

Teachers' Perspectives on Students' Proficiency on Standardized Assessments: A Qualitative Case Study



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ABSTRACT: The purpose of this qualitative descriptive case study was to examine teachers' perspectives and review preparation materials to understand why students in SS3 were not proficient on the mathematics SSCE standardized assessments. Teachers were randomly selected, and semistructured phone interviews using open-ended questions were utilized to understand teacher perspectives, course preparation materials, and how the materials could be improved. The study aimed to determine what teachers perceive to be working, what challenges exist, and describe the mathematics preparation materials used in preparing students for the mathematics SSCE standardized assessments. The study revealed the need to develop the senior secondary schedule to make improvements in curriculum implementation and a need for appropriate instructional materials and adequate instructional time to ensure essential learning outcomes and core skills are taught effectively.

KEYWORDS: Standardized assessment, mathematics, curriculum, instruction

INTRODUCTION

The Ministry of Education manages the education system at the federal level. The Nigerian education system is comprised of three sectors: basic education, postbasic/senior secondary education, and tertiary education. The Universal Basic Education (UBE) in Nigeria is called the 9-3-4 education system. Students are required to take a standardized assessment called the Senior Secondary Certificate Examination (SSCE) to qualify for entry into a tertiary institution. High-stakes tests measure students' academic achievements and readiness for the next level of education (Danielson, Månsdotter, Fransson, Dalsgaard, & Larsson, 2019). The SSCE is the final examination students in Nigeria take at the end of six years of secondary school education. The SSS certificate is equivalent to a high school diploma. The examination is required to receive the award of the SSS certificate mandatory for admission into any Nigerian university, polytechnic, monotech, and college of education.

Two different examination boards develop and conduct the SSCE standardized assessment: the West African Examination Council (WAEC) and the National Examination Council (NECO). The SSCE curriculum requires students to take a total of eight to nine subjects. English language, general mathematics, and civic education are mandatory. The highest mark a student can score is 100%; 50% is the lowest mark to receive a credit in a subject. The senior secondary mathematics curriculum used in schools aims to prepare students for the both the WAEC and NECO examinations. Students are expected to score at least 5 credits, which must include English language, mathematics, and one science-based subject, to be considered successful on the SSCE.

The SSCE is a requirement for students to proceed to college or university; some workforces require the certificate before confirming a job. Less than one third of students taking the SSCE will continue to tertiary institutions due to scoring below 50% in English, mathematics, and three other subjects (Ike, 2017). The high number of students failing the SSCE standardized assessments indicates a need for alternative forms of educational practices. According to Salihu and Jamil (2015), educators are expected to provide a substantial educational experience for students which enables them to master the skills needed to earn a high school diploma. Between 2016 and 2018, the National Bureau of Statistics (2019) reported the percentage of candidates who took the SSCE and made 5 credits and above, including in mathematics and English language, was 33.81%. The low percentage of students earning enough credits to earn a high school diploma suggests educational reforms may be necessary. Attending a tertiary institution provides an individual with more opportunities for employment. By attending a higher education institution, a student has the opportunity to develop the skills and knowledge employers require. Without a high school diploma, an individual may experience difficulty in obtaining abilities which allow them to be productive members of society. Tertiary institutions provide a stepping stone to career opportunities, provide a medium for individuals to have a higher standard of living, and, in turn, improve a nation's success and development of citizens (Salihu & Jamil, 2015).

Purpose of the Study

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The purpose of this qualitative descriptive case study was to examine why students in SS3 state-funded schools were not proficient on the mathematics SSCE standardized assessments. The aim of the study was to determine alternative approaches to improve student proficiency on the mathematics SSCE standardized assessments. If this study were not conducted in state-funded schools, educators in Nigeria may not know what programs help students perform proficiently on the mathematics standardized assessments. The study contributed to the knowledge base by providing evidence on what was working, the challenges, and what needed to be done to prepare students to be proficient on standardized assessments. This qualitative study provided educational supports to be used by educators to prepare students for success on mathematics SSCE standardized assessments. Educators can get information on best practices in curriculum and instruction which support student learning to achieve mastery of concepts taught (Howard, Woodcock, Ehrich, & Bokosmaty, 2017). An understanding of the factors which ensure effective educational practices may help students to achieve proficiency on standardized assessments and may provide insights on challenges and ways to improve student performance on the mathematics SSCE standardized assessments. Teacher professional development in delivering effective instructional practices and using appropriate teaching resources may influence students' academic performance and achievement on standardized assessments (Balta & Eryilmaz, 2019). Examining the mathematics curriculum, examination board's scheme of work and teachers' views may provide insights into what teacher professional development programs are needed to improve teaching practices and learner outcomes on the SSCE standardized assessments.

Exploring participants' perspectives and opinions regarding the supports, benefits, and barriers SS3 students face in achieving proficiency helped to advance knowledge in the education field in Nigeria to enable students to pass high-stakes assessments required for entry into tertiary institutions. Gathering personal perspective data helped to identify problems encountered and appropriate supports needed for educators who lack experience or background in preparing students for academic achievement. Understanding how to effectively plan and instruct students may positively impact students in SS3 achievement on the SSCE standardized assessments. An opportunity to influence the available supports and resources for educators, thus impacting the effectiveness of teachers as well as providing implications for positive change by improving student achievement and increasing the ability for more students to be proficient on high-stakes tests. The following research questions guided the study:

Research Question 1: What do teachers in state-funded schools perceive to be challenges in preparing students in SS3 for the mathematics SSCE standardized assessments?

Research Question 2: What do teachers in state-funded schools perceive to be working to help students in SS3 prepare for the mathematics SSCE standardized assessments?

Research Question 3: How do teachers describe the preparation materials used to prepare students in SS3 for the mathematics SSCE standardized assessments?

THEORETICAL FRAMEWORK

This research was grounded on the constructivist leadership and discovery learning theories which are based on the assumption of a teacher's role as the facilitator of learning through the use of a student's past experiences and existing knowledge to aid in promoting conceptual understanding, autonomy, and retention of concepts learned compared to traditional instructional methods (Akhsanul & Siti, 2017; Ott, Carpenter, Hamilton, & LaCourse, 2018; Yurniwati & Hanum, 2017). Supporting the purpose of the qualitative descriptive case study, which examined teachers' perspectives and mathematics preparation materials to determine why students in SS3 were not proficient on the mathematics SSCE standardized assessments (Levy et al., 2018). The discovery learning and constructivist leadership theories are based on the assumption to learn new concepts a student's past experiences and existing knowledge is activated by the teacher as a facilitator. Discovery learning and constructivist leadership theory take place in problem-solving situations where the learner draws on personal experiences and knowledge to discover facts and relationships and new information to be learned ("Discovery Learning," 2017). In achieving proficiency on assessments, learners are required to draw from past experiences and acquired knowledge.

DISCOVERY LEARNING

Discovery learning embraces a method of inquiry-based instruction (Akhsanul & Siti, 2017). The aspects of discovery learning theory can be analyzed to determine the elements of learning which enable students to acquire and retain knowledge for proficiency on standardized assessments (Yurniwati & Hanum, 2017). Educators' use of the discovery learning theory in the delivery of set curriculum can foster mastery of concepts. Aspects of discovery learning theory can be analyzed to support student learning and proficiency in academic skills and standardized assessments based on the integration of problem solving, learner management, integrating and connecting, information analysis and interpretation, failure, and feedback (Yurniwati & Hanum, 2017).

CONSTRUCTIVIST LEADERSHIP THEORY

Constructivist leadership theory supports teachers using auditory, visual, and kinesthetic learning approaches to ensure learners are engaged in active listening and repetition to create meaning and understanding of concepts taught (Zhang & Kang, 2017). The components of constructivist leadership theory can be utilized to understand the perspective of teachers as guides and coaches in

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the learning process for students' in-depth transfer of knowledge and skills required for proficiency on assessments (Akhsanul & Siti, 2017). Instructional practices focused on constructivist leadership theory and discovery learning support students in creating meaning out of new learning, leading to higher levels of proficiency on academic tasks (Ott et al., 2018).

