

Impact of Literacy intervention on Students' Learning of Basic Science in Junior Secondary Schools in Ekiti State, Nigeria

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ABSTRACT: *The study investigated the impact of literacy intervention on Students' learning of Basic Science in Junior Secondary Schools in Ikere local government Area, Ikere-Ekiti, Ekiti State, Nigeria. The study adopts descriptive survey of research design. The population for this study consists of all public junior secondary school students in Ikere local government Area, Ekiti State, Nigeria. The selection of schools and respondents was done by random sampling technique method. Twenty (20) students were randomly selected from JSS 2 classes from five (5) selected junior secondary schools for sample to make a total sample of 100 JSS2 basic science students. The instrument for data collection was questionnaire titled "Impact of Literacy intervention on Students' Learning of Basic Science in Junior Secondary Schools in Ikere Local Government Area, Ekiti State, Nigeria". It was a structured questionnaire developed to elicit relevant information from the respondents for the study. The instrument was subjected to validity and reliability mechanism. Test-retest method was used to ensure the reliability of the instrument. The reliability coefficient of the instrument is 0.86, which was very significant. Three research hypotheses were formulated and tested at 0.05 level of significance. The data collected were analysed using Chi-Square (X^2) statistical analysis package. The results revealed that there is no significant relationship between students' reading other text and his literacy in basic science, that there is no significant difference between student of low level of literacy and students of high level of literacy of students in senior secondary schools and also revealed that there is no significant difference between the academic achievement of students in basic science with low and high level of literacy. Based on the findings of the study, appropriate recommendations were made.*

Key Words: *literacy, literacy intervention, learning, basic science, junior secondary school.*

Introduction

Science education is meant to expose the learners to scientific nature (facts, principles and concepts), processes, attitudes and then equip learners with skills of professional scientist. Oyeniya (2019) cited Owolabi & Oginni (2014) that the objectives of science curriculum as provided in the National Policy of Education according to Federal Ministry of Education (2004) include; adequate laboratory and field skills in science, meaningful and relevant knowledge, ability to apply scientific knowledge to everyday life. Knowledge in Basic Science is central and indispensable to the development of every nation. This is due to its crucial roles in child's survival, adjustment and adaptation to his/her immediate and wider environments dominated by scientific activities. Basic Science is a basic subject that lays foundation for the take-off of pure sciences (biology, chemistry and physics) in secondary school classes (Oyeniya, 2019).

According to Trustee of Princeton University (2013), Basic Science is a revolutionary new introductory science curriculum developed at Princeton intended for students considering a career in science. Basic Science emphasizes scientific literacy and research oriented learning (Gunseli & Guzin, 2017). The subject encourages exploration of student's immediate environment. As a result, Basic Science teachers continue to learn along with their students. The teaching of Basic Science is therefore, based on the philosophy of active learner participation in the process whereby, students are encouraged to learn by constructing their own knowledge based on what they already understand as they make connection between new information and old information, guided or facilitated by the teacher (Piaget) as quoted by (Anna, 2015).

Literacy is one of the most integral parts of any human development. UNESCO (2010) defines literacy as the ability to identify, understand, interpret, create, communicate and compute using printed and written materials associated with varying contexts. Literacy involves a continuum of learning in enabling individuals to achieve their goals, to develop their knowledge and potential, and to participate fully in their community and wider society. Literacy is a right. Literacy is a foundation for all further learning. Literacy is

at the core in meeting the EFA Dakar Goals and Millennium Development Goals by 2015 (UNESCO, 2010). Although much emphasis is placed on its importance, based on the EFA Global Monitoring Report (GMR) (2010), literacy is still one of the most neglected education goals in many countries, especially among the poorest nations (UNESCO, 2011). The EFA GMR (2011) refers to it as the “forgotten goal” in the EFA framework (UNESCO, 2011). Central to literacy is the notion that language (its use, teaching and learning) works as a mediating, interpretive system in the development of literacy (Banguendano, 2012). Children enter school with varying degrees of competence in speaking their language. Typically they have little knowledge about how to read and write. Many students end up struggling in reading and often lag behind in academic achievement. Across Sub-Saharan African, literacy levels for primary school children are low (UNESCO, 2010). Issues such as poor health, poverty and limited access to print is likely to contribute to delay reading acquisition and even highly trained teachers are likely to struggle in these challenging settings (Glewen & Kremer, 2013).

