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Influence of School Library on Implementing Qualitative Science Education in Nigeria: Impediments and the Possibilities

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Abstract

This study investigated the influence of school libraries on implementing qualitative science education in Nigeria: impediments and the possibilities. The methodological approach adopted for this study was mixed methods. The study's population was 1,152, which comprised library staff, principals, and science teachers in public senior secondary schools as well as major stakeholders in education connected with the provision, management and utilization of library resources for teaching science subjects. The instruments of data collection were questionnaires, interviews, and observation. Quantitative data were analysed using the SPSS, while qualitative data were

transcribed and analysed thematically. The findings show that the state of school libraries was poor and the resource most frequently available in school libraries for teaching science was textbooks, and many of the library staff did not possess a librarianship qualification. Findings also showlibrary resources (textbooks) as being influential in science curriculum implementation, and the majority of teachers adopted a teacher-centred approach.

Keywords: *School Libraries, School Librarians, Science Teachers, Science Subjects, Secondary Schools.*

Introduction

The government of Nigeriaplacesmuch emphasis on science as mechanism required to achieve its economic growth (Economic Transformation Blueprint, 2009), and the critical role of school libraries in realising qualitative science education have been acknowledged by relevant and prominent organisation such as; International Federation of Library Associations (IFLA) and the United Nations Educational, Scientific and Cultural Organization (UNESCO).For example, in 1999, a School Library Manifestopublished by the IFLA/UNESCO, states that: the school library is indispensable to every long-term strategy for literacy, education, information provision and economic, social and cultural development. Also, several literature has alluded to the fact that school librarians and teachers' collaboration normally leads tostudents'higher level ofachievement in literacy, reading, learning, problem-solving and information and communication technology (ICT) skills.In achieving qualitative science education, UNESO partners with Nature Education and Roche to develop, a free online resource for science learning discovery termed the World Library of Science. The idea of this partnership is to motivate curiosity in science, facilitate collaboration and foster scientific enquiry(UNESCO, 2005; UNESCO Science Education, n. d.; UNESCO World Library of Science, n. d.). Advantageously, developing countries (Nigeria inclusive) have been selected as its priority area.On the other hand, secondary school education in Nigeria is the link between primary and tertiary education as well as the foundational basis of learning scienceeducation.The important role of the school library in science curriculum implementation has been recognised by the Nigeria National Policy on Education(2013), and this informs the reason it declares that proprietors of schools should make available well equipped libraries in all their schools in tandem with the laid down standards. As earlier mentioned, secondary school is the link between primary and tertiary education, and the foundational basis of acquiring science education (Olajide& Zinn, 2020). Since the agenda of the government is to achieve its economic development with science, therefore there is need to investigate the role of school libraries in implementing quality science education in Nigeria: impediments and the way forward. Very little is known about the role school libraries could play in achieving quality science education, particularly in Ekiti State. It is against this background that the study examines the influence of school libraries on implementing qualitative science education; impediments and the way forward in Ekiti State, Nigeria.

Objectives of the study

In achieving the purpose of the study, the gap in research will be addressed with the following objectives:

1. To find out different types of resources used to implement qualitative science education in schools in the state.

2. To find out the quality of the available resources for implementing qualitative science education.

3. To find out if the staff managing the school libraries in the state are qualified to perform their tasks.

4. To examine the method/s adopted for teaching science in the schools.

5. To investigate the influence of school library resources on qualitative science education in the state.

Literature Review

A review of related literature from impact/influence of school libraries on science education, condition of school libraries in Nigeriatomethodology of teaching and learning science in Nigerian schools is conducted.

