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Qualification, Teaching Experience and Attitude as Attributes of Integrated Science Teachers that Influence Pupils' Academic Performance in Integrated Science at the Junior Secondary Schools in Sierra Leone

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Abstract:- The paper examined the qualification, teaching experience and attitude as attributes of integrated science teachers that influence performance of pupils in integrated science at the junior secondary schools in Sierra Leone. A descriptive research type of a survey design was adopted for the study. The population of the study comprised of all the junior secondary schools that are purely boys, purely girls and mixed sex schools, integrated science teachers and integrated science heads of department. A sample size of 100 JSS was selected using stratified random sampling technique.The participants included 100 HODs, 200 integrated science teachers and 1,000 pupils making a total of 1, 300 that were selected using purposive sampling technique. Questionnaire was the main research instrument employed for the study. Data collected were analysed using frequency count and percentages through Statistical Package of Social Sciences software. The results obtained were displayed on tables and bar charts.

The findings of the study revealed that majority of the teachers are trained with Higher Teachers Certificate (Secondary), Higher Teachers Certificate (Primary) and University graduates who are specialized in specific basic sciences such as physics, chemistry, biology and agriculture. The also revealed that teachers have adequate knowledge and experience in the teaching profession. It was further observed from the findings of the study that integrated science teachers' attitude has a lot of influence in the academic performance of pupils at BECE. Based on the findings, the study recommended that teachers should be encouraged and motivated to acquire higher qualification by government and that the Ministry of Education should organize in-service training for all integrated science teachers. Finally, the study recommended integrated science teachers should develop positive attitude towards teaching integrated science.

Keywords:- *Qualification, Experience, Attitude, Integrated Science, Performance.*

I. INTRODUCTION

A. Background to the Study

Education in every nation serves as a great pillar for the transformation of the lives of its citizens. In the 21st century every nation is allocating and expending huge amount of money on the education sector, just to ensure that there are more educated people who may be trained in various disciplines to help develop the nation.

In Sierra Leone, to be very specific, the present government reverted to the former system of education (6-3-3-4) that was introduced in 1995 to ensure that the pupils are given the maximum opportunity to learn so that they would not become drop out.

To an extent, the present government has taken the bold step in a new direction in fulfilling its manifesto during its campaign period in February, 2018 in giving all Sierra Leonean pupils a free quality education, where in parents no longer pay fees for their children or wards from the pre-primary to the senior secondary school of all government and government assisted schools. In addition to the fee payment, government also supplied the pupils with exercise books.

This recent act of the government has reduced the burden and stresses of most parents especially those with economic challenges. All this effort by the government is done to ensure that, when the citizens of the nation are highly educated there is the tendency for the nation to develop. This is because; education is considered the nucleus of the economic and social development of a nation.

It improves and enhances the productive capacity of the nation thereby reducing poverty by mitigating its effects on the population. Many governments in both developed and the developing countries allocate much of their resources to education because a nation without consideration of its education sector finds it very difficult to develop.

B. Statement of the Problem

Attributes of teachers such as gender, age, qualification, experience, attitude, method of teaching to name but a few are major determinants that influence the academic performance of pupils either at the primary, junior secondary or senior secondary schools both at their internal and public examinations. In some countries, parents and other stakeholders are always eager to hear the outcome of pupils' performance in public examinations.

In Sierra Leone, the government and other international and national organizations reward pupils that extremely perform in public examinations like the National Primary School Examination (NPSE) or Junior Secondary School examination (BECE) or at the West African Senior School Certificate Examinations (WASSCE). Some of these rewards could either be providing the pupils with scholarships or school materials like exercise books uniforms and text books. This move taken by either the government or Non-Governmental Organizations that have interest in education of a country is done in order to motivate the pupils to learn more and to stay focused to learning so that other would emulate them.

Over the years, reports from Chief Examiners, shows that, though there are few pupils who extremely perform at the Basic Education Certificate Examinations in integrated science, yet majority fail this examination at the junior secondary school level. With this performance, teachers are mostly blamed for poor performances of these pupils at the BECE.(WAEC,2011).It is against this backdrop that the researcher seeks to examine the qualification, teaching experience and attitude of integrated science teachers as determinant attributes for performance of pupils in integrated science at the junior secondary schools in Sierra Leone.

C. Objectives of the Study

The study is guided by the following objectives:

- To determine the qualification(s) integrated science teachers in the selected schools.
- To examine experiences of integrated science teachers in the selected schools
- To identify the attitude exhibited by integrated science teachers in teaching integrated science in the selected schools
- To proffer suggestions on how these attributes could improve on pupils' performance in integrated science.

D. Research Questions

The study seeks to provide answers to the following research questions :

- What is/are the qualification(s) of integrated science teachers in the selected schools?
- What are the teaching experiences of integrated science teachers in the selected schools?
- What attitude do integrated science teachers exhibit in teaching integrated science in the selected schools?
- What proffered suggestions could be made on the identified attributes of integrated science teachers to improve on pupils' performance in integrated science?

E. Delimitation/Scope of the Study

The study is delimited to qualification, teaching experience and attitude of integrated science teachers as determinant attributes to performance of pupils in integrated science at the junior secondary schools in Sierra Leone. The study is also delimited to only junior senior secondary schools in the four regions (Northern, Southern, Eastern and Western Area) of Sierra Leone. The schools represent different types that are purely boys' schools, purely girls' schools and mixed sex schools of various religious orientations and governance.

II. REVIEW OF RELATED LITERATURE

This section discusses the review of related literature of the study, in line with the identified objectives and research questions that guided the study.

