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Research Article

Needs Analysis about Female Students' Interest and Anxiety for the Development of the Science Module

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Abstract
Science is still the best way for a country to advance technologically in the modern world, and women have been engaged in scientific endeavors for decades. Therefore, it has been widely acknowledged that enhancing science education and providing female children with job opportunities is essential for national growth. However, gender inequality against female students in science classes has been acknowledged in Nigeria. This issue is caused by parental views, religious beliefs, cultural influences, and female students' lack of interest and anxiety in science classes, which has led to a decline in the number of girls enrolled in secondary schools in Nigeria. Therefore, this study investigated the problems in science curricula and textbooks as well as the reasons for female students' lack of interest in and worry about learning science. A checklist of questions about interest in and worry about learning science was used to examine the scientific curricula and texts. Focus groups with particular SS II female students were also held utilizing the interview methodology. The results showed that problems with the Nigerian scientific textbooks and curriculum contribute to the uninteresting nature of science instruction. However, the focus group interview results show that female students face obstacles that make them less enthusiastic and nervous about studying science in secondary school. This led to the determination that a teaching module incorporating factors related to interest and anxiety in science learning was necessary.

Keywords: Science, Science Curriculum, Science Text Books, Female Students

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1. INTRODUCTION

Science curriculum and textbooks have been restructured as a dynamic, intellectual, and societal endeavor that includes more than a course, content, subject, and learning experiences to meet society's educational goals (Akudolu, 2012; Oluniyi & Olajumoke, 2013). This is because it covers the organization, carrying out, and evaluation of the educational opportunities offered to pupils by schools. The Senior Secondary Science, Senior Secondary Technology, Senior Secondary Humanities, and Senior Secondary Business Studies are the four academic areas that make up Nigeria's new senior secondary school curriculum framework from 2007. These five cross-cutting core disciplines are required of all students (Awofala & Awolola, 2011; Awofala & Sopekan, 2013).

However, the complete curriculum of study created for Nigerian schools includes performance targets that guide teachers and place a focus on relevant and consistent content that students may absorb as learning opportunities (Ezeudu et al., 2013). Awofala and Sopekan (2013) made the claim. Similarly, studies found that Nigerian science secondary school curricula require pupils to learn a body of scientific information to function beyond the level of basic education (Adikwu, 2008; Ezeudu et al., 2013). Regrettably, the curriculum exhibits gender bias due to its reflection on male concerns; science-related occupations are portrayed in the curriculum as being masculine (Okeke, 2007).

Despite this, the 2007 science curriculum takes into account emerging themes including value orientation, peace and communication, and entrepreneurial abilities, as well as problem-solving, critical and creative reasoning, and quality metrics. However, things are different in Nigeria, where academics have discovered that the country's secondary school curriculum is riddled with errors and out-of-date in both its content and delivery. In particular, the science curriculum has been found to have little bearing on society's needs and the general need for education (Adeyegbe, 2004; Adikwu, 2008; Awofala & Sopekan, 2013). These results make it abundantly evident that methods for resolving the problems of errors and the gap between the science curriculum and society's needs must be developed immediately. Creating, putting into practice, and testing a science education module that includes topics like history, health, culture, and religion is one way to accomplish this. If the module's contents are determined to be effective, they may be added to the science curriculum.

According to Sani and Gombak (2013), the Nigerian government ought to reconsider its curriculum, as it is only meaningful if it captures the culture, values, aspirations, and contemporary issues facing the populace. Furthermore, (1983) emphasized the need for the Nigerian science school curriculum to be developed going forward, as some of its contents are not relevant to the intended story's general education and cannot yet be covered within the allotted time frame (Adeyegbe, 2004). This is especially true for female students (Ekine, 2013; Nwachukwu, 2012). As a result, several students were forced to take a science class. As a result, learning is typically done by memorization, and most students, especially female students, find science to be uninteresting (Abbagana, 2013; Egun & Tibi, 2010; Ekine, 2013; Nwachukwu, 2012).