On influence of school library on science curriculum implantation, many international studies have unarguably provided evidence to support the positive influence/impact of school libraries on learners' performance. School libraries play a pivotal role in facilitating learning of science subjects in secondary schools. Various scholars and notable organisations have attested to this fact and revealed the importance of school libraries in achieving qualitative science education in schools. For example, in a study carried out in the United States by Subramaniam, Ahn, Waugh, Taylor, Druin, Fleischmann & Walsh (2013) on the role of school libraries in enhancing qualitative science learning, it is revealed that school libraries are a strong asset in science learning, as they foster youth engagement in authentic inquiry practices and engage young people's everyday life interests in science learning. The study recommended librarians input and expertise in enhancing science education efforts in schools. Similarly, notable international organisations such as;International Association of School Librarianship (IASL), the Chartered Institute of Library and Information Professionals in the United Kingdom (CILIP) and IFLA and Institutions (2015) further emphasised the importance role of school library within a school as a teaching and learning centre that provides an active instructional program integrated into science curriculum content, with emphasis on thinking-based and knowledge-based capabilities which are the major component needed to focus on substantive engagement with data and information through research and inquiry abilities and dispositions that focus on the creation, construction and the processes of higher order thinking, and critical analysis that lead to the creation of representations/products that demonstrate deep knowledge and deep understanding and shared use of the products of knowledge that demonstrate deep knowledge and understanding (CILIP, 2002; IASL, 2013; IFLA and

Institutions, 2015) Conclusively, all the afore-mentioned organisations acknowledge the crucial role of school library in actualising qualitative science education in schools.

The condition of school libraries in Africa, and particularly in Nigeria is appalling. Shonhe (2019) decried irrelevant library collections and poor staffing as the problem of school libraries in developing countries (such as Ghana, Sri Lanka, Nigeria, Malawi, and South Africa. In Nigeria, several scholars have conducted numerous studies on the conditions ofschool libraries (Adebamowo, 2011; Ajegbomogun& Salaam, 2011; Eghosa, 2011; Uzuegbu&Ibiyemi, 2013), and they all described the condition of school libraries as pitiful, and lamented the state of facilities in school libraries as inadequate as result of underfunding, and unorganised nature of library resources as a result of lack of professionals.

In Nigeria, teaching methodology (Zuofa & Olori, 2015) is an integral part of a school system and a proper instrument needed for students to question, select, analyse and synthesise information resources until they are able to discern paths to new understandings and knowledge construction for the purpose of achieving their educational goals or objectives. Several scholars (Aina & Langenhoven 2015; Alade & Ogbo 2014; Arubayi 2015; Ikitde & Edet 2013; Kalu-Uche, Alamina & Ovute, 2015; Moyinoluwa 2014) have conducted studies on teaching methods appropriate for teaching science subjects in Nigeria. They all emphasised the efficacy of an inquiry-based learning approach to teaching and learning science, and equally stated that teacher centre approach was still predominant in Nigeria (Achuonye, 2015). The studies recommended: 1, inclusion of teachers in curriculum planning and implementation; 2, science teachers availing themselves of opportunities embedded in these innovative teaching strategies to improve their students' achievement; 3, consistent refresher training for teachers in schools in order to enlighten and motivate them to integrate innovative teaching strategies into their teaching methods (Achuonye 2015; Adediran, Orukotan & Adeyanju 2015; Oyelekan, Igbokwe & Olorundare 2017).From the reviewed literature, it can be concluded thatschool library is not strongly considered as a major factor required for teaching and learning science and that teachers adopted majorly teacher centred approach in teaching science subjects. This could be attributed to the fact that many of the Nigerian schools were in poor conditions (Alumode&Onuma, 2016), which make inquiry based approach unsuitable to adopt in schools.

Research Methodology

The approach adopted for this study is a mixed method, andit combines the elements of quantitative and qualitative approaches for the purposes of breadth and depth of understanding and corroboration. The study site for the research was Ekiti State.Ekiti State is one of Nigeria's 36 states that comprises 16 Local Government Areas which is politically divided into three senatorial districts – north, central and south (Ekiti Yellow Pages 2005). The population of this study was 1,152, which comprises school librarians, science teachers and principals in 187 public senior secondary schools in Ekiti State, as well as the major stakeholders in education associated with provision, management and utilization of school libraries such as: Director of Planning, Research

and Statistics, Ekiti State Teaching Service Commission (PR&S TESCOM), and Area Education Officers (AEOs) of the three selected local government areas.