A. Qualification of Teachers of Integrated Science

Teaching is a profession in the educational sector that transforms individual to become useful citizen of a nation. It is not an easy task. It carries heavy responsibility and therefore requires special training, especially for those individuals who wish to take it as a profession or career. This training is needed purposely to acquire skills, knowledge, competencies and ethics of the teaching profession. Both the academic and professional qualification of teachers is important in the teaching and learning process.

In Sierra Leone today, teaching has become a job for most people who enter Teacher Education training institutions and higher institutions of learning. According to (Osafechinti, 1999), most people use the teaching field as a stepping stone to their profession. Also, some individuals who go through higher institutions of learning and are not trained as professional teachers or did not do anything on education pedagogy are found in the classroom teaching and they claim to be teachers. Those categories of teachers use the teaching field as a waiting venue for better jobs opportunities.

Khola and Sunday (2015) cited in Zuzovsky (2009), defined qualification of a teacher as a specific skill or experience or knowledge one possesses to make him or her suitable to teach in the classroom. A trained and qualified teacher is said to be an individual who has satisfactorily gone through educational training an possesses certain skills and competencies that enable him/her to deliver well as compared

to an untrained and unqualified teacher. He/she also possesses the following characteristics as a teacher to deliver effectively: vast experience, adequate knowledge in the content of the subject matter, pedagogical delivery strategies and understands the needs of the learners.

Teacher professionalism offers the teacher the theoretical, practical knowledge, ethical codes of conduct, continuous in-service development and rendering of essential and qualitative services to society. All these attribute of qualification of a teacher, improves the quality of teaching and the public image of teachers. Capacity building of the teacher helps him or her in his or her pedagogical delivery in the classroom. Ciwar (2003).

Teacher quality is emerging as "the most important ingredient in students' achievement" according to studies carried out by (Proetheroe, Lewis and Paik, 2002; US Department of Education, 2000).

Although research indicates the importance of having qualified teachers in the classroom, evaluating teacher quality can be a difficult task. Most researchers agree to the fact that basic skills are the most important indicators of teacher quality (Archer 2002). Research also suggests that at a minimum, teachers should have a solid general education and know their subjects. Students whose teachers know their subject perform better than students whose teacher lack subject-master preparation (Olson 2000).

Another factor that enhances teacher quality is experience. Studies suggested that students learn more from experienced teachers than they do from less experienced teachers (US Department of Education 2000).Research also showed that teachers who teach in the field in which they received their training and those who participate in high-quality induction and professional development programs are more effective than those who do not (US Department of Education 2000). Study by Jegede (1982) also revealed that most integrated science teachers are mostly produced by the Teacher Colleges and that most University graduates who are qualified in other sciences like mathematics and physics are found teaching integrated science in the classroom which they are not actually trained to teach.

Professional development plays an important role in creating and retaining quality teachers. Most teachers participate in such activities in some form; the US Department of Education reported that as of 1998, 99 percent of teachers participated in professional development programme within the preceding 12 months period (US Department of Education 2000).

Teacher supervision also plays an important role in successful professional development by providing teachers with feedback regarding effective classroom practices. Four key strategies have emerged for enhancing the professional growth of teachers through supervision (Wanzare and da Costa 2000).

First, staff development should be an ongoing process, "*supported by modeling, coaching, and collaborative problem solving*" and should focus on ways to link new information in existing knowledge experience and values. Teachers should be provided enough time to make development part of their normal teaching responsibilities.

Second, engagement of groups. Third, the goal of enabling teachers to become self-directed administrators, and finally, to promote the spread of ideas and shared learning (Wanzare and da Costa 2000, pp. 47-54).

According to Burke (2000), staff development must not only affect the knowledge, attitudes and practices of individual teachers, administrators and other school employees but it must also alter the cultures and structures of the organization in which these individuals work.

Protheroe, Lewis and Paik (2002) suggest that to ensure quality teaching, administrators should:

- Make sure that each school has an equitable distribution of competent teachers;
- Select and support principals who know how to establish a collaborative, instructionally focused school environment;
- Give schools the autonomy and support to create professional learning environments for teachers;
- Provide schools with high-quality expertise as part of consistent, intensive professional development;
- Hold teachers responsible for student achievement school wide.

Adeyemo (1999) gave the rationale for teachers' professional growth. These include:

- It is necessary for the building of a formidable teaching force.
- For professional commitment to teaching and training of our young ones.
- For coping with the problem of teachers' deficiencies.
- For moral building, a qualified teacher is confident, as he needs not fear any threat of incompetence.
- For acquisition of new information in all areas of knowledge.
- For social and job mobility.

Studies had also shown that teachers are not trained and retrained in their various areas of specialization; teachers are neither sponsored to workshops and conferences nor are they encouraged to attend in-service training in order to update their skills. This finding is in line with Ifeakor, (2003, pp.227-283) in which she noted that "in-service training would help science teachers know how to use science materials in teaching science subjects to their students in

more effective manner".The teacher in the teaching profession is regarded as a knowledge who grooms learners to become useful citizens of a nation. According to Taiwo and James (2015) as cited in (Sass, Hannaway, Xu, Figlio, and Feng 2010), teachers are recognized as the most important school factor affecting student achievement. They further affirmed that, in a situation where students perform poorly, the teacher bears the blame.

In a report delivered by Awoyemi (2012) he affirmed that the characteristics of a teacher in terms of his/her qualification, age, marital status, and years of teaching experience had significant influence on teacher effectiveness in the classroom. He also asserted that the quality of teachers has greater influence on their effectiveness and efficiency levels. This tendency exhibited by teachers in the classroom is a signal to school heads that it is indeed necessary for them to ensure that enough trained and qualified teachers should be recruited in the secondary schools.