Literature Review

The dimensions of discovery learning theory allows the development of systems to support student learning of the curriculum and improve proficiency in academic skills and performance on standardized assessments. Students construct an understanding of new concepts and the curriculum with the teacher's guidance. Table 1 presents the approach students use to access the curriculum and the role teachers play as facilitators in the learning process.

Table 1. Discovery Learning Theory

Curriculum principle	Teaching process
Engagement	Exploration
Exchange of information	Explanation
Empowerment	Exhibition

Curriculum principles. The discovery learning method is a constructivist theory where students construct an understanding of concepts and knowledge of the world through experiencing things and reflecting on experiences (In'am & Hajar, 2017). The principles of discovery-based learning focus on fostering student engagement by allowing learners to work together with peers to find the solution to the given task (Syarifuddin, 2017). Students are engaged and empowered to learn through the exchange of information, making learning more concrete, which may lead to academic achievement and proficiency on assessments.

Teaching process. Discovery learning is an exploratory, hands-on teaching approach which focuses on the learning process by encouraging students to look for solutions (Byoung-Gi, 2019). The objective moves away from teaching students to memorize rules or concepts. The teacher provides a medium for students to apply ideas to real-life situations. Students can create memorable explanations of lessons which may turn into lifelong knowledge and academic achievement. Discovery learning encourages motivation, active involvement, and creativity in students, which promotes autonomy and independence (Byoung-Gi, 2019).

CONSTRUCTIVIST LEADERSHIP THEORY

Constructivist leadership theory is the framework on which this study was built to understand the reciprocal, purposeful learning and action in ensuring students achieve academic proficiency and meet the standardized requirements for learning. Constructivist leadership theory supports the approach of teachers using auditory, visual, and kinesthetic learning strategies to ensure learners are engaged in active listening and repetition to create meaning and understanding of concepts taught, which may lead to proficiency on standardized assessments (Zhang & Kang, 2017). Constructivist teaching occurs as learners are actively involved in the process of meaning and knowledge construction as opposed to passively receiving information. Learners create sense and knowledge out of concepts taught. The principles of constructivism include learning takes time, learning is an active process involving sensory input and construction of meaning by the learner, people learn how to learn as they learn, and the action of constructing meaning is mental (Polenova, 2017). To enhance academic achievement and retention for proficiency on standardized assessments, educators can use the cooperative learning method and systematic teaching combined with the constructivist approaches (Toklucu & Tay, 2016).

Understanding the components of constructivist leadership theory can be utilized to understand the perspective of teachers as guides and coaches in the learning process for students' in-depth transferable knowledge and skills required to achieve proficiency on assessments (Akhsanul & Siti, 2017). Instructional practices focused on constructivist leadership theory and discovery learning support students in creating meaning out of new learning, leading to higher levels of proficiency on academic tasks (Ott et al., 2018). Jean Piaget's, Seymour Papert's, and Jerome Bruner's constructivist perspectives can be applied to advocate for change in instructional practices to align with the nature of knowledge acquisition. Clark (2018) explained student-centered learning facilitated by the teacher as a coach activates students' experience and knowledge to create an in-depth understanding of new learning. Illeris (2018) explained students use the information they already know to acquire more knowledge.

The theory of constructivism applies to differentiation. Teachers' application of the theory constructivism through differentiated instruction is student-centered. Students can demonstrate learning through alternate methods such as collaboration, hands-on activities, and technology, which increase active learning and student academic achievement on standardized assessments (Jitka, Jitka, & Pavlína, 2018). Constructivism emphasizes the active role of students in building understanding and making sense of information. Constructivist teaching is learner-centered, where students are actively involved in knowledge construction rather than as passive listeners (Vaishali & Pradeep, 2019). Students construct knowledge by transforming, organizing, and reorganizing

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previous experience through social interaction in the construction of knowledge and understanding; students can retain information learned and achieve higher results on assessments.

METHODOLOGY

This qualitative descriptive case study was to examine why students in SS3 state-funded schools were not proficient on the mathematics SSCE standardized assessments. The target population for this study comprised a specific population: 15 senior secondary mathematics teachers teaching in state-funded secondary schools. Senior secondary mathematics teachers instruct students in SS1 to SS3 using the mathematics curriculum. The education district consists of eight schools. Each school has two to three mathematics teachers. The entire sample population was selected from the target pool of 24 employees and was aligned with the research questions. Fifteen participants were interviewed for this study. The sampling frame and target population of the study included 15 randomly selected SS1 to SS3 mathematics teachers from the education district. Teachers not teaching mathematics in senior secondary school were excluded from the study. All study participants participated voluntarily in the study.

PARTICIPANTS AND LOGISTICS

The process of participant selection began by contacting the administration of the school to gain permission to conduct research at the site and to identify potential participants to learn perspectives on students' achievement on the mathematics SSCE standardized assessments. After obtaining contact information through the informed consent protocol, an e-mail which included an introduction to the study, an explanation of the objective of the study, the research questions, data collection method and informed consent form was sent to interested prospective participants. Teachers who expressed an interest in participating in the study were provided with informed consent. Teachers who agreed to participate in the study received a follow-up e-mail with a copy of the interview questions and a prearranged date, time, and location of a phone interview.

The research procedures involved a review of preparation materials and incorporating coded content into themes similar to how the open-ended teacher interview responses were analyzed. A review of the mathematics SSCE preparation materials including the mathematics examination board's scheme of work and mathematics curriculum for senior secondary courses were conducted by coding content into common themes. Utilizing thematic analysis from the preparation materials for the mathematics SSCE standardized assessment, and open-ended responses from teacher interviews allowed for triangulation of the data to strengthen the validity and reliability of the study (Neuman, 2014). For this study, specific information regarding mathematics standardized assessment, instructional practices, and teacher perspectives on student preparedness on mathematics SSCE standardized assessments was gathered. Interview questions were developed to address the research questions. The open-ended interview questions were developed and addressed teachers' perceptions of students' preparedness for the mathematics SSCE standardized assessments. Experts in the field reviewed the interview questions for reliability and validity (Creswell, 2014; Neuman, 2014). The teachers' responses to the interview questions allowed for thoughts of educators regarding instructional methods and practices to be explored.

Semistructured phone interviews. The interview consisted of 10 questions and examined teachers' perspectives on students' preparedness on mathematics SSCE standardized assessments. A primary source of data collection in case studies is interviews (Yin, 2014). Farooq (2015) explained establishing rapport during phone interviews to be challenging, leading to shorter interviews; in the absence of visual cues, both the interviewer and interviewee are more focused on listening, leading to better understanding. This interview protocol represented the content applicable to this study's research questions. Influencing literature and prior studies conducted by experts in the field of standardized assessments were the basis for the process development of the interview protocol. The questions were developed in a manner to answer the study's research questions. The data collection instruments are in Appendices C, D, and G. An email was sent to experts in the field for review and to provide feedback on the interview questions (see Appendices E and F). Interview questions were revised to reflect the feedback from experts in the field. The semistructured phone interviews provided an avenue for respondents to raise issues not already considered, and participants' responses were not limited to the questions asked.

Interview Questions 1, 2, 5 and 8 helped to answer the first research question. While Interview Questions 3, 4 and 9 aided in answering the second research question. Interview Questions 6 and 7 served to answer all three research questions. Interview notes were made throughout the data collection process.

Questionnaire. An online questionnaire served as a secondary instrument for the collection of demographic data from the participants. Closed ended questions were designed by means of the same process and influences as the interviews. Each question was designed to elicit demographic data of participants. The questionnaires, which should have taken between five and 10 minutes to complete, consisted of seven questions, focused on learning the background, and demographics of the participants (see Appendix G).

Preparation materials. The preparation materials include the examination board mathematics scheme of work from the official website and the senior secondary mathematics curriculum. The preparation materials were used to answer research question 3. The mathematics scheme of work and mathematics curriculum older than three years were not included. The preparation materials

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were reviewed and categorized for alignment using a checklist (see Appendix H). In qualitative descriptive case study research, the researcher must conduct data analysis and data collection concurrently by recombining evidence to produce empirical findings through examining, categorizing, tabulating, and testing (Yin, 2018). The examining and categorizing of the mathematics SSCE preparation materials (examination board's mathematics scheme of work and senior secondary mathematics curriculum) helped in answering the third research question.

