

## **PEDAGOGICAL PLACE OF E-LIBRARY IN IMPROVING SECONDARY SCHOOLS CHEMISTRY STUDENTS' ACADEMIC PERFORMANCE IN IREPODUN LOCAL GOVERNMENT AREA, KWARA STATE.**

**AJANAKU, Adeniyi PhD; Abdulkadir Suleiman Alabi & Olanrewaju Olaide Kuburat**

<sup>1,2,3</sup> Department of Chemistry Kwara state College of Education ,Oro

### **Abstract**

*This study was carried out to examine the Pedagogical Place of E-library in Improving Secondary Schools Chemistry Students' Academic Performance, Irepodun Local Government Area, Kwara State. The research method used is descriptive survey. Two research questions were formulated to guide this study. The sample consisted of 120 respondents who were sampled using multipurpose sampling technique. A set of questionnaire developed and validated by the researcher was used to collect data for the study. The data collected were analysed using descriptive statistics. The study revealed that a significant relationship existed between the use of e-library and students academic performance in chemistry. The finding of the study indicated that the digitalization of the library is being confronted with a number of problems which are the shortage of finance, epileptic power supply, unqualified library personnel. Based on the findings of this study, it was recommended that users of libraries, in this case, students of senior secondary schools, should be encouraged to become technological advanced in order to be able to use the e-library facilities, without difficulties.*

**Keywords:** Pedagogical, E-library, secondary school, chemistry, academic performance

### **Introduction**

Education is the process of facilitating learning or the acquisition of knowledge, skills, values, beliefs and habits. Quality education specifically entails issues such as appropriate skills development, gender parity, provision of relevant school infrastructure, equipment, educational materials and resources, scholarships or teaching force.

Science is a systematic study of the physical and natural environment through careful observation. Wikipedia (2022) defined science as a systematic enterprise that builds and organizes knowledge in the form of testable explanations and predictions about the universe. Science is the fundamental ingredients of technology and the development of any nation today depends on its scientific and technological development. Science and technology are important because they have turned many

countries to superpower, save lives, cures horrible and incurable diseases among others. Chemistry is one of the important science subjects taught at the senior secondary school and tertiary levels of education in Nigeria.

Achimugu (2020) defined chemistry as the study of matter, its properties, structures, compositions, uses as well as the changes of matter during chemical reaction. Our world is made of matter and chemistry probes into the structure and changes that matter undergoes. Chemistry is very important in the life of any human being as it is essential to meeting our basic need of life. It has contributed towards improving the quality of our life by providing their basic needs such as food, clothing, housing, medicine, and transportation. The power of chemical science is what creates an enabling environment that derives the food, medicines and materials which are the hallmarks of modern life.

Chemistry as the scientific discipline that investigates the properties, composition, and behavior of matter, as well as the changes it undergoes during chemical reactions, encompasses the study of atoms, molecules, ions, and the bonds that hold them together, providing insights into the fundamental principles governing the physical world (Yoshida.2020).

Chemistry explores the composition, structure, properties, and changes of matter. It encompasses various subfields, including organic chemistry, inorganic chemistry, physical chemistry, analytical chemistry, and biochemistry, each focusing on different aspects of matter and its interactions. Recent advancements in chemistry have led to significant breakthroughs in areas such as materials science, drug discovery, environmental remediation, and renewable energy (Schubert, 2021).

A library is a collection of books, and possibly other materials and media, that is accessible for use by its members and members of allied institutions. A library's collection normally includes printed materials which may be borrowed, and usually also includes a reference section of publications which may only be utilized inside the premises. Resources such as commercial releases of films, television programmes, other video recordings, radio, music and audio recordings may be available in many formats (Singleton, 2014).