But in today's world, science continues to be the finest means for any country to advance technologically, especially when it is taught to students in a way that increases their interest and lowers their worry (Potvin & Hasni, 2014). This depends on how well science education is provided, as scientists' futures depend on it (Rauf et al., 2013). Science education aims to provide a comprehensive understanding of the natural world and how it impacts people's social and personal lives (DeBacker & Nelson, 2000; Knorr-Cetina, 1981; Latour, 1987; Mendelsohn, 1977; Rauf et al., 2013; Smiley, 2011). Globally, there is widespread recognition of the importance of female students' education and the gender gap that prevents them from pursuing science degrees (Salinger, 2005; UNDP, 2001). To ensure that everyone has the chance to acquire new skills and make a respectable life, education and training must be widely available (Aguele & Agwagah, 2007; Akpan, 2010; Ekine, 2013; Salinger, 2005; UNDP, 2001). Throughout history, women have been observed engaging in scientific endeavors for centuries (UNESCO, 1999).

However, it has been recognized that increasing female children's access to science education and career opportunities is essential for national development on a global scale (Egun & Tibi, 2010; Ekine, 2013; Nwachukwu, 2012; Obomanu & Akporehwe, 2012; Tyler-Wood et al., 2012; UNESCO, 1999). In Nigeria, science education is extremely important for female students (Abbagana, 2013; Egun & Tibi, 2010; Ekine, 2013). However, it has been acknowledged that there is a gender gap in science education that affects female students. This imbalance can be attributed to several factors, including parental views, religious convictions, cultural influences, and female students' lack of interest and fear of the subject. Which has resulted in a decline in girls' enrollment in secondary schools in Nigeria as well as a lack of interest among girls in science and math subjects (Achor et al., 2010; Baram-Tsabari & Kaadni, 2009; Egun & Tibi, 2010; Ejiwale, 2013; Ekine, 2013; Etukudo, 2002; Jahun & Momoh, 2001; Leaper et al., 2012; Miller, 1993; Miller et al., 2006; Nnaka & Anaekwe, 2006; Nwosu et al., 2014; Ogunjuyigbe & Fadeyi, 2002; Skamp & Logan, 2005; Yang & Tsai, 2008).

This is because society has indoctrinated them into thinking they are not talented in science (Ker et al., 2010). Even though women around the world have more favorable opinions on and interest in studying science and technology than men do (Christensen et al., 2014; Heaverlo, 2011). Nevertheless, studies in southwest Nigeria revealed a link between female worry and subpar academic performance, with 71% of female students reporting difficulties in scientific classes and only 29% reporting no difficulties at all. Regarding parental support, the majority of female students (90%) reported receiving no support from their parents, and only a small percentage (10%) said that their parents helped them learn science (Olatunde, 2009; WASSE, 2013). In addition, 75% of female students reported receiving no support from society, while only 25% reported receiving support for learning science. Furthermore, some parents expressed a strong dislike for having a female child in the family (Abbagana, 2013; Akinbi & Akinbi, 2015; Uyanga, 1995).

Consequently, they become fearful and uninterested in science education (Olatunde, 2009; Muhammed Hudu, 2014; Oludipe & Awokoya, 2010). This, in the northern region of Nigeria, where girls' education ends in the kitchen, causing them to do subpar work at the end of their studies (Akinbi & Akinbi, 2015; Akinsowon & Osisanwo, 2014; Alaba & Adekomi, 2012; Aremu, 2014; Dalhatu, 2013; Egun & Tibi, 2010; Okenini, 2009). Therefore, more female students, scientists, and technologists in positions of decision-making are needed in Nigeria (Odunaike et al., 2013). This will allow them to direct technological research and advance policies that benefit female species (Odunaike et al., 2013; Okenini, 2009), ensuring that men and women have equal access to education (Erinosho, 1997; Odunaike et al., 2013). Because many of them may drop out in the future, especially in Nigeria, if these issues are not resolved (Nwosu et al., 2014).

Based on this, the Nigerian government and all relevant parties were urged to act quickly to increase the number of female scientists by ensuring that girls have the same opportunities and awareness as boys to attend school and pursue scientific degrees (Akinbi & Akinbi, 2015; Aremu, 2014; Barman & Shedd, 1992; Dalhatu, 2013; Ekine, 2013; Odunaike et al., 2013; Okenini, 2009; Zakka & Zanzali, 2015). In Nigeria, in particular, it has been determined that this problem is particularly pressing (Abbagana, 2013; Dalhatu, 2013; Egun & Tibi, 2010; Muhammad, 2011). To do this, science instruction must be improved by offering practical mechanisms that will increase female students' interest in the subject and raise awareness among parents and the general public about the value of science education for women.