Teacher quality and quality teaching are the basis to teaching. Teacher quality is referred to the knowledge, skills, abilities, dispositions, attitudes and values that a teacher possesses at a particular time while quality teaching refers to what is actually done in practice that are obtained as a results from an interaction between those aspects of teacher quality characterizing an individual who is operating within a particular context. Zuzovsky (2009) in a study conducted on 'Teachers' qualifications and their impact on students' achievement', he asserted that teachers' qualifications depend on the following indicators:

- Teachers' formal education
- Teachers' knowledge in the subject content
- Teacher education in pedagogical studies
- Certification and licensing status
- Years of experience
- Preparation in professional development activities

In a similar study**,** Ademulegun (2001) argued that students who are taught by more qualified and experienced teachers in terms of knowledge of the subject do perform better than those taught by less qualified but experienced teachers. This is also confirmed by Kiptum (2016) as cited Yala and Wanjohi (2011) and Adeyemi (2010) who found out that teachers' experience and educational qualifications were the prime predictors of students' academic achievement.

B. Integrated Science Teaching and Learning in Sierra Leone

Integrated Science is one of the core subjects offered in the junior secondary schools of Sierra Leone. It is a subject of integration of other subjects such as physics, chemistry, biology, agriculture etc. From the contents of the junior secondary school Curriculum, integrated science as a core subject was purposely introduced with the hope that it could be taught as a single subject of integration. That is, when the subject is taught as a science course, it is devised and presented in such a way that students gain the concept of the fundamental unity of science, and does eliminate the repetition of subject matter from the various specialized basic science subjects.

The principles of integration are intended to produce a course, which is relevant to students' needs and experiences, lays adequate foundation for subsequent specialist study, and also adds cultural dimension to science education. Integrated Science if presented this way would be a good move to achieve scientific literacy, understand the processes of science, increasing interest in science, meeting the needs of the learners and showing the humanistic character of the discipline where science is married to society.

Integrated Science is unique from Biology, Chemistry, Geography and Physics because it is holistic in nature and satisfies the following:

- Traditional subject boundaries do not exist
- The course is taught towards the realization of certain learning outcome,
- Logical sequencing of themes/concept is discernible
- Has a lot of activities which makes student actively involved in learning. Gbamanja (1992).

C. Years of Experience of a Teacher in the Teaching Classroom

The teachers' years of experience in the classroom is an attribute that serves as a determinant to pupils'' academic performance. According to Boyd, Landford, Loeb, Rockoff and Wyckoff (2008), they believed that the more years of teaching experience of a teacher, will produce students with higher achievement. Studies carried out by Darling-Hammond (2000) asserted that in-experienced teachers are typically less efficient than the experienced teacher. This is also confirmed by Agharuwhe (2013) that carried out a study and concluded that, positive relationship exist between teachers' effectiveness and their years of experience, and an efficient teacher positively influences students' academic achievement.

In an exceptional situation, there are teachers in the teaching profession who have served a school for more than ten years without professionally developing themselves. Such categories of teachers find it very difficult to cope with the paradigm shift in the teaching pedagogy in the new trends of the education system of Sierra Leone.

Teacher's years of experience serves as a determinant for understanding both the content and the pedagogical delivery of the subject content in which the teacher is trained and qualified. This serves as a fundamental basis for better performance of pupils in both internal and external examinations.

Studies have also shown that the more the teacher is experienced in his subject; such experience will produce the students with higher achievement.Boyd, Landford, Loeb, Rockoff, and Wyckoff (2008). Studies carried out by scholars also indicate that inexperienced teachers are less efficient than experienced teacher Darling-Hammond (2000).

Clotfelter et al. (2006), asserted with evidence that higher scoring students are placed in classrooms with more experience teachers. In a similar study on experience of a teacher, Hanushek (2011) confirmed that studies have found out that the first few years of experience significantly improve teacher quality and an additional experience beyond five years, improves teacher efficacy.

So many researches have been carried out on the experience of teachers as a determinant to the academic performance of pupils in school. Their points or observations are on the fact that experience improves teaching skills and gives the teacher the competencies in the approach they take to deliver the content of their subjects of specialization for their pupils to learn better at the hands of teachers who have taught them continuously over a period of years.

D. Teachers' Attitude in the Classroom

Teachers are considered in the classroom as knowledge dispensers and transform the behaviours of learners to be good citizens of a nation. In effect, the teacher serves as a role model in the classroom in terms of his/her attitude. Much is expected of teachers in the teaching and learning process. The major challenge in the academic performance of pupils in the schools is hinged on the characteristics of a teacher in terms of qualification, experience and their attitude to name but a few in the teaching and learning process.

Teacher's behaviour towards teaching of the pupils has significant impact on their performance. Afolabi (2009) cited in Adesoji (2002) defined attitude as cognitive, emotional, and action tendency to a particular behavioural intent. He ascertained that attitude is an important factor that determines achievement of students in sciences.

(Sandt, 2007) also defined attitude as the internal beliefs that influences personal action that is learned indirectly through one's experience and exposure. According to (Sandt, 2007), teachers' attitude toward teaching includes: work value, teacher self-esteem, teachers' self-efficacy, teachers' expectation, teachers' commitment among others.

Attitude teachers hold regarding students could be attitude toward individual learners, groups or classes of learners. This could include liking (affection towards learners) enthusiasm to teach these specific learners.

Van Aalderen-Smeets et al.(2012) defined attitude according to its constituent parts and gave distinction between personal attitudes and professional attitudes. Personal attitude according to them focuses on an individual's attitude toward science, whereas professional attitude focuses more on attitude toward the teaching of science. From this definition, professional attitude toward teaching science may be influenced by personal attitude of an individual and vice versa.