For instance, 27 schools that were offering science subjects were randomly selected to represent the three senatorial districts in the state, that is, nine schools from each of the district. Five participants (one school librarian and four science teachers teaching mathematics, physics, chemistry and biology) were purposively selected (because they teach science subjects in senior classes) to respond to a questionnaire. They were from each of 27 schools from three selected local governments (Ado, Ikere and Ido/Osi) which represent the three senatorial districts of the state. In addition, all 27 principals, the director of PR&S TESCOM and each of the AEOs in the three selected local governments were also purposively selected for the interviews because they were responsible for the management of secondary school education. The total sample size for the study was 166 participants. Further, observationof all the 27 school library resources was employed to elicit information for the study.

Presentation and Discussion of Findings

The research findings are presented and discussed under the headings:Demographic information of the respondents, types of available library resources that support implementation of the science curriculum, influence of library resources on science curriculum implementation in schools, quality of science library resources, responses of education stakeholders and researchers' observation.

Educational qualifications and experience of school librarians
In figures 1 and 2, educational qualifications and years of experience of school librarians are presented.

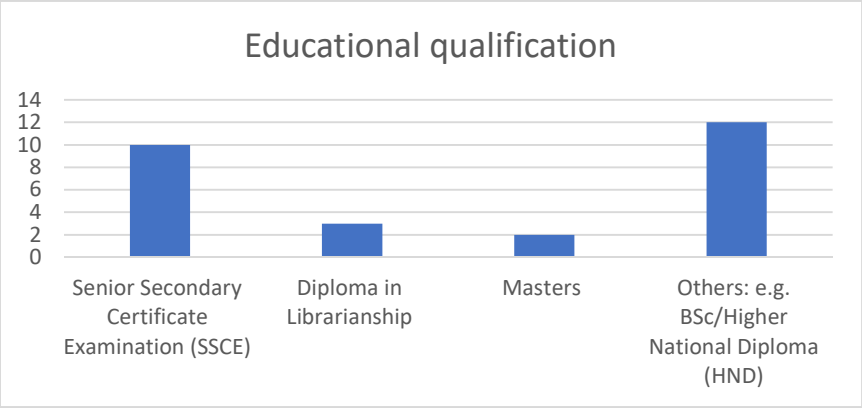

Figure 1: Educational qualification of the school librarians

As revealed in Figure 1, three (11.1%) of library staff had a Diploma in Librarianship while the majority 12 (44.5%) had other qualifications such as B.Sc. /HND, followed by 10 (37%) who did not possess more than a Senior School Certificate Examination (SSCE) while those who claimed to possess a Master's degree were 2 (7.4%) and no respondent had a Bachelor's degree in Library

and Information Science (B.L.I.S.). This implies that only few of the school library personnel possess qualification in librarianship.

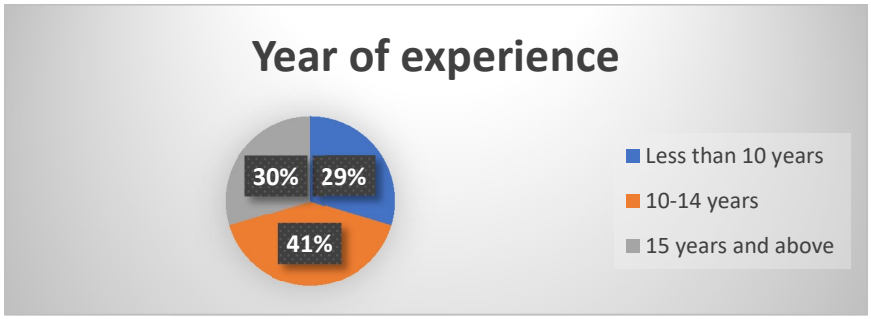

Figure 2: Years of experience of the school librarians

As shown in Figure 2, majority of the school librarians (40.7%) had working experience between 10-14 years. Those with less than 10 years of working experience were 29.6%, while another 29.6% had more than 15 years of working experience.The inference to be drawn from this is that most of the school library personnel have worked for not less than 10 years. It could be concluded that majority of the libraries were not been manned by qualified personnel. The inference to be drawn from this is that most of the school library staff seemed to be experienced as they have worked for less than ten years. Though, qualified library staff are required to make meaningful contributions to the qualitative education in schools.