Data Preparation

For the purpose of analysis, the audio recording of the participants' interviews was transcribed and entered into NVivo software to track and code themes. Interview responses were separated by the individual participant. The initial separation of interviews was organized and categorized by interview question responses. The interview transcripts were read to ensure transcriptions were verbatim teacher audiotaped interviews. A clean verbatim copy was created and used for member checking. This translated the transcription into a more polished form (Creswell 2015). A translated version of the teacher interview transcript showing major findings, theme and descriptions was presented for member checking by participants. At the end of member checking, which was employed to clarify interpretations, data analysis commenced with data categorization for each participant interview (Creswell, 2014).

The mathematics SSCE preparation materials, which included the examination board's mathematics scheme of work and the senior secondary mathematics curriculum were examined using a checklist (see Appendix H) to find common themes, concepts and topics to be mastered in preparing for the SSCE standardized assessment. Data were categorized in an Excel spreadsheet by themes, grade level, and topics taught to see commonalities between the mathematics scheme of work provided by examination board and the chosen mathematics curriculum of the schools.

DATA COLLECTION

Each of the study's research questions was answered through the use of the data sources. Table 2 identifies the data sources and how they relate to the research questions. The semistructured phone interviews were coded to identify Participant A, Participant B, and so forth, to help ensure participant identities were protected. Interview responses were recorded using a Sony digital voice recorder and transcribed through the use of an online transcription service. The goal of data collection is to comprehend how each participant functions and to understand perceptions and thought process (Ponelis, 2015). The interviews were conducted in private over the phone with no other persons in the room, to ensure no one overheard the conversations.

PARTICIPANT PROFILES

The online questionnaire aimed to obtain demographic and background data on participants. To maintain participant anonymity and confidentiality, details, including names and schools, were not included in the profiles and findings. The demographic data collected on participants demonstrated a wide range of teaching experience, knowledge of the mathematics preparation materials, and students' achievement on the mathematics SSCE standardized assessments. Six of the participants were male and nine were female. Educationally, 100% of the total population had a bachelor's degree or higher.

Participant A has taught mathematics for 15 years. Participant A believes the most important role of a teaching professional is to teach students effectively. Participant A believes a teacher's role is to make sure students excel in mathematics.

Participant B is in the eighth year of teaching. Participant B enjoys working with SSS students. This Participant is the mathematics teacher for students in SS 2. Participant B's biggest responsibility as a teaching professional is to cover the curriculum within the allotted time to ensure students are ready for internal and external tests.

Participant C is in the 23rd year of teaching and teaches SS2 and SS3 students. Participant C enjoys working with teenagers and feels a sense of joy when students struggling with a concept eventually learn the concept. As a teaching professional, Participant C believes the most important task is to continue to learn, which ensures students learn as well.

Participant D has taught for 26 years. Participant D believes the role of a teacher is to teach students adequately and effectively by covering the required scheme of work. Participant D stated many weaknesses hinder student performance, including a lack of adequate resources.

Participant E has taught SS2 and SS3 students for 23 years and stated, "The ends justify the means". The participant wants students to develop careers and encourages students to do well and reach maximum potential. Participant E believes math is an important component to gaining admission into a higher education institution and a math teacher's greatest responsibility is to promote love for math in students.

Participant F is in the 10th year of teaching. Participant F has always taught mathematics to SS1 students. Participant F believes the most important responsibility as a teaching professional is to impart knowledge to students as well as to ensure students have good morals and ethics.

Participant G has taught for eight years. The participant loves to teach mathematics and hosts school tutoring sessions for students in the morning and after school. Participant G stated, "My philosophy is that learners must be fully grounded before any internal or external standard test. That is, emphasis should be on the application of concepts taught rather than exams."

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Participant H is in the 11th year of teaching. Participant H loves teaching and collaborating with peers during team-teaching sessions. Participant H stated, "The biggest challenge in teaching in a state-funded school is students not having enough funds to buy the required textbook." Participant H enjoys working one-on-one with students and helping them learn the concepts in the required curriculum.

After 10 years of teaching SSS students, Participant I stated the role of an educator is to teach the required curriculum to the best of one's abilities. Participant I is happy when students reach success on internal and external assessments. Participant J believes one weakness of giving the test is some students do not take the internal examinations seriously and only start working effectively close to taking the external exam, giving little time to prepare.

Participant J stated pressure on teachers and students to complete the required curriculum to prepare for external assessments may lead to rushing the units. While Participant J has taught mathematics for nine years and enjoys teaching, the tendency is to rush to complete units which require more time than the syllabus allows. Participant J explained teachers have the responsibility to ensure students master the curriculum content.

Participant K has been teaching for 16 years. Participant K believes two of the challenges faced by students are lack of motivation to do homework and economic constraints. Participant K encourages students to focus on schoolwork and think of providing for family members after school is completed. Participant K stated the role of a teaching professional is to assist students, teach the course material, and work with students as needed.

Participant L stated internal and external assessments help teachers and students know what was learned and what still needs to be taught. Participant L believes the weakness is no time to review concepts not mastered, given the curriculum and scheme of work. Participant L has been teaching for nine years and stated completing the curriculum within the allotted time is the biggest challenge, but with each year, practice gets better as a deeper understanding of which units need more time is gained.

Participant M has taught for 22 years and has a wealth of experience teaching senior secondary students. Participant M finds teaching rewarding and enjoys working with older students and preparing students for the SSCE examinations and beyond. Participant M stated, while the curriculum helps prepare students for the exams, there is a need to use other teaching resources, including past questions, to help students prepare for external assessments.

Participant N is in the 16th year of teaching mathematics at the senior secondary level. Participant N has taught mathematics and worked with SS2 and SS3 students. Participant N stated, "My most important role as a teaching professional is to ensure all students are successful at their level and to want all students to reach full potential."

Participant O is in the 15th year of teaching mathematics and has worked with SS2 and SS3 students. Participant O reported pressure to complete the required curriculum and stated students need to retain what is learned in SS1 through SS3 to succeed in external tests. Participant O stated the first term of SS3 is a review of work learned in SS1 and SS2, and the third term is used to prepare students for external assessments.

Table 2. Research Questions and Data Sources

Research question	Interview transcripts	Scheme of work	Mathematics curriculum	Interview notes
RQ1: What do teachers in state-funded schools perceive to be challenges in preparing students in SS3 for the mathematics SSCE standardized assessments?	X			X
RQ2: What do teachers in state-funded schools perceive to be working to help students in SS3 prepare for the mathematics SSCE standardized assessments?	X	X	X	X
RQ3: How do teachers describe the preparation materials used to prepare students in SS3 for the mathematics SSCE standardized assessments?	X	X	X	X

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DATA ANALYSIS

The data for this study derived from the interview transcripts, a review of preparation materials for the mathematics SSCE standardized assessment, an online questionnaire and interview notes. Qualitative data analysis provides an opportunity to understand the research objective by revealing patterns and themes in data (Guo, 2019). The use of multiple sources of data and simultaneous collection and analysis make it imperative to manage the data collections. For this purpose, analysis of data collected using NVivo to track codes and themes was necessary.