Literacy has become an inter-disciplinary subject of study that draws attention of many stakeholders worldwide. In the US the seriousness and commitment to literacy education was evidenced by the passage of the “Reading Excellence Act” of 1998. This Act amended Title 11 of the Elementary and Secondary Education Act of (2012) by adding a reading component to ensure that children are provided with reading skills and support they need in early childhood in order to learn to read once they enter school. Every child is provided with opportunities to ensure that she/he is able to read by the end of third grade. Other instructional practices of teachers and other instructional staff are improved in elementary schools.

The ability to read and write and process information is a necessary part of our educational experience. The teaching of reading and writing is key for the formation of literacy as young children attends school through adolescence and finally as they emerge as competent and educated adults. Literacy is now more than ever essential for basic survival on day-to-day basis. The student that struggles to read will struggle in all subjects’ area especially in physics, affecting and perhaps perpetuating a negative attitude towards reading and school general.

Literacy was once known simply as the ability to read and write. Today it’s about being able to make sense of and engage in advanced reading, writing, listening and speaking. It’s common to believe that literacy instruction is solely the change of languages or other subjects but frankly this is just not so. Literacy also interferes in the teaching and learning of physics.

Science and the communication skills of reading and writing are important aspects of the science classroom.

For centuries, the ability to read and write has given power to those who possessed it, although access to book learning is often limited to a privileged minority (Vincent, 2012). Today, by contrast, students live in a digital age in which written texts are more widely available than ever before.

Over the past decade there has been an effort to increase the literacy of students. Reading is an essential part of scientific literacy. Literacy is the ability to read and make sense of written symbols in a variety of settings and subject areas and then to be able to locate information, evaluate it critically, synthesize it and communicate it. Far too many students leave American secondary schools without the advanced literacy skills they need to succeed in higher education or to flourish in a knowledge-based economy (Biancarosa & Snow, 2013). When students graduate from high school, many do not have the knowledge or skills to tackle readings, tests, and papers at the next level (Bauerlein, 2011). More alarming is that some research has found that students engage in very little sustained reading. In schools, the reading is mainly from brief, teacher-created handouts and textbooks. In a 2006 report titled *Reading Between the Lines: What the ACT Reveals About College Readiness in Reading*, the ACT asserts, “The type of text students are exposed to in high school has a significant impact of their readiness for college-level reading”. The more students are exposed to complex texts, the more they realize that they can’t complete their studies through “a single superficial reading”.

Most content area teachers devote little, if any, class time to showing students, explicitly, what it means to be a good reader or writer in the given subject area. In schools, much of the reading to which students has access is in course textbooks, and most students engage in very little discussion of what they have read, how to write, or how to interpret, analyze, or otherwise respond to texts (Wade & Moje, 2015). Studies have shown students are capable of reading most of the words in their textbooks and can memorize words and phrases for short-term purposes. Memorizing terms and learning for short-term does not indicate mastery of the subject nor does it indicate the students are literate in the subject (Clark, 2010).

The most difficult hurdle to literacy as defined above is for teachers to help students connect with texts being read and viewed in class. Many times extra activities and in-class time may be used to try to get

students to connect. With so much focus on high stakes testing and scores, many teachers are not doing the extra activities in the name of covering content (Miners & Pascopella, 2015).

David(2010) describes science readers as interactive information processors who switch between selective perceptions of texts and concurrent experiences such as experiments and discussions. He suggests that science reading should be as interactive as a lab experiment. So the challenge to teachers is to make reading an involved, active, and interactive exercise. This means science teachers need to use strategies in their classrooms that help students to read, to understand and most importantly, to connect to the science content (Matheny, 2012). Even though most science teachers are not reading experts, their teaching methodologies share at least one important characteristic. Effective reading and science teachers integrate the acquisition of skills with the understanding of content. Science teachers can build on this to help their students become more proficient readers (Improving Reading Skills, 2011).

It has been common practice for teachers to rely on traditional textbooks as means to relay or review information. When assigned the task of reading and taking notes from the textbook, many students skim the section and write down the bold faced words. Martin (2012) suggests that students do not take expository reading seriously. They skim over the text, ignoring the sidebars, and picture captions.