This will help parents enroll more of their daughters in science programs, especially in the northern region of Nigeria, where the situation is particularly dire (Aina, 2013; Akinsowon & Osisanwo, 2014; Egun & Tibi, 2010; Nwachukwu, 2012; Okenini, 2009; Umo & Ekong, 2014). To do this, science instruction must be improved by offering practical mechanisms that will increase female students' interest in the subject and raise awareness among parents and the general public about the value of science education for women. This will help parents enroll more of their daughters in science programs, especially in the northern region of Nigeria, where the situation is particularly dire (Aina, 2013; Akinsowon & Osisanwo, 2014; Egun & Tibi, 2010; Nwachukwu, 2012; Okenini, 2009; Umo & Ekong, 2014). Therefore, this study aims to investigate the existing problems with Nigerian science textbooks and curricula, as well as the interest and anxiety levels of female students in science learning. Lastly, the necessity of the intervention would be mentioned.

2. METHODS

2.1. Research Design

This study employed a qualitative research approach to explore interest and anxiety in science education among Nigerian SS II secondary school students. Both document analysis and focus group interviews were used as primary methods of data collection to gain in-depth insights into students' perceptions and experiences.

2.2. Documents Analysis

The documents analyzed included the Nigerian science curriculum and textbooks obtained from the Ministry of Education. These documents were selected because they serve as the core instructional materials and policy references guiding science teaching at the secondary school level. To facilitate a focused analysis, the researcher collaborated with three science teachers who are experienced educators, and together they developed a checklist based on students' interest and anxiety issues. This checklist was used to evaluate the relevance, content, and presentation of the curriculum and textbooks in relation to students' motivational and emotional challenges. The analysis involved tracing specific issues through the checklist using reference numbers, enabling systematic identification of content gaps and potential areas contributing to interest or anxiety.

2.3. Participants

The participants consisted of 40 SS II Nigerian secondary school students, selected through purposive sampling to include students from diverse backgrounds within the targeted schools. The

demographic profile included students aged 16–18 years, with a balanced representation of gender, to explore potential gender-related differences in interest and anxiety regarding science. Inclusion criteria required students to have completed at least one year of science classes, while exclusion criteria ruled out students with known learning disabilities or external stressors that could bias their responses.

2.4. Data Collection Procedures

2.4.1. Document Analysis

The researcher, in collaboration with the teachers, examined the curriculum and textbooks through a structured approach, utilizing the developed checklist to identify relevant content related to students' interests and anxiety. This process helped uncover content areas that could influence students' emotional responses to science learning.

2.4.2. Focus Group Interviews

A total of four focus group sessions were conducted, each lasting approximately 45–60 minutes. Participants were scheduled for multiple interviews to ensure rich data collection and comfort. The interviews were semi-structured, guided by open-ended questions exploring students' attitudes toward science, sources of anxiety, and suggestions for improvement. The key topics discussed included perceptions of science difficulty, interest triggers, anxiety symptoms, and motivational factors. The interviews were audio-recorded with participant consent, and the researcher also took observational notes during each session.

2.5. Data Analysis

The analysis was divided into two stages. First, the document data were analyzed by tracking issues identified in the checklist, linking them to specific curriculum and textbook content with reference numbers. This facilitated systematic identification of content issues linked to interest and anxiety. Second, the qualitative data from transcripts and observational notes underwent thematic analysis. The researcher familiarized themselves with the data, then coded responses manually to identify recurrent patterns and themes related to interest and anxiety. These codes were further organized into broader subthemes and overarching themes (e.g., sources of anxiety, interest factors). Triangulation was achieved by cross-referencing interview data with observational notes, enhancing credibility and validity.

3. RESULTS AND DISCUSSION

The results are broken down into two sections: an examination of the science curricula and textbooks in Nigeria and focus group interviews with female students.