A digital library, also called an online library, an internet library, a digital repository, a library without walls, or a digital collection, is an online database of digital objects that can include text, still images, audio, video, digital documents, or other digital media formats or a library accessible through the internet. Objects can consist of digitized content like print or photographs, as well as originally produced digital content like word processor files or social media posts. In addition to storing content, digital libraries provide means for organizing, searching, and retrieving the content contained

in the collection. Digital libraries can vary immensely in size and scope, and can be maintained by individuals or organizations (Achimugu, 2020).

The relevance of E-library in the teaching and learning of Chemistry is important in secondary schools as a subject because of its systematic approach and takes complex processes to aids effective teaching and learning of Chemistry. In most cases, Chemistry teaching and learning can be done with the use of E-library to start data, access, retrieval and dissemination of information to students of Chemistry in Senior Secondary Schools. E-library is important for effective teaching and learning of Chemistry because it ease learning and teaching of the chemistry in schools (Achimugu, 2020).

Olaewe, et. al. (2019) posited that e-library is a special library with a focused collection of digital objects that can include text, visual materials, audio materials, video materials, stored as electronic media formats (as opposed to print, microform or other media along with means for organizing, storing and retrieving the files and media contained in the library collection). According to them, the breakthrough in technology is the foundation on which the e-library is constructed. They wrote that the electronic era of the 21st century has brought tremendous changes to the libraries working environment and acquisition of information resources that in turn presupposes the implementation of new strategies, change of structure and devising new acquisition principles.

### **Incorporating E-library into Secondary School Chemistry Education**

Chemistry as one of core science subjects that deals with matter and the changes it undergoes under different conditions (Achimugu, 2020). It is a fascinating field of study since it is essential for meeting our basic needs of food, health, shelter, clothing, energy, etc. It is therefore not surprising that chemistry education is taught and learnt at two major levels of education namely senior secondary schools and tertiary education in many countries. The objectives of senior secondary school chemistry curriculum accordingly to Federal Ministry of Education (2014) are to: develop interest in chemistry, organise basic theoretical and practical knowledge and skills, develop interest in science, technology and mathematics, acquire basic knowledge and skills, develop reasonable level of competence in Information communication and technology (ICT) through E-library applications that will engender entrepreneurial skills, apply skills to meet societal needs of creating employment and wealth, take advantage of numerous career opportunities offered in chemistry and be adequately prepared for further studies in chemistry. No doubt, the achievement of these objectives in today's world requires the knowledge and practice of ICT through E-library. Chemistry teachers and students are part of digital society as emphasized in one of the objectives of secondary education objectives, and hence should be able to incorporate ICT through E-library into secondary school chemistry education. It is important with

to note that any ICT tool to be used in teaching and learning chemistry at the senior secondary school level should be simple, available, appropriate and affordable. These tools include Cellular phone, Radio, Television, laptop, etc. Their usage should be such that students will be at the comfort of their homes to avoid being kidnapped and killed in the school environment. Thus staying at home to learn will guarantee the safety of chemistry students from the various security challenges.

### **Different Types of ICT Through E-library In Improving Secondary Schools Chemistry Students' Academic Performance**

- (i) **Television:** Instructional television programme is very popular in disseminating information in chemistry education. Indeed one method of teaching is the use of Interactive Television Instruction (ITI) which is interactive lesson involving a chemistry teacher and the students. The students are normally given the time of the programme and they will tune to the television accordingly to receive the lesson. A number of concepts can be taught using this teaching strategy. Learning using instructional television is one of the methods students can study at home.
- (ii) **Radio:** It is the oldest ICT through E-library used in passing information. It is also means of radio instruction. It is cheap and has wider coverage. It is however one way interaction pattern where the teacher dishes out the materials and students take note of them. Learning through radio is an effective way of keeping the students to be academically busy at any place especially as the radio set is affordable and cheap to purchase. Beside handsets have apps that can access radio stations making radio affordable and popular ICT through E-library tool in teaching and learning of Chemistry.
- (iii) **Audio/Video Tapes:** Audio tapes can only capture voice and can be played using radio cassette player. The students can replay or rewind when necessary. Also video camera can be used to record a particular lesson in chemistry using CD-ROM or DVD. Information can be stored in these devices in different formats. The tapes can be viewed through Television set like audio tapes; it can be replayed, paused and rewound. The recorded cassette can be played at home without the child going to school.
- (iv) **Cellular Phones/Internets:** Cellular phones are computers open students to the world of internet from where they can access and study course materials online (Fasasi, 2016). This is a fast growing medium of teaching and learning. Live instructions can take place between students and teachers from different part of the world. It requires personal computer and internet. But many smart phones can be used in the place of computer and students can utilize them to learn online.