Odubunmi (1986) and Odunsi (1998) confirmed that the attitude of teachers teaching integrated science affect both the attitude of pupils and achievement in the subject. In another study, Ogunwuyi (2000) found out that significant causal relationship exist between the teachers' attitude and students' achievement in integrated science. The following teacher – related factors: Teachers' enthusiasm; Teachers' resourcefulness and helpful behaviour and teachers' thorough knowledge of the subject matter were highlighted by Ogunniyi (1982) as determinants for students' achievement.In a study carried out by Osborne et al. (2003) and Abudu and Gbadamosi (2014) indicated the constructs of attitude as:

- The perception of the science teacher;
- Anxiety toward science;
- The value of science;
- Self-esteem in respect of science;
- Motivation towards science;
- The enjoyment of science;
- The attitudes of peers and friends towards science;
- The attitudes of the parents towards science;
- The nature of the classroom environment;
- Achievement in science; and
- Fear of failure in the course.

Osborne et al. (2003) furthermore made emphasis on the fact that the attitude of an individual towards science is made up of a blend of the above mentioned constructs.

III. METHODOLOGY

A. Research Design

The study adopted a descriptive research type of a survey design that seeks to answer the why, how and when of the problem under study.

➢ *Target Population and Sample*

The target population for the study comprised of integrated science HODs, integrated science teachers and junior secondary school pupils in purely boys, purely girls and co-educational schools in Sierra Leone. The sample size included100 integrated science heads, of departments, 200 integrated science teachers from the junior secondary schools, 1000 JSS pupils who have been in the selected junior secondary schools for at least two years, making a total of 1,300 respondents. This sample size was selected due to

the fact that the researcher could not reach all sample population due to time and resource constraints.

➢ *Sampling Technique*

The study employed purposive sampling technique to choose the sample size of 100 junior secondary schools of purely boys, purely girls and mixed sex schools. Stratified random sampling technique was then adopted to choose the selected junior schools in each of the regions of Sierra Leone.

B. Research Instrument

Questionnaire was the main instrument used for collection of data.

C. Data Collection Procedure

The researcher administered questionnaires to Heads of Integrated Science Department, Integrated Science Teachers and the Junior Secondary School pupils in an effort to achieve the necessary information relating to the objectives and research questions.

D. Data Analysis and Presentation

The completed questionnaires obtained from the respondents were thoroughly checked by the researcher for completion. Only completed questionnaires were used for analysis. Mugenda & Mugenda (2003) assert that data obtained from the field in raw form is difficult to interpret unless it is cleaned, coded and analyzed. Qualitative data was grouped into meaningful patterns and themes that are observed to help in the summarizing and organization of the data.

Quantitative analysis was analyzed through the use of statistical techniques such as frequency counts and percentages. Bar charts and tabulation were illustrated to show differences in frequencies. Qualitative data was analyzed descriptively. Statistical Package for Social Sciences (SPSS) was used for analysis of quantitative data obtained from the closed ended questions.

IV. RESULTS AND DISCUSSIONS

A. Introduction

This section of the work presents the results and discussions of the study from the data collected through the administered questionnaires. The discussion was based on the stated objectives and research questions that guided the study. The researcher distributed 200 questionnaires to the integrated science teachers in the selected schools only 179 were completely filled and returned, 1000 questionnaires were administered to JSS pupils, 933 were returned while 100 questionnaires were distributed to the HODs, 97 questionnaires were returned.

B. Objective 1: Ages and Qualifications of Teachers Teaching Integrated Science in the Selected Junior Secondary Schools.

➢ *Ages of Teachers Teaching Integrated Science in the Selected Schools*

The study sought information on the ages of teachers teaching integrated science in the selected schools. From the data obtained, in the Northern Region according to the ages, 54.90% , 25.49%, 17.56% and 1.96 % of the teachers fell within the ages (21-30) years, (31- 40) years,(41-50) years and (51-60) years respectively. Most of the teachers (54.90%) of the survey, were very young and fell within the age bracket (21-30) years, followed by 25.49 % that fell between (31- 40) years.Three (3) of the teachers and one (1) of the teacher fell within (31-40) and (41-50) years respectively. There wasn't a teacher in the districts of the North within the age bracket (51-60) years except for Kambia District.

In the Southern Region, 40% of the teachers were within (21-30) years, followed by 25.49 % that were within (31-40) years. There were 6.67% of the teachers that fell within (51-60) years.

In the Eastern Region, 32.99 % fell within (21-30) years, 33.34% fell within (31- 40) years, 21.57% fell within (41-50) years and 5.89 % fell within (51- 60) years. This shows that higher percentages (43.02% and 30.73%) of the teachers fell within the ages (21-30) years and (31- 40) years respectively. In the Western Area, more (40.63%) of the teachers of integrated science were between (31-40) years, while 34.38% were within (21-30) years. Of the entire survey, the highest percentage (43.02%) of integrated science teachers fell within (21–30) years, followed by 40.63 % that fell within (31- 40) years. Few (5.03%) fell within (51-60) years.

➢ *Qualifications of Teachers Teaching Integrated Science in the Selected Schools*

In terms of qualifications of teachers teaching integrated science in the selected JSS, the results of the study for Northern Region showed that majority (45.10%) of the teachers had HTC(s), followed by 19.61% that had WASSCE, that is, those who had no professional qualification for the teaching job. There was none with post-graduate degree, 5.89% and 9.81% had B.Ed. and B.Sc. Education respectively. Bombali, Koinadugu and Port Loko Districts had no WASSCE teacher according to the findings.