3.1. Part 1 SS II Nigerian Science Curriculum and Text Books

The document analysis about interest and anxiety makes up the second half of the needs analysis. The curriculum and textbooks for science in Nigeria were initially acquired from the Female Education Board, a parastatal organization under the Ministry of Education. The curriculum for SS II students, which includes biology, chemistry, and physics, was examined. Additionally, the objective of this stage was to examine the SS II students' textbooks and science curricula (Physics, Chemistry, and Biology). To select and decide on the courses, associated exercises, and regional resources to be used in the creation of the FSSEMIA regarding interest and anxiety. Additionally, to identify the problems that prevent female students from becoming more interested in and less anxious about learning science, based on the needs analysis findings. The researcher traced the elements of the current curriculum and assessed the necessity of developing a science education module (FSSEMIA) with the help of an analysis of the Nigerian SS II science curriculum framework and textbooks. The analysis's specifics are explained.

3.2. Issues in the Nigerian Science Curriculum and Textbooks

Based on the researcher's and two seasoned science teachers' interpretations of the documents. The problems with the SS II science curriculum and textbooks in Nigeria are that they don't include things like role-playing exercises, a female teacher role model, connections between the lessons and religious and cultural events, or the use of local resources in place of laboratory equipment for instruction. In the area where this research was done, both male and female secondary school pupils are taught using the Nigerian curriculum, which is the subject of the analysis. According to the reviewed literature, if female students are familiar with the activities and examples linked to the concepts being taught, and if the teacher who teaches these concepts is a female teacher, then interest can be increased and anxiety can be reduced. For example, science education researchers have discovered that children's interest can be piqued and their anxiety reduced by engaging in science activities and receiving high-quality instruction that incorporates scientific concepts found in their everyday surroundings (Barton, 2007; Fusco, 2001; Macdonald, 2014; Oloruntegbe et al., 2010).

Table 1 displays the subjects, activities, number of pages, and synopsis of the textbooks, and also shows the curriculum's contents and the components that the researcher and three science teachers decided upon.

Table 1. Analysed SS II Nigerian Science Textbooks

S/N	Title of the Textbook	Total Number of Pages	Total Number of Chapters	Total Number of Topics	Total Number of Sub-Topics	Total Number of Activities
1	Modern Biology for Senior Secondary Schools (Third Edition) Ramalingam, S.T. (2006). AFP African First Publisher Limited.	566	25	25	66	117
2	New School Chemistry for Senior Secondary School (Third Edition) Abiabio, O.Y. (2006), AFP African First Publisher Limited.	608	32	32	166	89
3	New School Physics for Senior Secondary Schools. Anyakoha, M.W. (2000). AFP African First Publisher Limited	505	37	37	197	58

Table 1 above indicates a checklist comprising ten items about interest, anxiety, and parents was employed to analyze the curriculum and texts. The preparation of the items was based on the students' responses regarding their level of interest and worry. It was determined that the material in Nigerian scientific textbooks did not accurately represent the values and customs of the country's citizens, nor did they include any information that would encourage or calm the fears of female scientists studying science. Supporting these conclusions, Egu and Tibi (2010) and Aikenhead and Jegede (2006) discovered that because of underlying conflicts between the advancement of Western science and their indigenous cultures, science was imported into Nigerian secondary schools when it was first established. Following their examination of the textbooks, the researcher and two science instructors examined the Nigerian SS II science curriculum, taking into account the curriculum's title, goals, and structure as shown in Table 2.

The Nigerian science and curriculum's organizational contents are displayed in Table 2 above; therefore, the results of the document analysis also showed that there are problems with the science curriculum in Nigeria. These problems are: 1. the absence of some components (female teacher role models, historical accounts of outstanding women scientists, historical accounts of women around prophets, culture, religion, and health), 2. Discrimination against women in the classroom 3. Absence of role-playing exercises 4. Absence of local resources in place of those that are accessible. 5. The community's lessons and activities are not designed or planned with cultural, health, or religious activities in mind. This is consistent with the research since it has been shown that factors like cultural pressure, societal pressure, and views and attitudes regarding girls and women in science can increase the interest and concern that female students have when learning science (Clegg, 2006). Lastly, seven distinct activities with their related

topics, the local materials, and the questions were submitted to a group of experts in the field of science education for their feedback, based on the findings of the needs analysis and evidence from literature related to interest and anxiety. The activities in these lessons have been completed, and the next phase of FSSEMIA development is design.

