educators with sufficient educational and teaching resources. Suitable educational and teaching resources include course-specific instructional materials, sample assessments of expected performance (for example, rubrics), information and computer technology (ICT) tools, and experiential learning activities that support reasoning, problem resolution, and thinking beyond individual tasks. If provided with insufficient resources, teachers may continue only using recall-based instruction as opposed to more complex, higher-level tasks.

It is important for curriculum writers to incorporate Webb's DOK model more clearly into teacher Guides, Assessment manuals and curriculum materials. Doing so will assist teachers with an understanding of how to use DOK as a means to align the curriculum objectives with classroom activities and assessment tasks. The materials should also provide a variety of task examples at each of the four levels of the DOK model across all secondary high school subjects.

Educators need to be supported in reducing excessive reliance on teaching through assessments by their school's leaders. This does not mean that there won't be any preparation for assessments because this would be unrealistic. However, the goal should be to assist teachers in developing lessons and assessments that prepare students for assessments but also develop their critical thinking, reasoning and problem-solving skills.

In order for policy makers to effectively implement DOK in secondary school (SHS) classrooms, there needs to be an emphasis put on addressing the institutional barriers hindering that implementation; these barriers include large class sizes, teacher overloads, limitations on instruction time and insufficiently training of teachers. Management of larger classrooms with standardised teacher workloads will allow teachers to have greater opportunities to create and deliver assignments to students across multiple levels of DOK.

11. Limitations

Data from self-reported questionnaires served as the primary data source for this study. Teachers' perceptions and how they implement DOK describe the experience but do not provide actual evidence of how DOK was implemented in classrooms.

A descriptive survey design was utilized for this study; therefore, no conclusions about DOK implementation and student achievement could be drawn.

Classroom observations, lesson plan analysis, or assessment item analysis were not conducted for this study. Therefore, future studies should implement these methods to confirm whether teachers who report implementing DOK do so in their classroom(s).

The study was limited to Senior High School teachers in the study area, so the findings should be generalised cautiously to other educational contexts.

12. Suggestions for Further Research

1) Future studies should examine how teacher self-efficacy, assessment literacy, and subject specialisation influence teachers' reported and actual use of Webb's DOK in SHS classrooms.
2) Comparative studies should be conducted between rural and urban SHS contexts to examine how class size, resources, school support, and examination pressure shape teachers' application of DOK.
3) Future studies should use classroom observation, lesson-plan analysis, and assessment-item analysis to verify whether teachers' reported use of DOK reflects actual classroom practice. This would address the limitation of relying mainly on self-reported questionnaire data.
4) Longitudinal or quasi-experimental studies should be conducted to examine the sustained effect of DOK-based instruction on students' reasoning, engagement, problem-solving, and academic achievement. Such studies would provide stronger evidence than perception-based studies.
5) Further research should explore students' perceptions of DOK-based instruction to complement teachers' views and provide a broader understanding of how DOK is experienced in SHS classrooms.

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Ethical Approval Statement
Permission was obtained from the appropriate educational authorities and school heads before data collection.

Informed Consent
Respondents participated voluntarily and were informed about the purpose of the study.

Data Availability

The data supporting the findings of this study are available from the author upon reasonable request.

Author Contributions

The author was responsible for the study conception, literature review, data collection, analysis, interpretation, and manuscript preparation.

Conflict of Interest Statement

The author declares no conflict of interest.

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