Contemporary reviews of the literature and meta-analyses of research findings indicate that considerable progress has been made in identifying key teaching practices that underlie effective reading and literacy instruction during the early years of schooling (Center, 2015; Louden *et al.*, 2012). For example, a publication from the International Reading Association Cowen (2013) provides a summary and review of six influential research studies of beginning reading instruction in the United States of America (US).

Teachers are the key players in enabling students acquire literacy. A teacher, who is successful with literacy, forms a critical foundation block for thriving at school. Teachers need to be trained on how to enable students acquire literacy skills by coming up with better ways of lesson preparation, teaching strategies or methods and teacher motivation (education and training). For the teacher to be effective she/he needs to be motivated and regular observation of teachers" work by administrators.

It is important that reading instruction for students at school is conducted by skilled teachers who understand the process of literacy acquisition and are able to base their teaching of reading on research findings. In the case of the teaching of reading and writing, quality teaching involves knowledge of how students learn to read, knowledge of how to assess reading proficiency and growth (Griffi & Nix, 2012; Griffi n et al, 2012, Rowe, 2013; Rowe & Hill, 2010) and knowledge of how to use assessment information to apply the appropriate strategies. The senior secondary schools are guided by a syllabus which points out the literacy areas to be guided to students in order for them to acquire literacy.

Rose & Martin (2012), Reading to learn integrate the teaching and writing across the curricular at all schools levels and the approach has been designed and refined through extensive classrooms applications and professionals learning programs. To begin with, the task of learning, reading is addressed from two perspectives, the problem of teaching reading in the classroom, and the nature of reading itself. This sets the context for describing the reading to learn methodology for reading and writing. This program was to keep needs of indigenous students from remote communities in Ekiti State. This program was initiated after an alarm that students of Ekiti State were finishing secondary schools with no literacy a problem similar to Ado local government area. To address this need Rose David initiated the project scaffolding in reading and writing for indigenous students in school, in collaboration with Brian fircy and Wendy Cowey of schools and community centre.

In order to develop a literate and learned individual, there is a need to create sustainable literate environments for that individual to live in because a learned person is a product of literate environments (UNESCO, 2011). Dynamic and stimulating literate environments at home, in the classroom, workplace, and the community are essential to literacy acquisition, development and lifelong use (Easton, 2011). The basic elements of literate environments include: literacy materials and activities, physical environment and socio-cultural environment. It is the dynamic relationship among these elements that provide a rich and stimulating literate environment (UNESCO, 2011).

Literacy materials are tools that can facilitate literacy development, acquisition and application. These include reading and writing materials, counting objects and even audiovisual materials. With the advent of new technologies, many of these materials can be provided in electronic formats, thus making the facilitation of learning easier and sometimes faster (UNESCO-Bangkok 2011).

Promoting a literate environment calls for greater attention and focus on access to reading materials or manuals that are responsive to the interests and learning needs of learners in school and more particularly, at home. The relevance and meaning of the information they gain increases their knowledge,

wisdom and competencies. These serve as major driving forces that encourage self-learning, learning for life, and productivity. Examples of reading materials include: books, newspapers, magazines, reading from internet enable learners to connect their spoken language with the written script thus making reading a natural activity for them (Krolak, 2011). Unfortunately, most of the secondary schools are not are priority when the school is budgeting and purchasing reading materials in secondary school.

Good quality reading materials should target all types of learners, from students who are new readers to competent readers (UNESCO, 2010). To do so, the following factors need to be considered: Appropriateness and relevance of materials. Reading materials should be appropriate and relevant to all types of learners. Materials based on the reading level, interests and needs of the learners, written in the languages they speak, addressing the problems they have identified, and helping to achieve their personal and community goals, will serve as a useful resource for their development (Malone & Arнове, 2011).

Involvement of learners and community: Reading materials can be composed by the learners themselves. These are usually referred to as learner-generated materials. Their content can arise from in-class discussions about issues concerning the learners. In this process, learners discuss a relevant topic and based on the discussion they compose their own way of solving problems and assignment given to them. Other community members can also compose reading materials about topics that are interesting to the learners in their community. Locally developed materials can communicate functional information to learners in story form. These stories may be about a community health problem, or about a local person who overcame a certain difficulty, or about individual learners who were able to transform their lives. Do our teachers have the technical knowhow in coming up with these materials? Alternative ways of producing materials: Reading materials are sometimes produced by publishing houses and these include textbooks and supplementary materials (UNESCO, 2011).