Table 1. Nigerian Science Secondary Curriculum Framework

Title of the Curriculum	Federal Ministry of Education Senior Secondary School Education Curriculum (2009) for SS 1 to 6. Published by the Nigerian Educational Research and Development Council (NERDC)
Objectives of the Curriculum	1. Adequate Laboratories and field skills in science Subjects 2. Meaningful and relevant knowledge of science subjects 3. Ability to apply scientific knowledge to everyday life 4. Reasonable and functional scientific attitude
Curriculum Framework	1. Theme 2. Topic 3. Performance objectives 4. Contents 5. Activities (a)Teachers' activities (b) Students' activities 6. Teaching materials 7. Evaluation guide

Source: Ministry of Science and Technical Education, Gusau, Zamfara, Nigeria

3.3. Part Two: Focus Group Interviews

Audio and video recordings of the focus group interviews with 10 chosen female students were made, and the collected data were subjected to qualitative analysis. The results are arranged under the five themes that surfaced.

3.3.1. Students' Interest

The data that was coded and transcribed served as the basis for this subject. In response, the pupils said that because the courses had little to do with their everyday lives or religious beliefs, they didn't enjoy learning. Furthermore, they don't regularly do practicals, and their method of instruction is discouraging. For example, when questioned about their emotions while studying science.

As shown below, every student said they disliked studying science and were dissatisfied with the instruction.

Researcher: How do you feel during science lessons?

Kausar: *I don't like learning science.*

Researcher: Why don't you like learning science lessons?

Kausar: *Because the lessons are not linked to our religion and culture.*

Nusiwat: *Because our parents are encouraging and supporting us to learn science at home*

Balaraba: *The introduction of the lessons is not related to our daily life and religion.*

Saat: *I want to get married after my secondary school*

Saudat: *We don't have enough laboratory equipment, and we don't do practical lessons frequently.*

(G.G.D.S.S. Shinkafi Classroom, Interview, 10:00 am, 14 February 2017)

Nafi provided evidence for this by pointing out that when Nusiwat and Saudat stood up to respond to certain queries, they did not smile or laugh. As a result, Rumasa sat with their heads on the table for the entire interview. Zuwair didn't smile and appeared upset as well. When asked if they enjoyed studying science, the responses indicated that female students had no interest in the subject because the lessons and practicals had nothing to do with their religion or cultural practices, like washing their hands and fetching water for their homes, and the teacher was a man. This is supported by earlier research, which found that

female students are disinterested in science education due to a variety of factors, including gender roles in society, the difficulty of science concepts, the scarcity of science practicals, inadequate teaching strategies, and unfavorable learning environments (Davis-Kean, 2005; Jacobs et al., 2002; Skamp & Logan, 2005; Yang, 2010).

3.3.2. Students' Anxiety

Under this theme, students answered questions regarding how they felt about anxiety during science classes. The majority of students said that they didn't enjoy learning science since they felt anxious during the classes. For example, when questioned about how they were feeling during the lessons, the students said that they were anxious. Below are some quotes from the transcript data that were taken from the interview.

Researcher: How do you feel during science lessons?

Kausar*: I am feeling frustrated during the science lessons.*

Zara: *I find it difficult to learn science.*

Researcher: Why?

Kausar: *Because the teacher teaching us is a male teacher*

Mario: *The lessons are not lively.*

Nusiwat: *We are not fully involved in the lessons.*

Saudat: *Because the lessons are abstract.*

(G.G.D.S.S. Shinkafi Classroom, Interview, 10:00 am, 14 February 2017)

Nafi saw that Kausar was dozing during the interview, and Saudat was yawning when asked about their sentiments when learning the science lessons, when answering the question about the teaching technique, which supports what the student claimed regarding anxiousness in learning science. Furthermore, Nafi noted that Balarab "exhibited erratic eye blinking during the interview." Sami further mentioned that "Saat was shivering" as she responded to queries regarding how she felt about understanding scientific ideas. (Interview, G.G.D.S.S. Shinkafi Classroom, 10:00 am, February 14, 2017)

Some students said that the science classes are challenging and abstract to master. The pupils expressed feeling anxious, frustrated, and uncomfortable during the lessons. Additionally, students are experiencing anxiety when learning science, presumably as a result of the scientific topics' difficulty and the lack of relevance to their daily lives. This result is consistent with the study of Bryant et al. (2013), which discovered that female students are linked to anxiety and a lack of positive attitudes when learning science.