Educational qualifications and experience of science teachers

In figures 3 and 4, educational qualifications and years of experience science teachers are presented.

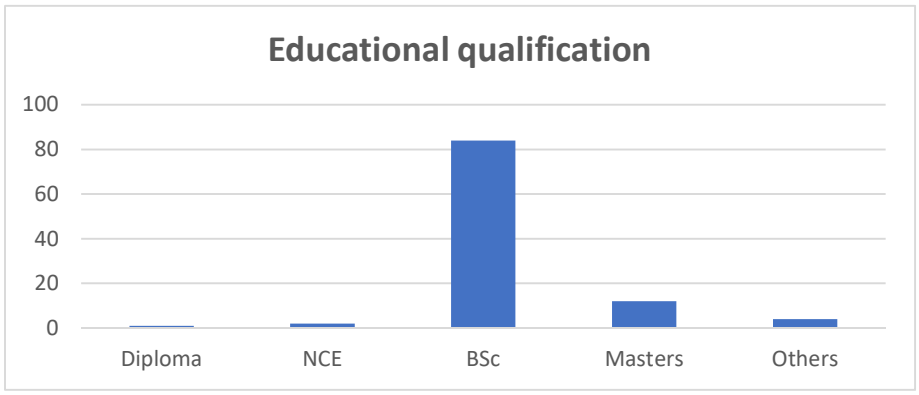

Figure 3: Demographic information of the science teachers

From Figure 3, it is revealed that the majority (81.6%) of respondents had a B.Sc. degree while 12 (11.7%) had a Master's degree. Respondents with a Diploma and NCE were less than 3%, while respondents with others qualifications such as the HND and PGDE were less than 4%. This infers that majority of science teachers possessed at least first degree as their minimum educational qualification.

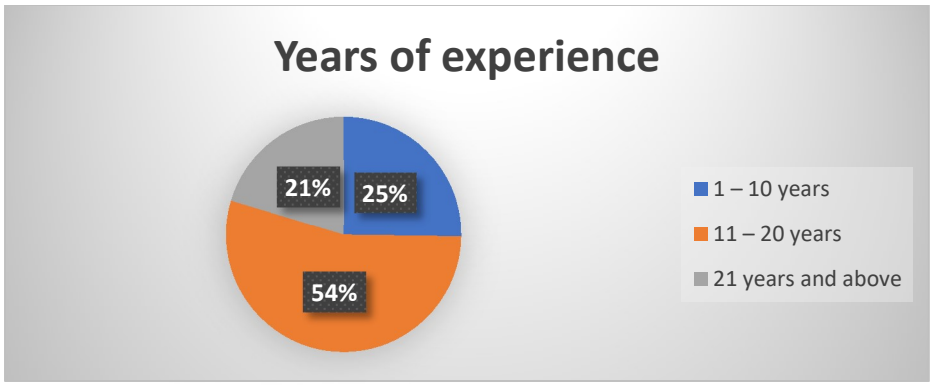

Figure 4: Demographic information of the science teachers

Also, as shown in Figure 4, majority of teachers (54%) had taught between 11-20 years, 20.4% had taught for more than 20 years, while 25.2% had taught for more than 10 years. This denotes that majority of the science teachers were well experienced as they had taught for not less than 10 years.

Educational qualifications and experience of education stakeholders
In figures 5 and 6, educational qualifications and years of experience of education stakeholders are presented.