Audio visual materials: In creating literate environments, while the written word is important, it is not the "final" word. Oral stories, visuals, and ideas expressed in dialogue, folktales, art, rituals and traditions are also bearers of literacy, educational context and meaning. Today's world has become more visual than before and the ability to understand images and symbols is just as important as understanding words (Lim, 2010). Learning from these materials is even made easier with the advent of modern technology that enables learners to view images and hear sounds repeatedly. This has resulted in the development and production of audiovisual materials.

The basic science environment is a "literacy stimuli." It has an effect on the development and functioning of learners. An attractive, organized and inviting environment that encourages conversations among learners or allows them to work on their own or in small groups, can accelerate their literacy development and promote good reading behavior and habits. The availability of literacy materials as well as how they are organized in space can greatly influence learning and enhance the acquisition of reading and writing skills by learners (UNESCO, 2011).

One of the most commonly cited reasons for the level of illiterate youth is students simply do not have the literacy skills to keep up with the high school curriculum, which has become increasingly complex (Kamil, 2013; Snow & Biancarosa, 2013).

Literacy intervention is the overall scope of reading and writing skills and emergent literacy skills includes phonological awareness, phoneme blending, segmenting skills and knowledge of point concepts.

Ekiti State illiteracy rates continues to rise despite the measure the government introduced that the before any student could be admitted into secondary schools in Ekiti State must know how to read and write.

Although, teachers in the primary schools focus on developing of oral language skills coupled with emergent literacy skills that have been shown to facilitate the reading process because study have shown that reading problems are usually first seen in the very first year of reading acquisition and they are very hard to overcome.

Research Hypotheses

The following hypotheses were formulated for the study:

1. There is no significant impact of students' reading other text on his literacy in basic Science.
2. There is no significant difference between student of low level of literacy and students of high level of literacy of students in senior secondary schools.
3. There is no significant difference between the academic achievement of students in Basic science with low and high level of literacy.

Research Method

A descriptive survey research design was adopted for this research study on the impact of literacy intervention on Students’ learning of Basic Science in Junior Secondary Schools in Ikere local government Area, Ikere-Ekiti, Ekiti State, Nigeria. The population for the study consists of all public junior secondary school students in Ikere local government Area, Ekiti State, Nigeria which comprises of 10 public secondary schools.

The selection of schools and respondents was done by random sampling technique method, because they serve the purpose of the research study. The sample size of the study was 100 respondents in Junior Secondary School. Twenty (20) students were randomly selected from JSS 2 classes from five (5) selected junior secondary schools for sample to make a total of 100 JSS2 basic science students.

The instrument for data collection was questionnaire titled “Impact of Literacy intervention on Students’ Learning of Basic Science in Junior Secondary Schools in Ikere Local Government Area, Ekiti State, Nigeria”. It is a structured questionnaire developed to elicit relevant information from the respondents for the study.

The face and content validity of the instrument were determined by experts by subjecting the instrument to validity and reliability mechanism. Test-re- test method was used to ensure the reliability of the instrument. A sample of 100 respondents was selected to respond to the questionnaire on different occasion with a time interval of two weeks. The two set of score generated were then correlated to determine the correlation between the first and the second administrations and the result showed reliability coefficient Of 0.86, which was very significant.

The researchers visited all the schools personally to administer the questionnaire on the selected sample. A total of 100 copies of the questionnaire were sent out and all were retrieved for analysis.

Three research hypotheses were formulated and tested at 0.05 level of significance. The data collected were analysed using Chi-Square (X^2) statistical analysis package.

Results and Discussion

Hypothesis One: There is no significant relationship between students’s reading other text and his literacy in basic science.

Table 1: Chi-Square (χ^2) Statistics for students reading other text and his literacy in Basic Science.