3.3.3. Teaching Materials

This theme investigated the students' feelings about the apparatus in their school laboratory, which affects their interest in learning science. The availability of laboratory equipment for hands-on learning facilitates teaching and learning, which can pique students' interest and allay their fears associated with understanding scientific ideas. Additionally, the students responded that their teachers are not using improvised or local materials in place of the laboratory apparatus. For example, when asked whether they have enough laboratory apparatus in their school, or not. For instance,

Researcher: Do you have enough laboratory apparatus?

Kausar: *We don't have enough laboratory apparatus.*

Nusiwat: *Hmm.. our laboratory looked like our normal classroom.*

(G.G.D.S.S. Shinkafi Classroom, Interview, 10:00 am, 15th February 2017)

Furthermore, when they were asked further about it, they said they didn't have enough laboratory materials. The students responded as follows;

Researcher: *Why don't you have enough in your laboratories?*

Alnuri: *We did not see them, and our teachers are not using some improvised materials,*

Saudat: I think because our teachers do not have alternatives.

Balarab: *We are doing Physics, Chemistry, and Biology practicals in the same laboratory*

Zuwaira: *Some of us keep standing during the practical lessons*

Nusiwat: *There is not even space for keeping the few apparatuses safely.*

(G.G.D.S.S. Shinkafi Classroom, Interview, 10:00 am, 14 February 2017)

In support of this, Nafi noted that *"Kausar nodded her head and said,* Himmm…*we are not using improvised materials, can see how our laboratory*." This indicated that the students do not have enough laboratory equipment for their practical lessons, which could be one of the reasons for their lack of interest in learning science. Because the conducive environment makes learning more interesting and successful. This conclusion is corroborated by earlier research by Ogunmade (2006), which revealed that a large number of kids acquire very little science since there are insufficient resources in schools to help teachers teach scientific concepts to their students. Moreover, Logan (2005) established that one of the causes of a lack of interest in science is the lack of practicality in science.

3.3.4. Parents' Related

This theme focuses on female students' opinions regarding their parents' views on the value of science education. In response, every student said that their parents don't understand the value of science education and don't support or encourage them to study science at home. For instance, when asked whether their parents appreciate and encourage them to learn science at home. The female students mentioned lots of reasons, such as their parents don't see them doing any important science activity at home, some parents send them to a religious school, and some parents tell their daughters that they will marry them after secondary school. The excerpts from the interview transcripts are reported.

Researcher: Do your parents encourage and appreciate you to learn science?

Zuwair: *No, my parents are not supporting me to do the homework.*

Zara: *My parents used to say my education was a waste of time and money, and I would not do any government work after my graduation.*

Saudat: *They always say science is not meant for girls*

Alnuri: *They only encourage and support my brothers*

Nusiwat: *Parents do not appreciate my performance*

Saat: *My parents used to say they never saw the importance of science*

Researcher: Why?

Balaraba: *Because the culture of our community is to send sons to the university and colleges, but marrying daughters as soon as they finish secondary education.*

Zuwair: *Because they only used to say I shall read my religion books.*

(G.G.D.S.S. Shinkafi Classroom, Interview, 10:00 am, 14 February 2017)

This showed that some parents believe that only religious schools can assist them, while other parents think that sending their daughters to a university is a waste of time and don't have any plans to enroll them there. As a result, following their secondary school education, they will wed their daughters. But they help with science just with their sons. Supporting this, Jacob et al. (2005) found that parents appear to help their male children more than their female children by giving the male children a lot of science toys.