In the Southern Region, 24.48% had B.Sc. Education, 11.12% had B.Ed. Equal percentages (4.45%) had HTC (P) and WASSCE. None in the South had Post-graduate degree.

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In the Eastern Region, 31.38% had HTC (S) and equal percentages (17.65%) had HTC (P) and B.Sc. Education respectively.In the Western Area, 37.50% had B.Sc. Ed, 25% had HTC(S), 15.63% had B.Ed. and 26.25% had M.Ed. and M.Sc. respectively. From the table, the Northern Region had the highest percentage (19.61%) of WASSCE teachers followed by the Eastern Region (17.65%). The highest percentage (38.55%) of qualified teachers had HTC(S) followed by B.Sc. (20.67%).

The study further revealed that most of the integrated science teachers that participated in the study are professionally qualified with just a few with WASSCE who are yet to obtain the teaching qualification. However, the presence of WASSCE teachers in the classrooms or in the teaching profession is an indication that the teaching field still accommodates people without the requisite professional knowledge. It cannot therefore be contested if one posits that this is one of the reasons for high failure rate of candidates in integrated science in public examinations like BECE. See table below.

Region	District	Response on Age				Response on Qualification							
		21-30	31-40	41-50	51-60	HTCP	HTCS	B.Ed	B.Sc.	M.Ed.	M.Sc.	Dip	WASSCE
Northern n=51	Bombali	07	02	03	00	02	08	00	00	00	00	02	00
	Kambia	07	02	02	01	01	04	00	01	00	00	00	06
	Koinadugu	00	03	01	00	00	01	00	02	00	00	01	00
	Port Loko	08	04	02	00	03	08	01	02	00	00	00	00
	Tonkolili	06	02	01	00	00	02	02	00	00	00	01	04
	Total	**28 (54.90)**	**13 (25.49)**	**09 (17.65)**	**01 (1.96**	**06 (11.77)**	**23 (45.10)**	**03 (5.88)**	**05 (9.80)**	**00 (0.00)**	**00 (0.00)**	**04 (7.84)**	**10 (19.61)**
Southern n=45	Bo	11	05	04	01	00	13	02	04	00	00	02	00
	Bonth	00	00	04	00	00	04	00	00	00	00	00	00
	Moyamba	05	04	04	01	02	04	02	03	00	00	01	02
	Pujehun	02	03	00	01	00	01	01	02	00	00	02	00
	Total	**18 (40.00)**	**12 (26.67)**	**12 (26.67)**	**03 (6.67**	**02 (4.44)**	**22 (48.89)**	**05 (11.11**	**11 (24.45**	**00 0.0**	**00 0.0**	**03 6.67**	**02 (4.44)**
Eastern n=51	Kailahun	06	07	0	00	04	06	02	04	00	00	01	01
	Kenema	05	09	04	00	02	09	01	04	00	00	01	01
	Kono	09	01	02	03	03	01	01	01	00	00	02	07
	Total	**20 (39.22)**	**17 (33.34)**	**11 (21.57)**	**03 (5.89**	**09 (17.65)**	**16 (31.38)**	**04 (7.85)**	**09 (17.65**	**00 0.0)**	**00 (0.0)**	**04 (7.85)**	**09 (17.65)**
Western Area n=32	Western Rural	03	03	00	00	00	03	01	02	00	00	00	00
	Western Urban	08	10	06	02	01	05	04	10	02	02	00	02
	Total	**11 (34.38)**	**13 (40.63)**	**06 (18.75)**	**02 (6.25**	**01 (3.13)**	**08 (25.00)**	**05 (15,63**	**12 (37.50**	**02 (6.25)**	**02 (6.25)**	**00 (0.00**	**02 (6.25)**
Grand Total		**77 (43.02**	**55 (30.73**	**38 (21.23**	**09 (5.03**	**18 (10.01**	**69 (38.55)**	**17 (9.50)**	**37 (20.6)**	**02 (1.12)**	**02 (1.12)**	**11 (6.15)**	**23 (12.85)**

Table 1:- Ages and Qualifications of Integrated Science Teachers in the Selected Schools
n=179 (Figures in Parentheses are Percentages)

- *Qualifications of Integrated Science Teachers of the Selected Junior Secondary Schools and Their Subject Areas of Specialization*

The figure below shows the qualifications and subject areas of specialization of integrated science teachers in the selected schools. In the Northern Region 31.38% had HTC(S) in integrated science, 5.89% had Bachelor of Education .and 9.81% had B.Sc. in the basic sciences.

In the Southern Region, 40% of the selected teachers had HTC(S) in integrated science, 6.67% had B.Ed. in integrated science and 8.89 % in the basic sciences. Majority of the teachers though trained, they were trained in other subject areas rather than Integrated Science.

Similarly, in the Eastern Region, 13.73% had HTC(S) in Integrated Science, 7.81% in the basic sciences. Majority of these teachers were also trained in other subjects and had

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the highest percentage (17.65%) of Untrained and Unqualified Teachers.

The study further revealed that in the Western Area, 28.13% had Bachelor's degree in the basic sciences and 6.25% in the other subjects, 18.75% had HTC(S) in Integrated Science. It was observed that there were no WASSCE teachers in the selected schools in the Western Area.

The implication is that the highest percentage,(26.26%) of the teachers of the survey had HTC(S) and were trained in integrated science. This is a clear indication that a very good percentage of integrated science teachers of the survey were trained and qualified but they were qualified in other subjects and were employed to teach integrated science in these schools.

This obtains because of the scarcity of real trained and qualified integrated science teachers. The findings confirms the assertion of Jegede (1982),which states that integrated science teachers are mostly produced by teacher colleges and that most of the University graduates are qualified in other sciences like mathematics and physics and are found teaching integrated science which they are not trained to teach.