A description and interpretation of the themes is represented through narratives (Creswell, 2014; de Sousa et al., 2018). A thematic analysis approach was used to explore themes and patterns in the data. J. Swain (2019) explained an essential part of thematic analysis is identifying, analyzing, and reporting trends within the data to explore the experiences, meanings and realities of the participants. The data collected from the interview transcripts and mathematics preparation materials ensured the creation of a set of codes to address the research questions. The responses were e-mailed to participants requesting a review to prevent data misinterpretation and to ensure member checking. After the transcripts were accepted as correct by the participants, a thorough reading and examination of the transcripts and supporting evidence were conducted to explore the data. Data analysis for this study consisted of examining, categorizing, preparing, and organizing data into themes and patterns using an electronic portable PDF format. First, open coding was used through repeated reading to uncover emergent categories and concepts pertaining to the attributes of what is challenging, what is working, and descriptions of the preparation materials used in preparing students for the mathematics SSCE standardized assessment. Second, the examination board's mathematics scheme of work and mathematics curriculum review continued the coding process, with open coding and axial coding to reveal emergent themes concerning attributes of mathematics preparation materials. As coding was completed for each source, themes, concepts and similar patterns were noted across the sources. Pattern matching was applied for the purpose of linking data to the conceptual framework propositions:

1. What is challenging about preparing students for proficiency on the mathematics SSCE standardized assessment?
2. What is working in preparing students for proficiency on the mathematics SSCE standardized assessment?
3. What mathematics preparation materials aid in preparing students for proficiency on the mathematics SSCE standardized assessment?

The coding cycle was directly related to the interview question number within each question block; research question 1 had four related interview questions, research question 2 had three, and research question 3 had two. The interview transcripts were coded with preliminary subthemes codes (see Table 4), rereading through the data to ensure the codes were accurate and to find the emerging themes were established. Next, codes were combined into themes. Sections of data were grouped into similar participant responses, and themes emerged. The interview transcripts were further analyzed until redundancy and data saturation occurred. The goal of the data analysis was to examine what is challenging, what is working, and descriptions of mathematics preparation materials used in preparing students for proficiency on the mathematics SSCE standardized assessment. Three major themes emerged from teachers' perceptions on what is challenging, what is working, and descriptions of mathematics preparation materials used in preparing students for proficiency on the mathematics SSCE standardized assessment: the rigor of the curriculum, learning influences, and instructional resources. The data were arranged and categorized according to the three themes, and the corresponding data were placed under each theme. Table 4 provides a summary of the interview data.

RESULTS

As part of the findings, a review of the senior secondary mathematics curriculum and the examination board mathematics scheme of work for alignment was essential. The implementation of the mathematics preparation materials and availability of instructional resources directly impacted teaching practices and students' learning experiences. Part of the findings indicated some of the topics on the mathematics examination board's scheme were not aligned with the senior secondary mathematics curriculum which is problematic if students' proficiency on the SSCE standardized assessment is to be assessed at the end of SS3. A display of the relationship between the mathematics preparation materials is shown in Table 3.

Table 3. Relationship Between Mathematics Curriculum and Scheme of Work

Theme	Grade	Curriculum topics	Scheme of work
Number and numeration	SS1	<ul style="list-style-type: none">● indices● logarithms● modular arithmetics● number base systems● sets	decimals and approximations, fractions, financial arithmetics, indices, logarithms, logical reasoning, matrices and determinants, modular arithmetics, negative integers, number bases, positive and rational numbers, proportions and

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	SS2	<ul style="list-style-type: none"> ● approximations ● logarithms ● sequences and series 	percentages, rates, ratios, sequences and series, sets, surds, and variations
	SS3	<ul style="list-style-type: none"> ● arithmetic of finances ● determinants ● indices ● logarithms ● matrices ● numerical processes ● surds 	
Algebraic processes	SS1	<ul style="list-style-type: none"> ● logical reasoning ● quadratic equations ● simple equations and variations 	algebraic expressions, algebraic fractions, changes of subject of formulas/relations, functions, graphs of linears, quadratic equations, linear inequalities, quadratic functions, relations, simple operations on algebraic expressions, and solution of linear equations
	SS2	<ul style="list-style-type: none"> ● algebraic fractions ● gradient of a curve ● linear inequalities ● logical reasons ● quadratic equations ● simultaneous linear equations 	
Algebraic processes (<i>cont'd.</i>)	SS3	<ul style="list-style-type: none"> ● algebraic graphs ● algebraic processes ● calculus ● equations ● functions and relations ● linear inequalities ● quadratic equations 	
Mensuration	SS1	<ul style="list-style-type: none"> ● plane shapes ● solid shapes 	areas, perimeters, lengths and volumes
	SS3	<ul style="list-style-type: none"> ● latitude and longitude ● surface areas and volume of spheres 	
Plane geometry and trigonometry	SS1	<ul style="list-style-type: none"> ● chord properties and circle theorems 	angles, angles of elevations and depression, angles and intercepts on parallel lines, bearings, circles, constructions, coordinate geometry of straight lines, loci, triangles and polygons, cosine, sine, and tangent
	SS2	<ul style="list-style-type: none"> ● chord properties and circle theorems 	

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Plane geometry and trigonometry (cont'd.)	SS3	<ul style="list-style-type: none"> ● construction ● coordinate geometry of straight lines ● geometry and vectors ● graphs of trigonometric ratios ● latitude and longitude ● loci ● mensuration ● surface area, trigonometry, and volume of spheres 	
Statistics and probability	SS1	<ul style="list-style-type: none"> ● data presentations 	probability and statistics
	SS2	<ul style="list-style-type: none"> ● cumulative frequencies ● grouped data ● measures of central tendency ● probability ● measures of central tendency for grouped data ● measures of dispersion 	
	SS3	<ul style="list-style-type: none"> ● mean ● probability standard deviations ● statistics 	
Calculus	SS3	<ul style="list-style-type: none"> ● differentiation of algebraic functions ● integration of simple algebraic functions ● mean and standard deviation 	
Vectors and transformation			Vectors in a plane, transformations in the cartesian plane

Research Question 1

Research Question 1 asked, What do teachers in state-funded schools perceive to be challenges in preparing students in SS3 for the mathematics SSCE standardized assessments? Interview Questions 1, 2, 5, and 8 (see Appendix C) were designed to address research question 1. Asking 15 participants about the challenges of preparing students for standardized testing identified these issues: perceived weaknesses of the current curriculum in preparing students for the SSCE standardized assessments, developmental readiness of students, and how teaching pedagogy is consistent with cumulative tests for students.

Table 4. Summary of Interview Themes

Theme	Subthemes	Participant descriptive comments
Rigor of the curriculum	<ul style="list-style-type: none"> ● Course material applicability ● Curriculum requirements ● Standardized testing 	<ul style="list-style-type: none"> ● “While the <i>New General Mathematics</i> textbook covers much of the scheme for the SSCE, the material is

	<ul style="list-style-type: none"> ● Scheme of work ● Lack of adequate time to cover scheme ● Extra classes 	<p>applicable. I still need to use supplemental materials to meet the demands and rigor of the test.”</p> <ul style="list-style-type: none"> ● “There is a need to work with students on past questions, which is not part of the curriculum requirements or course material needed to be covered but helps for the standardized assessment.” ● “The time to complete the entire scheme of work is not enough.” ● “Providing additional classes before and after school is necessary to complete the scheme of work and prepare students for external examinations at the end of the year.” ● “Given the current school schedule, completing the scheme of work is challenging as there is not adequate time to cover all concepts. We give extra classes.” ● “There is a lot of rigor due to the cumulative nature of the standardized assessment and the length of time required to complete the scheme of work.”
<p>Instructional resources</p>	<ul style="list-style-type: none"> ● Adequacy in instructional materials ● Teaching instruction and practices ● Collaboration and team-teaching 	<ul style="list-style-type: none"> ● “Giving students a good base in SS1 is critical to their success on the SSCE assessment. Adequate resources are necessary.” ● “Reviewing past questions is empirical to allow students to have experience in what will be on the test; employing best teaching practices is important.”
<p>Instructional resources (cont'd.)</p>	<ul style="list-style-type: none"> ● Pressure from administrators ● Scheduling 	<ul style="list-style-type: none"> ● “Rushing through the syllabus when students don't understand the concepts is a disadvantage to students' proficiency on assessments.” ● “Administrators expect teachers to complete the scheme of work and prepare students for the next year; providing effective teaching instruction and practices on all required concepts is important.” ● “In Lagos State, the math clinic which is organized for all teachers provides a way to collaborate and team-teach with others and helps to improve teaching practices.” ● “I use at least three other textbooks and past questions in addition to <i>New General Mathematics</i> to make sure students get a broad understanding of the concepts to be taught; the schedule does not give enough time to treat all topics.”
<p>Learning influences</p>	<ul style="list-style-type: none"> ● Classroom environment and structure ● Home life or family obligations ● Learner motivation ● Students' aptitude ● Student absence during extra class sessions ● Other commitments 	<ul style="list-style-type: none"> ● “Student aptitude impacts learning; to ensure students are prepared for assessment, they need additional tutoring.” ● “The classroom structure does not provide enough time for remedial instruction for students with learning challenges.” ● “Some students have obligations such as providing for their family, which can distract them from coming to school regularly.” ● “Student motivation is a major factor in learning the required material.”