Moreover, the findings showed that the female students responded that some parents don't see their daughters doing any home activity with the knowledge learned from their school. This explains why some parents have stated that they do not understand the value of their children learning science. These findings are consistent with those of Egun and Tibi (2010), who discovered that a similar issue exists about parents' ignorance of the value of science education for female students.

3.3.5. Importance of Science

The significance of science, which focuses on students' opinions regarding the value of learning science and about their community, is the first theme that came to light. The majority of pupils said that they didn't think knowing science was important or that it would help them in any way. For example, in response to the question of whether science benefits students' lives and the community. As shown below, every student said that they did not think science was significant.

Researcher: Do you think that science is important to you and your community?

Kausar: *No, science is not beneficial to me and our community.*

Researcher: Why?

Kausar: *Because it cannot solve our daily life problems. Like using polluted water for domestic uses.*

Saudat: *I only study it to obtain the certificate.*

Zara: *Because the experiments are not important to us and our community, we are only doing it for the sake of passing examinations.*

(G.G.D.S.S. Shinkafi Classroom, Interview, 10:00 am, 14 February 2017)

Because science lessons are not connected to their culture and religion, the majority of the students who were interviewed indicated that they are not helpful or supportive of them or their community. These findings are corroborated by research by Egun and Tibi (2010) and Aguele and Awagah (2007), which found that science lessons are helpful and perceived as unimportant for female students. Thus, the above findings of the needs analysis were used as a basis to analyze the science curriculum and textbooks. Also, it was used to determine the elements (Culture, religion, health, history, and female teacher model) that were infused in developing FSSEMIA.

4. CONCLUSION

In addition to analyzing the scientific curricula and textbooks, focus groups with female SS II Nigerian students were held. The findings show that there are several problems with the Nigerian science curriculum and textbooks, including gender bias in both teaching and learning, and lessons that are connected to community cultural and religious events. Additionally, parents are not included in science-related activities. The focus group interview results, on the other hand, reveal that parents do not understand the value of their daughters learning science, that teachers do not substitute local materials for laboratory equipment, that they do not employ role-playing or dramatization to encourage female students to be less fearful and more interested in science, and that female students become fearful and uninterested during science lessons and practical. This implies that science is less engaging and uninteresting, which has an impact on science education. As a result, the study's findings will allow the researcher to consider a variety of strategies, such as creating a curriculum, module, or set of exercises that include specific components to address the problems and increase female students' interest in and decrease their anxiety about learning science starting in secondary school.

The issues found in the present school curriculum and textbooks would have implications for teacher education because the teachers will be aware of the limitations of the curriculum and textbooks they are using, which will enable them to make improvements where necessary to make their teaching and learning more interesting and less boring. Knowing how female students feel about their interest in and concern about learning science is another significant aspect of this study. It will allow educators of science as well as legislators to begin brainstorming solutions for these problems.

5. RECOMMENDATION

Research findings provide concrete solutions to reduce interest and anxiety challenges among female students in science education. Developing interactive and contextualized science modules that incorporate real-world applications, problem-solving tasks, and inquiry-based methods can improve the relevance and engagement of science, thereby alleviating anxiety and fostering interest. Additionally, creating modules that include mentorship initiatives with female role models, peer support networks, and stress management techniques can cultivate a supportive environment that addresses concerns and boosts confidence. Enhancing teacher training and providing resources to help educators recognize and alleviate fear and disinterest in science is crucial; professional development should emphasize gender-sensitive teaching methods and the development of an inclusive classroom atmosphere. A comprehensive review of the Nigerian science curriculum is recommended to integrate gender-responsive content and teaching strategies, supported by policies that promote ongoing research and evaluation of intervention effectiveness. Ultimately, encouraging greater parental and community involvement through awareness initiatives and community programs can highlight the importance of science, normalize female participation, and ignite sustained interest in STEM careers among female students.

It is recommended that this research be expanded to create a module or program. A module designed to address parents' interest and fear in science education and learning that incorporates components of the community's cultural and religious activities.

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Research Ethics. The study on the Needs Analysis about Female Students' Interest and Anxiety for the Development of Science Module did not negatively impact the students in the secondary schools, or Nigeria at large. Our research was conducted according to the norms and standards of the National Research Ethics Guidelines.

Data Availability Statement. We declare the availability of the data used for this study.

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