S/N	STATEMENT	SA	A	D	SD	df	χ^2 -Cal	χ^2 -Tab
1.	I think about the basic science I experience in everyday life.	45	30	15	10	3	18.93	7.82
2.	To understand basic science, I sometimes think about my personal experiences and relate them to the topic being analyzed.	50	20	25	5			
3.	The subject of basic science has little relation to what I experience in the real world	35	30	15	20			
4.	Reading skills are important for understanding basic science	50	20	20	10			
5.	I think it is important to read novels in classes other than English	35	34	21	10			
6.	Reading other text books increase my knowledge in basic science.	55	25	15	5			

P< 0.05

The result presented in table 1 showed that χ^2 -calculated (18.93) is greater than χ^2 -table (7.82) at df = 3, and at p< 0.05 level of significance. This makes the null hypothesis one which states that there is no significant difference between the students reading other text and his literacy in basic science to be rejected.

Hypothesis Two: There is no significant difference between student of low level of literacy and students of high level of literacy of students in senior secondary schools.

Table 2: Chi-Square (χ^2) Statistics for student of low level of literacy and students of high level of literacy of students in senior secondary schools.

S/N	STATEMENT	SA	A	D	SD	df	χ^2 -Cal	χ^2 -Tab
1.	When I am answering a basic science question, I find it difficult to put what I know in to my own words.	20	30	10	40	3	21.14	7.82

2.	Literacy assisted me to understand basic science and its terms	65	15	5	15			
3.	To learn basic science I only need to memorize facts and definition.	45	25	10	20			
4.	Understanding basic science basically means being to recall something you have read or been shown.	75	5	10	10			
5..	I basically don't read books much at all.	30	25	20	25			
6.	I don't have much time to read for pleasure, but I like to read when I get the chance.	60	20	5	15			

P < 0.05

The result presented in table 2 showed that χ^2 -calculated (21.14) is greater than χ^2 -table (7.82) at df = 3, and at p < 0.05 level of significance. This makes the null hypothesis two which states that student of low level of literacy and students of high level of literacy of students in senior secondary schools to be rejected.

Hypothesis Three: There is no significant difference between the academic achievement of students in basic science with low and high level of literacy.

Table 3: Chi-Square (χ^2) Statistics for academic achievement of students in basic science with low and high level of literacy.

S/N	STATEMENT	SA	A	D	SD	df	χ^2 -Cal	χ^2 -tab
1.	High level of literacy improves my academic achievement.	50	25	15	10	3	15.23	7.82
2.	I enjoy figuring out answers to basic science questions.	45	15	25	15			
3.	Reasoning skills used to understand basic science can be helpful to my everyday life.	50	20	18	12			
4.	When studying basic science, I relate the important information to what I already know rather than to just memorizing it the way it is presented.	30	27	23	20			
5.	I think that reading the textbook in detail is a good way to learn basic science.	55	30	5	10			
6	I read constantly for my own personal satisfaction	40	25	16	19			

P < 0.05

A cursory look at the result presented in table 3 showed that χ^2 -calculated (15.23) is greater than χ^2 -table (7.82) at df = 3, at p < 0.05 level of significance. This makes the null hypothesis to be rejected. Therefore, the result is significant (i.e. the result shows positive affirmation), showing that there is no significant difference between the academic achievement of students in basic science with low and high level of literacy.

Discussion

The findings of this study titled “Impact of Literacy Intervention in the Teaching and Learning of Basic Science in Junior Secondary Schools in Ikere Local Government Area of Ekiti State”.

Table 1 reveals that there is no significant relationship between students’s reading other text and his literacy in basic science.

Table 2 Shows that there is no significant difference between student of low level of literacy and students of high level of literacy of students in senior secondary schools.

Table 3 shows that there is no significant difference between the academic achievement of students in basic science with low and high level of literacy.

Conclusion

From the research findings, it is evident that literacy intervention has contributed to literacy acquisition in learners but teachers need to be motivated to implement the programme fully in order to realize the objectives. Most learners could read but in oral and writing areas are still wanting.

Recommendations

From the findings of the study several recommendations were suggested in various aspects which would go a long way in improving performance of public schools in literacy intervention in teaching and learning of basic science in senior secondary school in Ikere local government area of Ekiti State.

1. Stakeholders need to focus on all aspect of basic science learning in senior secondary school. Teachers need to be trained intensively.
2. The school administration and other education stakeholders should ensure that enough text books are provided to students for revision, give priority to construction of enough library rooms.
3. The school management, Administration and government to support basic science student of senior secondary school by providing practical laboratory and practical materials.

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