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- “Students need to attend classes regularly, including sessions before and after school; many of them are absent during the extra classes.”

Theme	Subthemes	Participant descriptive comments
Learning influences (cont'd.)		<ul style="list-style-type: none"> • “Employing a tutoring service is necessary as some students do not show up for the extra class sessions.” • “Many of the students do not attend the extra sessions maybe due to family obligations and no time or other commitments.”

Participants expressed the importance of standardized assessments to provide feedback; discovery learning theory supports the use of assessments as a method of providing feedback to students and to inform instructional practices for teachers. Participants' overall perception of the challenges in preparing students for standardized assessments were related to issues with scheduling and the short time frame to complete required course work, constraints with instructional resources, and student motivation.

Research Question 2

Research Question 2 asked, “What do teachers in state-funded schools perceive to be working to help students in SS3 prepare for the mathematics SSCE standardized assessments?” Research Question 2 explicitly addressed what is working for students and teachers in preparing for standardized assessments. Interview Questions 3, 4, and 9 (see Appendix C) were designed to address research question 2. The overall beliefs of each teacher indicated, despite the challenges of testing, the intent is to apply best practices in the classroom effectively. Due to course length and rigor, teachers felt limited in organizing the course material to promote extended learning opportunities, remedial lessons, and additional learning opportunities which foster curiosity and hands-on learning experiences. Although challenging, senior secondary teachers were determined to support students' interests by providing an engaging classroom while adhering to state-mandated initiatives.

Participants described the curriculum as rigorous in the instruction, coursework, and learning expectations, and experiences which are academically, intellectually, and personally challenging. The rigor of the curriculum leads to pressure from administrators on teachers to deliver the expected curriculum in the time allotted, and the demand placed on students to master a cumulation of concepts learned in senior secondary in preparation for external tests can be overwhelming. Every participant identified ways in which pedagogical knowledge and past experiences influence teaching practices and methods of instruction. The basis of discovery learning theory is to use past experiences and knowledge to learn new truths. A relationship can be made between the participants' past experiences in preparing students for the mathematics SSCE standardized assessments and how new truths are used to inform current teaching practices to foster student learning. The participants had experience with preparing students for internal and external mathematics standardized assessments. All of the participants perceived internal and external standardized testing to be a benefit for students' monitoring and progress. Table 5 details participants' responses. The overall comments were quite favorable to the benefits of taking the mathematics SSCE standardized assessments. Comments also included issues related to the curriculum demands, limitations in scheduling, and the impact of testing and instructional practices.

Table 5. Participant Responses to the Question, Do You Perceive the Utilization of Internal and External Standardized Testing to Be of Benefit? Why or Why Not?

Participant	Participant response	Overall perception	
		Beneficial	Not beneficial
A	“Administration expects us to complete the curriculum; however, it is difficult to rush to complete the curriculum if students do not understand half the concepts. The test helps to know which concepts students have mastered and which require further teaching.”	X	

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- B “The tests help students know which areas they need to work to understand better. This is a rigorous scheme of work with many concepts to be taught before the end of SS3. There is a lot of pressure on both students and teachers.” X
- C “Internal and external testing benefits teachers and students. Teachers can see which areas students are struggling with, while students can also see their areas of weaknesses. The aim is to understand the concepts.” X
- D “It [assessment] makes the students realize their mistakes and also work harder.” X
- E “Well, it [assessment] does establish the comprehension or otherwise of lessons taught, via the attainment of lesson objectives, both formative and summative.” X
- F “In a way . . . when students are tested and you mark, you see the student weaknesses and reteach so students don't mistake.” X
- G “Not taking into consideration the varying level of candidates' cognitive capabilities. Tests are biased to measure only the cognitive domains of learning at the expense of other domains: affective and psychomotor.” X
- H “You can really know a student is following what you are teaching. The test is beneficial as you can see how much the student has learned what the test is testing, and to what degree, and it provides opportunities for reteaching concepts not learned.” X
- I “We have morning lessons before the school day and lessons during the school day. Students are also given assignments; they get a test every week which gives feedback to students and teachers, so the internal and external test benefit as it prepares students for exam.” X
- J “The school administrators' expectation is for teachers to give tests every week, and exams take place at the end of each term. We use the results to adjust teaching practices and for students' exam results to determine if a student gets promoted to the next class, so these tests are very important, especially the SSCE. Students use the results to get into higher [education] institutions, and passing mathematics is a requirement.” X
- K “Of course, both the test given in school and the SSCE is beneficial. We give mock SSCE; however, at times, students do not take the X

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test seriously and prefer to work on the actual test. This is not a good system for success on the test. All tests should be taken seriously by the students, and I try to encourage them to do their best.”

L	“Testing puts a lot of pressure on the student, but it is important for students to know where they are in learning so they know what to revise for examinations.”	X
M	“Taking internal and external tests is good for the students, it gives them practice for the bigger tests such as the SSCE. I always have students take practice from past questions and use the WAEC marking guide to grade students; this way they know how they performed.”	X
N	“It is important to have a good foundation in SS1 and SS2. Many of the concepts taught in SS1 and SS2 will come up again in SS3; this should be a review for students. Without a good foundation, both internal and external tests will be difficult for students. The tests help students prepare for the SSCE, which will be more challenging for those that do not have a solid foundation in mathematics.”	X
O	“We follow the unified scheme and give tests every week; if we do not give tests, we will not know where students are. The tests are used to determine which students are promoted.”	X

Research Question 3

Research Question 3 asked, “How do teachers describe the preparation materials used to prepare students in SS3 for the mathematics SSCE standardized assessments?” Interview Questions 6 and 7 (see Appendix C) and review of the mathematics SSCE preparation materials (see Table 3) were designed to address research question 3. Through asking the 15 participants about the perceived appropriateness of current curriculum materials in preparing students for proficiency on mathematics SSCE standardized assessments, participants' perceptions of the preparation materials used in preparing students for the mathematics SSCE standardized assessments varied from inadequate instructional materials to pressure from administrators to scheduling. The majority of the comments regarding curriculum materials indicated the curriculum is a good foundation for preparing students for the mathematics SSCE standardized assessments. Participants expressed a need for supplemental and additional resources.

Table 6. Participant Responses to the Question, Are the Current Mathematics Curriculum Materials Preparing Students for Internal and External Standardized Testing? Why or Why Not?