Philippe (2000) also confirms from the findings that both the academic and professional qualifications of teachers are important in the teaching and learning process. The teachers' educational background in the field of instruction is a value index of teachers' understanding as experts in their field.

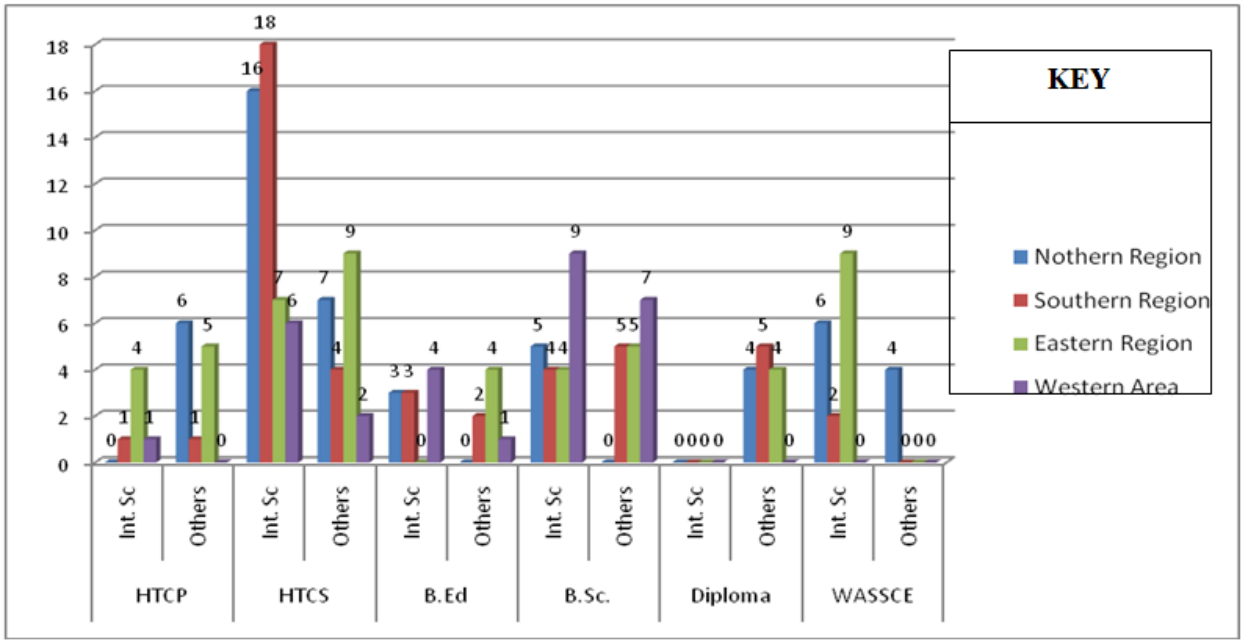

Fig 1:- Bar Chart Showing Qualifications and Areas of Specialization of Integrated Science Teachers.

➢ *Distribution of Qualified Integrated Science Teachers of the Selected JSS*

The figure below indicates the number of qualified integrated science teachers. According to the figure, 71.43% from the Northern Region were trained and qualified, 80.53% were trained and qualified from the South, 48.73% were trained and qualified from the East and 75.32% were trained and qualified from the Western Area. The table shows that there were more (80.53%) trained and qualified Integrated Science teachers in the South as compared to the other regions followed by the Western Area (75.32%).

In terms of Trained and Unqualified Teachers (TU), there were 5.72% from the North, 10.62% from the South, 8.23% from the East and 11.69% from the Western Area. The table further revealed that more (11.69%) Trained and Unqualified Teachers were found in the Western Area and least (5.72 %) in the Northern Region.

For the Untrained and Unqualified Teachers, there were 22.86 % from the North, 8.85% from the South, 43.04% from the East and 12.99% from the Western Area. There were more (43.04%) untrained and unqualified Integrated Science teachers in the Eastern Region followed by the Northern Region (22.86%).

These untrained and unqualified Integrated Science teachers included those who did not have the requisite professional qualification to teach Integrated Science, they only sat to the GCE or WASSCE and were employed because the schools lacked qualified teachers. Some were employed as voluntary teachers.

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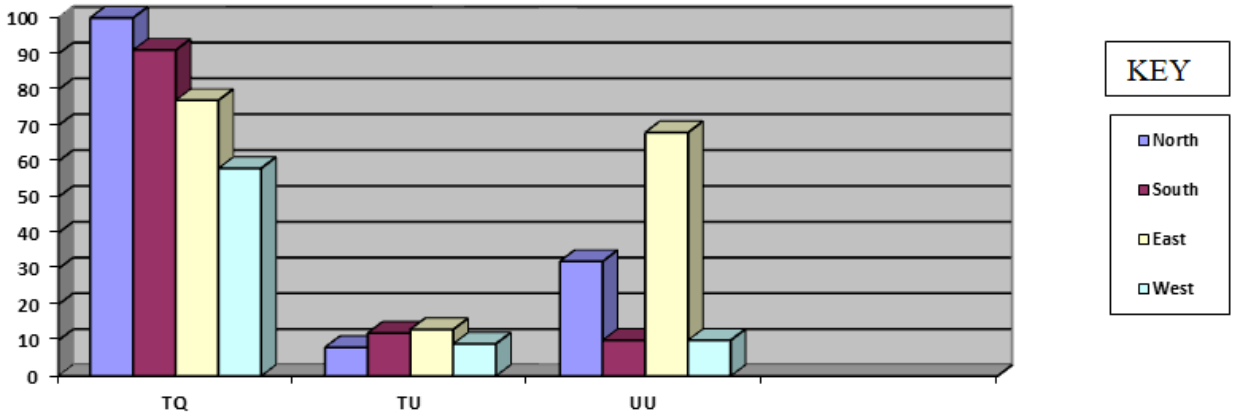