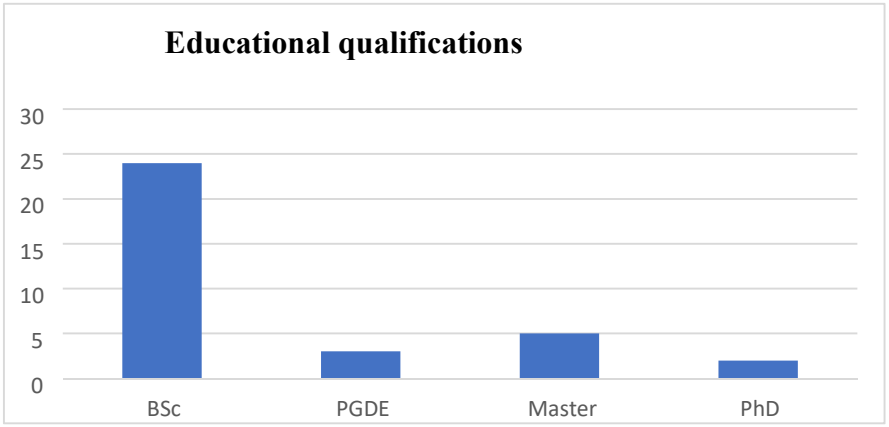

Figure 3: Educational qualifications of education stakeholders

From Figure 5 above,24 stakeholders had a first degree (BSc, BSc ED, BED), five had a Master's degree, while four had a Post-Graduate Diploma in Education (PGDE), while two had PhD as their

highest qualification.It can be concluded that educational stakeholders were qualified as none of them had any qualification lesser than first degree.

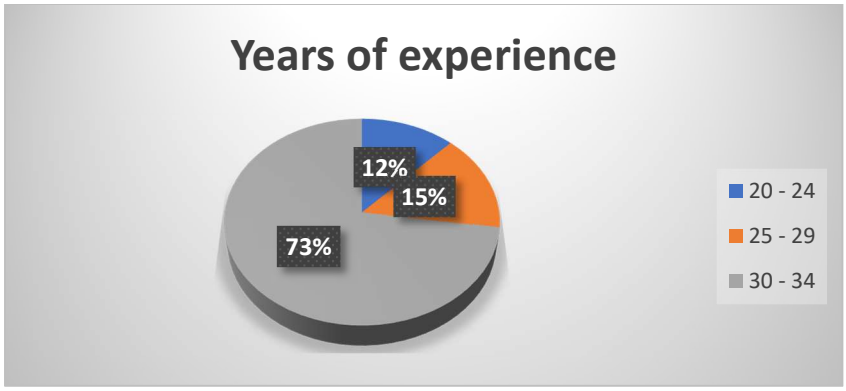

Figure 6: Years of experience of education stakeholders

From Figure 6, it is revealed thatmajority (73%) of respondents had between 30 and 34 years of experience, 15% between 25 and 29 years, and 12% with 20 to 24 years of experience, as presented in Figure 2. This denotes that education stakeholders were well experienced as majority of them had spent not less than 30 years in service.

Table 1: Types of Available library resources that support implementation of science curriculum

Types of resources in school library that support implementation of science curriculum	Available		Not Available	
	Frequency	%	Frequency	%
Textbooks	26	96.3	1	3.7
Nonfiction science books	5	18.5	22	81.7
Reference books	12	44.4	15	55.6
Encyclopaedias	14	51.9	13	48.1
Dictionaries	21	77.8	6	22.1
Magazines	6	22.2	21	77.8
Newspapers	7	25.9	20	74.1
Journals	5	18.5	21	77.8
Year book	4	14.8	23	85.2

Internet facilities	4	14.8	23	85.2
CD-ROM/DVD-ROM	3	11.1	24	88.9
Computer games	5	18.5	22	81.5
Documentaries	3	11.1	24	88.9
Charts & Pictorials	7	25.9	20	74.1
Pictures	7	25.9	20	74.1
Wall Charts	6	22.2	21	77.8
Flip charts	4	14.8	23	81.5
Real Objects/sample	2	7.4	25	92.6
Television	3	11.1	24	88.9
Microscopic slides	1	3.7	26	96.3
Articles collections (e.g. newspapers and magazine cuttings)	0	0	27	100

Types of available library resources that support implementation of the science curriculum

Table 1 reveals that approximately 96% of the library staff reported that textbooks were available in their school libraries, 77.8% reported availability of dictionaries in the school libraries while other resources like newspaper and magazine cuttings were reported by all respondents as absent. It could be deduced that the school libraries in Ekiti State placed a higher premium on the acquisition of textbooks than any other type of library resource.