These technologies facilitate access by students to internet and thus open to them the opportunity learning theory and practical chemistry at home.

(v) **Audio/Video Conferencing**

This is a form of capturing from audio and video. Teachers and students in different location see and hear each other in reality without physical presence of the interacting parties. It gives opportunity for asking questions and making clarifications. The use of smart phones makes this interaction relatively cheap and easier compared to use of computers. There is no physical contact between chemistry teacher and his/her students and hence the students do not need to travel or be at the school to learn.

In spite of the roles of e-libraries, teachers and learners of Chemistry in schools still face challenges in access and retrieval of e-resources and services which grossly affect effective teaching and learning of Chemistry activities. If improvement and innovation of e-library for teaching and learning of Chemistry are not put into consideration, the teachers and learners of chemistry would be discouraged to patronize the e-library and that would culminate into low teaching and learning of Chemistry output and falling standard of the school. This work is in support of the use of e-library in teaching and learning of Chemistry.

**Purpose**

The aim of this study was to:

1. determine the frequency and quality of e-library usage on the academic performance of students of Chemistry in secondary schools?
2. find out the perceived challenges of using e-library resources for teaching and learning of chemistry in secondary schools?

**Research Questions**

1. How does the frequency and quality of e-library usage affect the academic performance of students of Chemistry in secondary schools?
2. What are the perceived challenges of using e-library resources for teaching and learning of chemistry in secondary schools?

**Research methods**

The study adopted descriptive research design of the survey type. The research design was considered appropriate because it described the existing situation regarding the e-library and the academic performance among the respondents. The population of the study comprises of all the senior secondary school chemistry students of Irepodun Local Government Area, Kwara State. A total of 120 (One hundred and twenty) students were selected through a random sampling techniques from six selected

secondary schools in the study area. The researchers utilized a set of questionnaire for data collection. The questionnaire was subdivided into two sections. Section ‘A’ elicits information on the respondents’ bio-data. Section ‘B’ gathered data on various statements as related to each of the research questions raised in chapters. These statements were rated on five point modified likert scales of Strongly Agree (SA), Agree (A), Disagree (D), Strongly Disagree (SD) and Not Sure (NS). The instrument was validated by four experts. The reliability of the questionnaire was determined using test retest with a reliability coefficient of 0.89. The administration of the questionnaire was done by the researcher after obtaining permission from the schools’ authority, teachers and the respondents. The questionnaire was administered to the respondents in the class rooms at different levels of the classes in the schools that were involved in the study. The respondents were given sufficient time to answer the questions in the instrument. The data collected were analysed using descriptive statistics of frequency counts and percentages.

**Results Table 1:** Analysis of the respondents’ responses to the research question one: How does the frequency and quality of e-library usage affect the academic performance of students of Chemistry in secondary schools?