Fig 2:- Bar Chart Showing Number of Trained and Qualified Integrated Science Teachers in the Selected Schools

C. Objective 2: Teaching Experiences of Integrated Science Teachers in the Selected Schools

The study sought information on the experience integrated science teachers have in the teaching of the subject in the classroom. Statistics collected from empirical investigation showed that in the Northern Region, 50.98% had (0-4) years' experience, 15.69% had (5-9) years, 9.81 % had (10-14) years, 5.89 % had (15-19) years, 9.89 % had (20-24) years and equal 3.93% of the teachers had (25-29) years and 30 and above years' experience respectively. The figure further revealed that 50% of these teachers had (0-4) years' experience and 66.67% had at least 10 years' experience**.**

In the Southern Region, Bo had (5) teachers and Moyamba (2) teachers with (0-4) years' experience. There were no teachers with (5-9) years' experience from Bonthe. Bo had the highest number (6) of the teachers with (5-9) years of experience. There were more (31.12%) teachers for the entire South with (10-14) years' experience. Only Bo and Moyamba District had one teacher each with 30 years and above experience. This also occurs in the Northern Region with only (2) teachers with at least 30 years' experience.

In the Eastern Region, the concentration 37.26 % of the teachers with experiences fell within (10-14) years followed by (5-9) years with (31.38%). There was no teacher with (20-24) years' experience in all the districts of the Eastern Region. Only (1.96%) from Kailahun District had 30 years and above experience.

In the Western Area, most (37.50%) of the teachers from the Urban and Rural District had experience between (10-14) years, with more (10) from the urban and (2) from the rural. There was no teacher with, (25-29) years and 30 and above years' experience.

From the figure, it was observed that highest percentage (27.94%) of years of teaching experience of these teachers fell between the age range (10-14) years; this implies that, the teachers had the adequate knowledge of their work and with that number of years especially from 5 to 30 years and above, these teachers would play a greater role in helping candidates most especially in the examination classes (BECE) to perform better in the public examinations. Years of experience do seem to improve professionalism among Integrated Science teachers, the least experienced teachers fell between (0-4) years 24.03% while the more experienced teachers 75.97% fell between (5-9) years to 30 years and above.

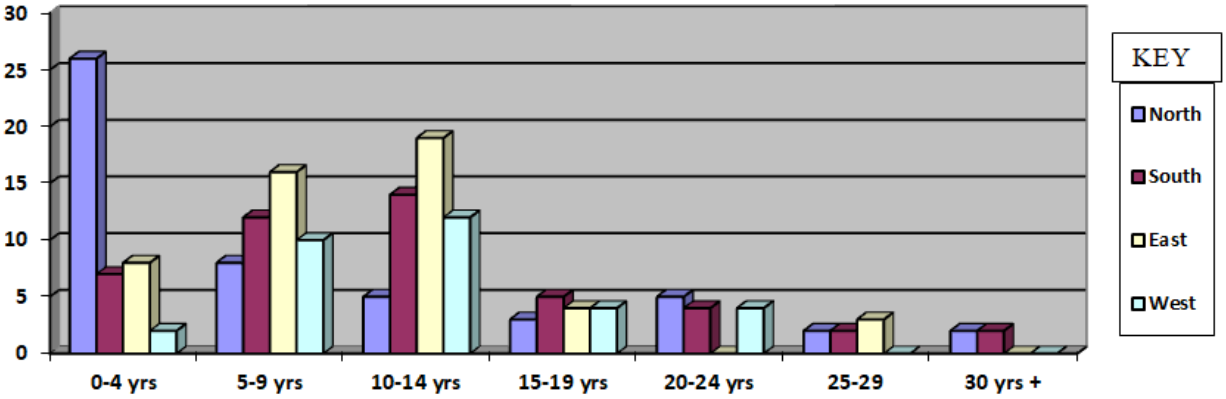

Fig 3:- Bar Chart Showing Teaching Experience of Integrated Science Teacher

D. Objective 3: Attitude of Teachers Teaching Integrated Science in the Selected Schools

➢ *Response from Integrated Science HODs and JSS Pupils on the Commitment Level of Integrated Science Teachers in Teaching Integrated Science.*

Level of Commitment	Heads of Department	Junior Secondary Pupils
Highly Committed	10(10.0%)	03
Moderately Committed	90(90.0%)	900
Not Committed	00(0.0%)	30
TOTAL	**100(100.0%)**	**933(100.0%)**

Table 2: Frequency Distribution on the Level of Commitment of Integrated Science Teaching

Table 3, reveals the level of commitment of integrated science teachers in the classroom in teaching integrated science in the selected junior secondary schools in Sierra Leone as responded by HODs and the JSS pupils. According to the table, 90% of all the HODs in the selected junior secondary schools described teachers' commitment as moderate. Few (10.0%) of the HODs rated the integrated science teachers as having high commitment level toward teaching/learning in the classroom. However, it was realized from the findings that none of the HODs did not respond on integrated teachers not being committed to their classroom work. These findings show that good performance in the teaching/learning process is as a result of high commitment levels by the classroom teachers.