Table 2: Level of library resources' influence on science curriculumimplementation in schools

Influence of library resources on teaching of science subjects in the schools	High influence	%	Low influence	%	No influence	%	Not available	%
Textbooks	19	79.2	2	8.3	1	4.2	2	8.3
Nonfiction science books	1	4.2	3	12.5	2	8.3	18	75
Reference books	8	33.3	4	16.7			12	50
Encyclopaedias	5	20.9	5	20.9	2	8.3	12	50
Dictionaries	19	79.2	1	4.2			4	16.7
Magazines	2	8.3	3	12.5	3	12.5	16	66.7
Newspapers	4	16.7	5	20.9	3	12.5	12	50
Journals	1	4.2	2	8.3	5	20.9	16	66.7
Year book	1	4.2	2	8.3	1	4.2	20	83.3
Internet facilities	2	8.3			2	8,3	20	83.3
CD-ROM/DVD-ROM	2	8.3	3	12.5			19	79.2
Computer games	1	4.2	3	12.5	1	4.2	19	79.2
Documentaries	1	4.2	3	12.5			20	83.3
Charts & Pictorials	6	25	2	8.3		.	16	66.7
Pictures	4	16.7	2	8.3	1	4.2	17	70.8
Wall Charts	9	37.5	1	4.2	1	4.2	13	54.2

Flip charts	3	12.5	2	8.3			19	79.2
Real Objects/sample	2	8.3	1	4.2	1	4.2.	20	83.3
Television	1	4.2			2	8.3	21	87.5
Microscopic slides	2	8.3			1	4.2	21	87.5
Articles collections (e.g. newspapers and magazine cuttings)			5	20.9	1	18	19	79.2

Influence of library resources on science curriculum implementation in schools

On the level of influence library resources have on the teaching of science subjects in schools, respondents were asked to rate all the available library resources from; 'high influence', to 'low influence', 'no influence' to 'not available'. As revealed in Table 2, textbooks (79.2%) were the major library resources that had high influence on the teaching of science subjects. All other resources either had a low influence, no influence or were not available. This could be as result of the fact that textbooks were the only resource available in libraries.

Based on respondents' level of understanding of school library, the main resource they expected to see in a library is textbooks, then it makes sense that they rated the library resources highly influential. However, teachers with training in information literacy skills and the techniques of effective inquiry-based learning are required to challenge and engage students with the various sources of information available to them; and to question, select, analyse and synthesise until they are able to discern paths to new understandings and knowledge construction (Barrett & Barrett, 2010), which is required of 21st century secondary school education expected to lay a solid educational foundation for producing quality manpower. Teaching to the textbook and exams does not prepare students for independent and lifelong learning. They may pass the exams and enter university but often students who have learned by rote fall by the way side in university which challenges critical thinking and expects independent learning. The issue of transforming a school library into a collaborative, technology-enabled, physical and virtual spaces where students work on their own and with others to construct knowledge and actively use, evaluate, co-create, and share information, that involve the use of digital tools, devices, 3D printers, robotics, craft and software and hardware supplies (Burke, 2015; Howell & O'Donnell, 2017).