Participant	Participant response	Overall perception	
		Sufficient	Not sufficient
A	“I feel <i>New General Mathematics</i> is very good in preparing students for the SSCE. . . . Past questions are also good. I usually use the last three year past-question papers.”	X	
B	“I think the current curriculum is okay on the average.”		X

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C	“The school’s chosen textbook <i>New General Mathematics</i> , helps to get our students ready to learn the concepts for the current class; however, there is a need to use supplemental resources to ensure students master the majority of the concepts. For instance, I also use <i>Extended Mathematics</i> and <i>Hidden Facts</i> as part of my lessons in addition to SSCE past-question papers.”	X
D	“Current curriculum is not sufficient.”	X
E	“The current curriculum is fairly adequate in addressing the preparation of students for the exams.”	X
F	“The textbook is good, but I use <i>Extended Mathematics</i> and past questions to review. . . . The marking guide is also good so students know how the exam is scored.”	X
G	“The current curriculum is fairly adequate in addressing the preparation of students for the exams.”	X
H	“I think it [curriculum] is good. When I follow the units, I cover many of the topics students will see on the exam. . . . It is good.”	X
I	“There is pressure from admin to complete the scheme of work. . . . I find I have to rush through some of the units requiring more care to teach . . . skipping some units to get through the syllabus; this is not good . . . but overall, the textbook is good.”	X
J	“I feel the curriculum is good, . . . Some concepts take more than a week to teach effectively; however, the scheme of work only allows one week. . . . Students that need reteaching of concepts may suffer the consequences if they do not come for extra help.”	X
K	“Yes, it [curriculum] is a good foundation for students. Practicing with the past questions is very important as well.”	X
L	“It [curriculum] is good. I try to focus on the units students will need on the exams. . . . If you look at past questions, for example, questions on longitude and latitude always appear.”	X
N	“It [curriculum] is good. If students have a good understanding of the concepts in each unit, they will do well on the exam. . . . I feel, as a teacher, teaching the units effectively is key.”	X
O	“It [<i>New General Mathematics</i> textbook] is good. I also like to use <i>Hidden Facts</i> and <i>Extended Mathematics</i> . I feel students need a strong foundation. . . . One textbook is not enough for some of the units.”	X

DISCUSSION AND IMPLICATIONS

This study presented a starting point to address gaps in the literature. The study's significance is the provision of information concerning which elements were enabling and preparing senior secondary students for proficiency on the mathematics SSCE standardized assessments, which has been unavailable to senior secondary teachers. Zaram and Singh (2018) reported instruction focused on the application of learning outcomes impacts students' comprehension of concepts required for proficiency on standardized assessments. Many avenues of research existed in the field of SSCE standardized assessments in Nigeria; one which continues to be of great importance to researchers and teachers is the development of student proficiency on the mathematics SSCE standardized assessments. Research regarding student achievement and lack of achievement has garnered much attention, yet a clear set of effective teaching and learning strategies and best practices to aid in the improvement of student proficiency on the mathematics SSCE standardized assessments remains absent.

School administrators and senior secondary educators may benefit from research on teacher perceptions by the provision of an outline for increasing proficiency on standardized assessments. One suggestion by Syarifuddin (2017) was the use of discovery learning approaches which encourage students to use hands-on learning experiences and methods to achieve proficiency in the understanding of concepts. The literature suggests a need exists for further research on instructional approaches geared toward student proficiency on mathematics standardized assessments.

The methodology utilized was a qualitative descriptive case study using semistructured phone interviews with 15 senior secondary mathematics teachers and a review of the mathematics preparation materials. The major themes emerged naturally during data analysis. The first research question examined what teachers perceived to be challenges in preparing students in SS3 for proficiency on the mathematics SSCE standardized assessments. The theme which emerged for the first research question was learner influences; the internal and external factors influencing student achievements, such as student aptitude and student motivations, were key indicators of proficiency. In addition, subthemes for the first research question emerged indicating the importance of a supportive environment for student learning and family obligations impacting students' commitment to learning.

The second research question examined what teachers perceive to be working to help students in SS3 prepare for the mathematics SSCE standardized assessments. The theme which naturally emerged for the second research question was the high level of curriculum expectations on both teachers and learners. Furthermore, subthemes emerged indicating the importance of accessibility and applicability of course materials, pressures to complete the curriculum, and the need to provide students with ample opportunities for standardized test practice questions.

The third research question examined mathematics preparation materials utilized in preparing students in SS3 for proficiency on the mathematics standardized assessments. The theme which emerged for the third research question was the benefit of having a rigorous mathematics curriculum aligned with the SSCE scheme of work. Subthemes indicated the need for ample time to complete the curriculum effectively and adequate instructional resources to help facilitate teaching and learning.

Limitations

A number of limitations applied to this study: sample size, time constraints, and means of data collection. The number of participants and location were a limiting factor as only 15 mathematics teachers from an education district in one zone were selected to participate in the study. The sample excluded other teachers from other districts, zones, and subjects. Additionally, the means of data collection was limited to telephone interviews. Depending on various factors, face-to-face data collection could yield more data than telephone data collection.

Additional limitations not mentioned in Chapter 1 include not having behavioral observations relating to nonverbal cues to guide the interview process. In the absence of visual face-to-face interaction, the telephone interview may lead to lower rapport as participants may feel more reluctant to speak freely and openly with the interviewer, leading to shorter interviews (Farooq, 2015). The second limitation was in contacting prospective participants by telephone and e-mail. In addition, limitations were related to contacting participants given the low use of the Internet and e-mail. Internet connection subscriptions are expensive; as a result, income status impacts internet accessibility (Mossey, Bromberg, & Manoharan, 2018). Individuals with higher incomes are more likely to have regular access to the internet and e-mail than individuals with lower incomes. Income status is an indicator of how likely someone is to have access and use the internet or e-mail (Mossey et al., 2018).

Member checking was used to control limitations related to credibility and dependability. This qualitative descriptive case study investigated teacher perceptions on what is working and what is challenging in preparing students for proficiency on the mathematics SSCE standardized assessments. In addition, mathematics preparation materials used to prepare students for proficiency on the mathematics SSCE standardized assessments were examined. The results could be transferable to other teaching practices in Nigeria. Although participant selection was limited to 15 senior secondary mathematics teachers, this study's findings could be applicable in similar settings. The recommendations are focused on the outcomes of the three research questions. Recommendations for curriculum and instructional practices, instructional resources and learner influences emerged from this study.

Recommendations for Curriculum and Instruction Practices

SS3 student performance on the mathematics SSCE standardized assessments should increase nationwide (National Bureau of Statistics, 2019). The exploration of the qualities in SSS which are achieving high percentages of proficiency could benefit senior

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secondary teachers' practices. A systemic approach is required to conduct curriculum and instruction reviews and address issues in the preparation materials management and documentation. Participants perceived the preparation materials to be beneficial in preparing students for the mathematics SSCE standardized assessments. In addition, mathematics teachers expressed concerns in the ability to complete the required preparation materials in the scheme adequately with the given schedule.

1. The results of this study's data analysis indicated teachers are working outside the school schedule to complete curriculum requirements. More focus on teachers' involvement in curriculum initiatives and giving time for documenting the curriculum to improve student outcomes are required.
2. Further research should focus on curriculum mapping and indexing to identify and address academic gaps, redundancies, and misalignments for the purpose of improving the overall coherence of the senior secondary courses and, by extension, its effectiveness.
3. Evaluating courses for alignment to address the changing needs of students and the workforce is required. A curriculum and instruction review can be used to identify these issues.
4. The scheme of work and school schedule should be modified to ensure teachers have ample time to teach the required topics effectively.
5. Educators seeking to research, develop, and implement curriculum changes which increase student achievement can be viewed as advantageous for the student population. Identifying the curriculum and instructional demands will aid in teacher training programs and professional development in course mapping and instruction delivery for current and future teachers, which potentially creates a learning environment focused on how students learn and the best ways to educate.
6. Consideration must be balanced between current investigative needs, developing trends, and providing professional development opportunities for teachers who work to prepare students for proficiency on standardized assessments.
7. In-service and preservice training support for teachers to acquire the needed knowledge, competencies, and attitudes should be explored further.

RECOMMENDATIONS FOR INSTRUCTIONAL RESOURCES

Participants in this study identified concerns with accessing instructional and supplemental resources for both teachers and students. Participants indicated some students lack the financial resources to purchase the required text, let alone supplemental materials.

1. Policymakers should reference research-based best practices before determining the required resources for students.
2. An investigation into resources which promote teachers applying hands-on materials instead of working through pages in the textbook will help to create a positive learning environment for growth and learning for both teachers and students.
3. School administrators should evaluate the validity of providing teachers with tangible resources and goals which stimulate creativity and enable self-reflection on best teaching practices.
4. Training programs which enable teachers to become aware of the benefits of using instructional materials to foster student understanding of course content should be investigated.
5. Emphasis should be placed on the use of instructional materials by teachers to foster and enhance student engagement and learning.
6. Policymakers should liaison with government and nongovernment agencies to acquire appropriate instructional materials for effective teaching and learning in secondary schools.