➢ *Behaviour of Integrated Science Teachers Towards Teaching and Learning of Integrated Science?*

Table 3 indicates responses of HODs on the behaviours of integrated science teachers as observed by them. The same table shows percentage response that ranges from 20% to 92% (under Always); 7% to 51% (under sometimes); 0% to 7% (under rarely); and 1%to 15% (under never) for all items. The results shows 86% responded that the integrated science teachers write lesson plan for each lesson they teach, 99% give assignment on each topic taught, 98% mark students' test and hands them back to the students. 91% attend departmental meetings called by HODs, 98% arrive on time in class to teach and 95% do not attend professional development activities. The results of the table indicate good professional habits demonstrated by the integrated science teachers.

	How it is observed by Integrated Science HODs			
Expected Behaviour for Teaching/Learning	**Always %**	**Sometimes %**	**Rarely %**	**Never %**
1. Prepares lesson notes for each lesson to be taught	65	21	07	07
2. Always gives pupils assignment on topics taught	92	07	00	01
3. Mark pupils' tests/exams and hands them back to them	89	09	02	00
4. Teacher buys their own reference books.	20	48	17	15
5. Attends departmental meetings called by HODs	40	51	07	02
6. Attend professional Development Programmes	02	03	00	95
7. Always punctual in class to teach	70	28	03	02
8. Spends time in the evening and over weekends on school work.	38	44	12	6
9. Spends time during holidays on school related work	24	50	15	11
10. Monitors the pupils' academic work.	55	30	10	05

Table 3: Distribution of Responses of HODs on Expected Behaviours of Integrated Science Teachers and how They are Often Observed.

➢ *Students' Rating of Integrated Science Teachers on Their Conduct to the Teaching /Learning of Integrated Science.*

As indicated in the table below, the junior secondary schools pupils who participated in the study claimed that integrated science teachers are engaged in all listed practices. The following items are in a greater proportion of the pupils at least 60% upheld the view that:

- Integrated science teachers is always absent in school;
- Come late to class ;
- Integrated science teachers stay in the staff room when he/she is scheduled to be in class;
- Integrated Science teachers hit their students ;
- Integrated Science teachers come to class without preparing for the class

- And Integrated Science teachers abandon their classes for other out of school purposes

The absenteeism of a teacher from school or class may be the cause of the learner's poor performance, as they do not cover the syllabus, they do not honor due dates, and do not give remedial teaching in respect of poor performance (Lebata, 2014p.78). The teacher's absenteeism also damages his or her credibility (Lebata, 2014). Consistent absenteeism of the teachers may also increase the learner's absenteeism as they believe that when a teacher is absent no learning will take place (Lebata, 2014). The teacher's absenteeism results in their not marking the learner's work. This may demotivate the learners, and their demotivation in turn, may affect their academic performance.

Exhibited Behaviours	**Always %**	**Sometimes %**	**Rarely %**	**Never %**
1. Absent from school	30	40	20	10
2. Teacher comes to school late	15	50	05	30
3. He comes to class drunk	11	29	40	20
4. He stays in the staff room when he/she is scheduled to be in class	20	40	20	20
5. He hits students	12	58	10	20
6. He comes to class without preparation	20	50	10	20
7. He goes away on his own business and leaves pupils to work on their own.	20	40	10	30
8. He is aggressive to pupils for asking question in class	5	33	57	5
9. He leaves school before time without asking permission	8	36	50	6
10. He extends love relationship to pupils	10	36	44	10
11. He gives higher /lower marks to pupils he doesn't like.	10	26	54	10

Table 4:- Pupils' Rating of Integrated Science Teachers on Their Conduct Towards Teaching /Learning Integrated Science

V. CONCLUSIONS

The study examined the qualification, teaching experience and attitude of integrated science teachers as attributes that serve as determinant to pupils' performance in integrated science in selected junior secondary schools in Sierra Leone. Based on the findings, the study concluded that:

The majority of the teachers who teach integrated science are trained from the teacher training colleges with Higher Teachers Certificate (Secondary) and Higher Teachers Certificate (Primary) together with University graduates who are specialized in specific basic science subjects like physics, chemistry, biology or agriculture instead of the three basic science subjects as subject of integration and few with WASSCE. This makes the integrated science teachers bias in teaching only areas in which they specialized. This result in an unbalanced coverage of the teaching syllabus, thereby reflecting on pupils' performance in external exams like BECE in integrated science.

The findings of the study further reveals that the teachers had the adequate knowledge or experience of their work and with that number of years especially from 5 to 30 years and above, this reveals that experiences of teachers play a greater role in helping candidates most especially in the examination classes (BECE) to perform better in the public examinations. Years of experience do seem to improve professionalism among integrated science teachers, the least experienced teachers from the findings fell between (0-4) years 24.03% while the more experienced teachers 75.97% fell between (5-9) years to 30 years and above.

Teachers' attitudes towards the teaching of integrated science play a significant role in shaping the attitudes of pupils towards the learning of integrated science which influences of pupils' learning achievement. Pupils' positive attitude towards integrated science could enhance teachers' motivation, resourcefulness. All these attributes could influence integrated science teaching/ learning. The study shows that the behaviour of the teachers towards integrated science teaching and learning has a lot of influence in the academic performance in integrated science.

RECOMMENDATIONS

Based on the findings of this study, is therefore recommended that:

- Some attributes like experiences, qualifications and attitude of teachers should be considered in the recruitment process of teachers by the employers or Teaching Service Commission.
- Experienced and trained teachers in integrated science should be recruited by employers to teach integrated science at the junior secondary schools in Sierra Leone.
- The Ministry of Education should give scholarship to science teachers to acquired higher qualifications in Teacher Education institutions.
- Integrated Science teachers must develop positive towards teaching/learning integrated science in the classroom.
- Government through the Ministry of Education should organise in-service training for integrated science teachers on regular basis for professional enhancement.
- Government should ensure that teachers are paid on time and remote allowances are given to teachers in rural areas.

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