Table 3: Quality of science library resources **N = 103**

Rating of science resources in term of quality	Adequate (%)	Fairly adequate (%)	Not adequate (%)	Not available (%)
Textbooks	61.4	30.7	4.0	4.0
Dictionaries	35.2	26.4	8.8	29.7
Wall Charts	34.8	23.9	9.8	31.5
Charts & Pictorials	28.9	28.9	5.6	36.7
Real Object/Sample	28.4	17.0	9.1	45.5
Pictures	28.1	30.3	5.6	36.0
Reference books	26.4	37.4	12.1	24.2
Flip charts	25.8	23.6	10.1	40.4
Internet facilities	15.6	15.6	14.4	54.4
Documentaries	12.4	20.2	12.4	55.1
Encyclopaedias	12.4	32.6	16.9	38.2
Microscopic slides	12.4	19.1	15.7	52.8
Television	11.5	13.8	16.1	58.6
Year books	11.2	12.4	22.5	53.9
CD-ROM/DVD-ROM	10.1	16.9	13.5	59.6
Nonfiction science books	10.1	28.1	19.1	42.7
Magazines	10.0	22.2	15.6	52.2
Computer games	9.0	15.7	15.7	59.6
Newspapers	9.0	16.9	19.1	55.1
Journals	7.8	20.0	17.8	54.4
Article topics collections (e.g. newspapers and magazine cuttings)	6.7	10.1	25.8	57.3

Quality of science library resources

Twenty-two(81.5%)of the respondents rated the level of provision of library resources as adequate for implementation of the science curriculum. The majority of science teachers (as shown in Table 3) indicated that the available library resources were adequate in terms of quality.As observed by

the researchers, most of the library resources were textbooks. Other possible resources such asDVDs/CD-ROMs, non-fiction science, newspapers, magazines,television,video games, internet facilities and e-books were either inadequate or unavailable. It is worrisome to observe that the "library staff" were not critical of their libraries. The majority of science teachers still surprisingly rated their libraries that consistedmainly of textbooks, as good. It appears that the science teachers and "librarians" may not have a sound idea of ideal school library resources as espoused by IFLA's School Library Guidelines. This may not be unconnected with the fact that virtually all the library staffin the schools were not qualified and may not know what constitutes an ideal school library.

Responses of education stakeholders

One Area Education Officer (AEO#3) said it is regularly recommended to the Ministry of Education, Ado-Ekiti, that every student in all public schools be provided laptops to enable them to google, send and receive information online. With this, students would be able to browse and read ahead and beyond their textbooks.According to school principals (SP#7 and SP#14), Ekiti State Government had just supplied schools with various textbooks which were kept in the school libraries for use. This indicates that school principals still see textbooks as an important part of library resources, whereas textbooks are better positioned as classroom necessities; every student is expected to have a textbook for each subject they are taught (UNESCO Science Education n.d.).In more developed countries such as the United States (American Library Association (ALA), 2010) and even a developing country like South Africa (South Africa, Department of Basic Education 2012, 37), textbooks are not a library but a classroom resource. In addition to textbooks, students need access to library resources in multiple formats to support reading for information and lifelong learning (ALA 2010).

Conclusions and Recommendations

In view of the findings, it is concluded that thecondition of many of the school libraries in the state is abysmal, as no functioning internet in any of the schools at the time of visitation, while majority of school libraries were being managed byunqualified staff. The State has only one functional public library (Ekiti State Library Board), which is grossly inadequate to cater for people of the state and its resources are insufficient as it has not been seriously funded since its creation in 1996 (Zaid 2011).Further, teacher centred approach was still predominant in the state, and this approach does not require diverse sources of information to implement. Though, this teaching approach does not improve student's problem-solving abilities and investigative potentials. The study alluded to the fact that school libraries have great influence on science curriculum implementation.

Based on the findings and conclusion, it is, therefore, recommended that:

1. All education stakeholders (Ministry of Education, Science & Technology, school principals, AEOs) should advocate for standard school libraries that contain diverse sources of information for teaching science, as standard libraries will afford students to consult beyond textbooks for their assignments and projects, which are the elements of qualitative science education.

2. Government should provide an enabling environment that will stimulate learning of science in schools. Such environment should include employment of qualified personnel to manage library as well as updating of science curriculum in a manner that will encourage inquiry based learning in schools.

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