RECOMMENDATIONS FOR LEARNING INFLUENCES

Participants identified internal and external influences which impact student performance on standardized assessments. Factors influencing student learning included student motivation, competencies, and instructional environment. The learning environment affects students' and teachers' abilities. The principal investigator has personal knowledge of the learning environment of state-funded schools which has significant effects on students' and teachers' well-being; large class size and poor-quality lighting and ventilation harm student achievement and health.

1. Policymakers should investigate methods which provide developmentally appropriate learning environments for successful learning.
2. Exploring changes in the learning environment which would foster student achievement, such as reduced class size, will make learning more favorable. Participants identified home obligations and financial constraints as predictors of student motivation.
3. More focus on discovery learning approaches may encourage motivation, active involvement, and creativity in students, which promote autonomy and independence, which influences student learning and achievement (Byoung-Gi, 2019).
4. Based on the findings, professional development for teachers which fosters inquiry-based instruction to enhance the learning environment for students and allows for the assimilation of concepts taught is recommended.
5. Future consideration to school funding, which could provide free educational resources such as textbooks, is recommended.

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6. A system in which students can borrow textbooks yearly from the school to ease financial constraints on students and families will provide students with the needed resources to focus on learning.
7. Participants identified absences among students as a challenge in preparing students for standardized assessments. This study's data analysis indicated a need for administrators and educators to develop and implement a scoring rubric to monitor attendance and work to curb absenteeism and lateness among students, using data to determine when to intervene and catch at-risk students.
8. Furthermore, this study's data analysis indicated the need to provide instructional time for students requiring remedial support to master concepts taught (Table 5). These needs could be met by creating time every week for remediation classes, such as Response to Intervention or a multi-tiered system of supports model, which would free up the teachers to have more time to assist students in core subjects.

RECOMMENDATIONS FOR FUTURE RESEARCH

1. Recommendations for future research at other senior secondary schools throughout the country with other SSCE subject areas would be beneficial in gaining further insights into the phenomenon.
2. This study's results indicated a need to conduct further research in curriculum-related data focusing on core skills and content taught, forms used, and assessments utilized for each grade and subject area. To gather more information from a larger sample size, future research using a quantitative or mixed-methods approach is recommended, for instance, examining the social characteristics of high-performing students and underperforming students in state-funded schools versus private schools.
3. Future research using qualitative methods should still be considered as qualitative data have advantages, such as an in-depth understanding of a phenomenon (Creswell, 2015).
4. In addition, future research should focus on teaching methods and pedagogy and teacher training programs, with a focus on best practices for delivering effective instruction based on the curriculum and learning standards.
5. Future research should focus on examining grade-level mathematics standards and benchmarks which allow teachers to instruct students toward proficiency on mathematics standards per grade level.
6. Furthermore, the theoretical premise of this research could apply to curriculum review and teacher professional development programs. Future researchers should target these areas while considering the findings of this study.
7. This study focused on teachers' perspectives; further studies on the perspectives of principals on the same topic could be beneficial. The focus of the research should be on qualities which enable and prepare students for proficiency on standardized assessments. To ensure instructional designs provide best practices in teaching, regular curriculum and instruction reviews should be scheduled, particularly in senior secondary courses.

IMPLICATIONS FOR LEADERSHIP

The qualitative descriptive case study explored teachers' perspectives on what is challenging, what is working, and a description of preparation materials used in preparing students for proficiency on the mathematics SSCE standardized assessment, with the intention to support student achievement on mathematics standardized assessment.

1. Data collected through the case study indicated curriculum-related constraints and limited instructional materials impact teaching practices and student motivation. Constructivist leadership approaches have a direct impact on teacher and student performance.
2. Teachers who willingly take steps to improve classroom practice to facilitate student learning have job satisfaction, commitment to professional growth, and student achievement.
3. Constructivist leadership perspectives can be applied to professional development training for teachers to advocate for change in instructional practices to align with the nature of knowledge acquisition.
4. The value of the study lies in the identification of additional research into the methods by which school leaders could utilize professional development in curriculum implementation and instruction practices to support teachers and student learning.
5. Educational leaders could use the data from the study to provide professional development opportunities and training programs for current and new teachers. Implications of the study include the necessity for educational leaders to improve teaching and learning through the influence of staff motivation and working conditions. Highly skilled teachers who can deliver effective instruction to students are needed.
6. Professional development which allows teachers to cultivate constructivist leadership skills to ensure teachers see roles as leaders, derive meaning from work, and assess professional growth is needed.
7. Future investigation techniques used in developing the senior secondary schedule to make improvements in curriculum implementation is necessary to ensure adequate instructional time is allotted to essential learning outcomes and core skills.
8. This study could benefit school administrators in the improvement of programmatic practices while striving to implement research-based best practices in schools.

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9. Consideration should be given to a system for providing instructional resources such as the required textbooks to students through the school library. Furthermore, the theoretical premise of this research could apply to teachers and teaching practitioners.
10. A limited amount of research has explored the factors which enable senior secondary students in state-funded schools to achieve proficiency on standardized assessments (Awofala, 2017; W. Ibrahim, Umar, & Clement, 2017).
11. This study's findings provide an outline for SSS educational leaders. The examination of teacher perceptions and preparation materials qualities serves to expand knowledge in student proficiency on standardized assessments.
12. The expansion of knowledge surrounds the provision of curriculum and instruction practices and instructional resources necessary to prepare SS3 students in state-funded schools for proficiency on the SSCE standardized assessments and successful admission into higher education institutions.

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LAGOS STATE GOVERNMENT

19th September, 2019.

The Principal,

1. Opebi Senior Grammar School.
2. Oregun Senior Grammar School.
3. Army Cantonment Senior Sec. School.
4. Army Children Senior High School.
5. Community Senior High School Wasimi.
6. State Senior High School Ikeja.
7. Ikeja Senior High School.
8. Ikeja Senior Grammar School.

ACADEMIC RESEACH ON MATHEMATICS TEACHERS

I am directed to introduce to you an Ed. D researcher (Ph.D. equivalent) Miss **Omofolarin Ashiru** of American College of Education whose study requires administration of Questionnaire and to be complemented with an oral interview with respondents in selected schools.

Kindly give her the necessary assistance to achieve the desired goal.

Thank you.

Farinloye, A.O. (Mr.)

For: Tutor General /Permanent Secretary

EDUCATION DISTRICT VI

IKEJA, MUSHIN & OSHODI L.G.A.s

PROVIDING THE CITIZENS WITH GOOD QUALITY EDUCATION IN PARTNERSHIP WITH COMPETENT TEACHERS IN A CONDUCTIVE TEACHING AND LEARNING ENVIRONMENT

Old Ideal Nursery/Primary School Complex, Apapa-Oshodi Expressway, Emerica B/Stop, Oshodi, Lagos, Nigeria.
Tel: 08150291250. E-mail: educationdistrict6@gmail.com

Teachers' Perspectives on Students' Proficiency on Standardized Assessments: A Qualitative Case Study

Appendix B: Site Permission Letter

The Tutor General/Permanent Secretary Education District
C/O Ideal Nursery & Primary School

Dear Sir:

My name is Folarin Ashiru and I am a doctoral candidate at American College of Education (ACE) writing to request permission to interview teachers at Education District, Lagos. This information will be used for my dissertation research related to Teachers' Perspectives on Students' Proficiency on mathematics SSCE Standardized Assessments. The purpose of the Qualitative Case Study is to understanding beliefs and perceptions of teachers regarding students' proficiency on the Mathematics Senior Secondary School Certification Examination (SSCE).

The number of participants required for this qualitative study is fifteen Mathematics teachers. Interviews will be conducted at an agreed time by your establishment. To begin I would like an official letter from your granting me permission to conduct the research/interview at your school.

Important Contacts for this study are as follows:

Principal Investigator: Folarin Ashiru

E-mail: [REDACTED]

Phone: [REDACTED]

Dissertation Chair: Dr. Rita Deyoe-Chiullan

E-mail: [REDACTED]

Phone: [REDACTED]

Thank you for your attention to this issue and prompt response. I appreciate your time and consideration of my request.