S/N	Items	SA	A	D	SD	Mean	Decision Rule
1	Electronic libraries help the students of Chemistry to save time of visiting the conventional (physical) library to search for relevant materials from the shelves	56(3.6)	49(0.15)	11(0.05)	4(0.02)	3.82	Accepted
2	Digital libraries can help in the preservation of information materials from falling to degradation, as a result of repeated/constant use.	60(2.2)	40(0.75)	6 (0.1)	14(0.15)	3.2	Accepted
3	Digital libraries strongly guarantee Chemistry students multiple accesses to the same information material at the same time.	100(3.2)	8 (0.45)	7 (0.05)	5(0.025)	3.73	Accepted
4	Digital libraries provide Chemistry students, a fast accessibility to	90 (3)	20(0.6)	7 (0.07)	3(0.015)	3.69	Accepted

	information materials which are universally located by means of automated enhanced catalogues.						
5	Electronic libraries make the provision and circulation of information materials on Chemistry more efficient and enjoyable for students.	65 (2)	34 (1.2)	7 (0.04)	14(0.08)	3.32	Accepted

**Table 1** above revealed that the mean rating of items 1,2,3,4 and 5 are 3.82, 3.2, 3.73, 3.69, and 3.32. All the mean ratings of items 1, 2, 3, 4, and 5 are above the cut - off point of 2.5. This implies that the respondents agreed that the frequency and quality of e-library usage affect the academic performance of students of Chemistry in secondary schools.

**Table 2:** Analysis of the respondents' responses to the research question two: What are the perceived challenges of using e-library resources for teaching and learning of chemistry in secondary schools?

S/N	Items	SD	A	D	SD	Mean	Decision Rule
1	Lack of the required funding is a major factor preventing the functionality of electronic library in our school.	90(3.2)	15(0.53)	10(0.03)	5(0.01)	3.77	Accepted
2	There is no enough library personnel that have the required skills needed for the digitalization of the library operations in our schools..	95(3.6)	10(0.15)	12(0.04)	3(0.03)	3.82	Accepted
3	Epileptic power supply is a major factor militating against the functionality of digital library.	80 (2)	20(1.35)	15(0.05)	5(0.02)	3.42	Accepted

4	Internet connectivity is a problem facing the attempt of digitalizing the operations of library in our schools.	60(1.8)	30(1.05)	19(0.15)	11(0.13)	3.13	Accepted
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Table 2 above revealed that the mean ratings of items 1, 2, 3 and 4 are 3.77, 3.82, 3.42. All the mean ratings of items 1, 2, 3 are above the cut-off point of 2.5. This implies that the respondents agreed that the above factors are the perceived challenges of using e-library resources for teaching and learning of chemistry in secondary schools.

### Discussion

Findings revealed that a significant relationship was observed between frequency and quality of e-library usage on the academic performance of students of Chemistry in secondary schools. The relevance of E-library in the teaching and learning of Chemistry is important in secondary schools as a subject because of its systematic approach and takes complex processes to aids effective teaching and learning of Chemistry. In most cases, Chemistry teaching and learning can be done with the use of E-library to start data, access, retrieval and dissemination of information to students of Chemistry in Senior Secondary Schools. E-library is important for effective teaching and learning of Chemistry in which it ease learning and teaching of the chemistry in schools (Achimugu,2020).

The findings further showed that there are many challenges of using e-library resources for teaching and learning of chemistry in secondary schools. This is similar to findings of a study conducted by Okorie et al (2018) that the biggest problems that students encounter in using Elibrary, according to the study, are epileptic power supply and access cost. As a result, it was advised that consistent provision of electric power and a reduction in the cost of accessing the Internet be considered as potential solutions to the highlighted concerns in students' use of Elibrary.

### Conclusion

Based on the findings of this research work, it is clear that E-libraries have become more responsive in making library users more literate in terms of using technology. These technologies have significant relevance to the learning of Chemistry in Senior Secondary schools.

### Recommendations

Based on the finding of this study, the following recommendations are made:

- i. Library administrators should collaborate with their parent institutions or establishing authorities to gain some sorts of financial assistance and any other form of assistance to help them in running the e-library.

- ii. Users of libraries, in this case, students of senior secondary schools, should be encouraged to become technological advanced in order to be able to use the e-library facilities, without difficulties.
- iii. Constant power supply, such as standby generators and Uninterrupted Power Supply (UPS) should be made available in the libraries, to facilitate the effectiveness of the digitalized set-up.

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