Regards,

Folarin Ashiru

Appendix C: Informed Consent

PLEASE KEEP THIS INFORMED CONSENT FORM FOR YOUR RECORDS.

Good morning/afternoon (**Name**), my name is **Folarin Ashiru**. I am a doctoral student at American College of Education. I am conducting research for my dissertation, and you have been identified as a possible participant for my study. Do you have a moment to discuss this study over the phone?

No: Thank you for your time. I will send you some material regarding the study within a week, and please feel free to contact me at [REDACTED]

Yes: Great! The purpose of the research study will assist with understanding beliefs and perceptions of teachers regarding students' proficiency on the mathematics Senior Secondary School Certification Examination (SSCE). This qualitative study will examine teachers' perspectives and preparation materials to determine why students in SS3 are not proficient on the Mathematics SSCE. Through the investigation of teacher practices and instructional materials, contextual conditions within your school may provide support to state-funded schools on why students are not proficient on standardized assessments and effective educational supports for preparing students for standardized assessments. As I have mentioned, you have been identified as a possible participant for this study. Participation involves an interview that may last up to two hours, and your participation in the study is voluntary. If you do not wish to participate in the study, you may withdraw at any time.

I may publish the results of this study; however, I will not use your name or share any information you provided. Your information will remain confidential. Do you have any questions for me so far?

Yes: (Answer any questions)

While there may be no direct benefit to you, the potential benefit of your participation is that it will offer a greater understanding about teachers' perspectives and documents to determine why SS3 students are not proficient on the Mathematics SSCE. In this

Teachers' Perspectives on Students' Proficiency on Standardized Assessments: A Qualitative Case Study

research study, there are no known risks to you. How does this sound? **(Answer any further questions, set up time for the interview, and explain the process for Informed Consent)**

Thank you for your time, **(Name)**. I greatly appreciate that you have taken the time to discuss this with me over the phone. **(Offer contact information)**

Appendix D: Interview Questions

1. Do you perceive the utilization of standardized testing to be of benefit? Why or why not?
2. What are the perceived weaknesses, assuming any, in the use of internal and external standardized testing?
3. Do you perceive the use of internal and external standardized testing improves your classroom practice? Why or why not?
4. Do you perceive the use of internal and external standardized testing creates an opportunity for discussion about teaching practices? Why or why not?
5. Do you think your students are developmentally ready for formal and informal student testing in your current grade level? Why or why not?
6. Are the current curriculum materials appropriate for the instruction of your students? Why or why not?
7. Are the current mathematics curriculum materials preparing students for internal and external standardized testing? Why or why not?
8. Is your teaching philosophy of how children learn consistent with testing of students?
9. What do you see as your most important task(s) and responsibilities as a teaching professional?
10. Would you like to add any additional information that you feel may be relevant to this study?

Appendix E: Subject Matter Expert Contact

★ Folarin Ashiru

August 30, 2019 at 3:02 PM

Evaluating interview questions

Hide



To: fashiru29@gmail.com,

Bcc: nneyasi@gmail.com, Olaitan Komolafe, Annemarie Hodge, Angel Catholic, Dia Dadlani,

Reply-To: Folarin Ashiru

Re: Teachers' Perspectives on Students' Proficiency on Standardized Assessment: A Qualitative Case Study

As per our discussion, this letter is to inform you that I am seeking validation on a research instrument, which will be used to collect data regarding a future study involving secondary school teacher perspectives on standardized assessments. The instrument is a list of semi-structured interview questions for face-to-face interviews.

Please review the instrument, by evaluating the questions and provide feedback for me. I would appreciate your suggestions regarding questions which require changes or modification for improvement to this instrument. The instrument is attached.

Your feedback will be appreciated.

Warmest regards,
Folarin Ashiru



Appendix
B.docx

Teachers' Perspectives on Students' Proficiency on Standardized Assessments: A Qualitative Case Study

Appendix F: Subject Matter Expert Responses

Annemarie Hodge

September 6, 2019 at 7:06 AM

AH

Re: Evaluating interview questions

To: Folarin Ejiwunmi

Hi Folarin,

Happy Friday! Sorry for the late response. I woke up this morning and remembered I hadn't got back to you. The questions look great to me. Will you be interviewing in person so you can clarify if the participants have any questions?

Chat later,

Annemarie

On Fri, Aug 30, 2019 at 3:02 PM Folarin Ashiru <fashiru@aislagos.org> wrote:

Re: Teachers' Perspectives on Students' Proficiency on Standardized Assessment: A Qualitative Case Study

As per our discussion, this letter is to inform you that I am seeking validation on a research instrument, which will be used to collect data

[See More](#)

All information and attachments included in this email are confidential and intended for the original recipient only. You must not share any part of this message with any third party. If you have received this message by mistake, please let us know immediately, so that we can make sure such a mistake does not happen again and delete this message from your system.

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Angel Catholic

September 2, 2019 at 1:36 PM

AC

Re: Evaluating interview questions

To: Folarin Ashiru

Hi Folarin,

I think your questions are great. I was just having a conversation the other day and someone asked if it is beneficial for students to set their goal for the following year based on their test results. Will they refer back to it? Does it inspire them to work harder or just focus on trying to get a higher score?

That may be a question you could ask.

Great job! Brilliant Lady!

Angel Catholic MAE/ITED-S
Instructor in IBDP Visual Art, Art 1, and Art 2
American International School of Lagos

"There are only two types of people in the world: artists, and subject matter." - Robert D'Arista

On Fri, Aug 30, 2019 at 3:02 PM Folarin Ashiru <fashiru@aislagos.org> wrote:

Re: Teachers' Perspectives on Students' Proficiency on Standardized Assessment: A Qualitative Case Study

As per our discussion, this letter is to inform you that I am seeking validation on a research instrument, which will be used to collect data

[See More](#)

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Appendix G: Questionnaire

Background/Demographic Information

1. What is your gender?

- Female
- Male

2. How old are you?

- under 25

Teachers' Perspectives on Students' Proficiency on Standardized Assessments: A Qualitative Case Study

- 25-29
 - 30-39
 - 40-49
 - 50-59
 - 60+
3. What is your employment status as a teacher?
- Full-time
 - Part-time
 - Other: _____
4. What is the highest-level of formal education that you have completed?
- HND Degrees
 - Bachelor's Degree
 - Master's Degree
 - Doctorate Degree
 - Other: _____
5. How long have you been working as a teacher?
- This is my first year
 - 1-2 years
 - 3-5 years
 - 6-10 years
 - 11-15 years
 - 16-20 years
 - More than 20 years
6. How long have you been working as a mathematics teacher?
- This is my first year
 - 1-2 years
 - 3-5 years
 - 6-10 years
 - 11-15 years
 - 16-20 years
 - More than 20 years
7. Do your students take practice tests before the "official" standardized test (i.e SSCE.WAEC)?
- Yes
 - No
 - Maybe

Appendix H: Preparation Materials Checklist

Items to verify	Check	
	Mathematics Curriculum	Mathematics Scheme of Work
Topics to be mastered per grade level		
Essential elements in preparation materials		
Identify missing elements/topics in preparation materials		
Identify concepts to be mastered		
Review time frame and curriculum maps		
Identify commonalities in topics		

Teachers' Perspectives on Students' Proficiency on Standardized Assessments: A Qualitative Case Study

Appendix I: Invitation to Experts

Re: Teachers' Perspectives on Students' Proficiency on Standardized Assessments: A Qualitative Case Study

This letter is to inform you that I am seeking validation on a research instrument, which will be used to collect data regarding a future study involving secondary school teacher perspectives. The instrument is a list of semi-structured interview questions for phone interviews.

Please review the instrument, by evaluating the questions and provide feedback for me. I would appreciate your suggestions regarding questions which require changes or modification for improvement to this instrument. The instrument is attached.

Your feedback will be greatly appreciated.

Warmest regards,

Folarin Ashiru