

**EFFECT OF POWER POINT PRESENTATION MODE ON STUDENT  
ACHIEVEMENT AND RETENTION IN STRUCTURE AND BONDING IN  
CHEMISTRY KADUNA STATE**

**BY**

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## ABSTRACT

This study was carried out to determine the effect of power point presentation on secondary schools' students' achievement and retention in chemistry. The sample of the study consisted of 99 students. The sample consisted of the intact classes, one experimental group with 58 students and the other one as control group had 39 students. A random sampling technique using balloting method was used in selecting the two schools out of the 65 public secondary schools in Chikun Educational Zone. A pre-test-post-test quasi experimental design was used. The instrument used was Chemistry Achievement Test (CAT) and Chemistry retention Rating Scale (CRRS) which were both validated and with reliability coefficients of 0.75 and 0.78 respectively. The hypotheses stated were tested using t-test statistics at  $P \leq 0.05$  level of significance. Major findings of the study revealed that there is significance difference in the academic achievement and retention rating among secondary school students exposed to power point presentation. But there is no significance difference in the academic achievement and retention in Chemistry rating scale between male and female students exposed to power point presentation. In the light of the findings from this study, the following recommendation was made among others. School authorities and government agency in charge of managing the affairs of secondary schools should make provision of computers and education softwares and train teachers with the current development in the methodology of teaching and learning chemistry.

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## **CHAPTER ONE**

### **1.0 INTRODUCTION**

#### **1.1 BACKGROUND TO THE STUDY**

There is no simple or universal definition of science and technology, the easiest way for us to understand these two concepts is when science gives man a conceptual frame work of his physical and social worlds. Technology equips a man with the tools, knowledge, skills, techniques and attitudes of the mind with which to respond to the challenges of the world. Hensicke (2009) see technology as the application of knowledge and skills in solving a problem that is the knowledge and skills applied in using artifact and processes, Abdullahi (2007) stated that science is an activity culminating into a testable falsable, veritable body of knowledge through systematic and rational organization of fact about a particular phenomenon of interest. Science is mainly concerned with understanding natural phenomenon and creating conceptual frame work for its explanation. The practical manifestations of science tools and technical knowhow can be best describing as technology. Technological tools and equipment when integrated into educational sector could enhance learning process thereby enhancing effectiveness to instruction.

McEwan (2015) concludes that computer-based interventions in primary schools have higher average effects of 0.15 standard deviations than teacher training, smaller classes, and performance incentives. Chemistry been a very broad subject and area of study with many sub topics versely describing elements, compounds and the relationships between them, most sub topics are more of practicals so it appeals to both hearing,

seeing and touching to observe better retention for teaching and learning process to be observed.

Chemistry is a branch of science its genesis can be traced to certain practices known as Alchemy, which had been practiced for several decades in various part of the world, particularly in the Middle East (Ancient chemistry (2009), chemistry is the scientific study of interaction of chemical substances that are constituted of atoms or sub-atomic particle -protons and neutrons. Iwagu (2009) defined it as the science concerned with the composition, structure and properties of matter as well as the changes it undergoes during chemical reaction.

One topic in the subject area of chemistry which is "STRUCTURE AND BONDING" must be carefully observed due to the large number of drawing of structures and bond angles, therefore Teaching and learning process can be carry out through the effective use of computer-based presentation in these field of study to enhance retention in the students.

Therefore, the use of PowerPoint presentation will play a very important role in the teaching contents and instructions

A PowerPoint presentation is a type of digital presentation created using Microsoft PowerPoint software. It is typically used to display slides with text, images, charts, graphs, and multimedia elements such as audio and video. PowerPoint presentations are commonly used in business, education, and other settings where information needs to be presented in a clear and organized manner. They can be used for training sessions, product demonstrations, business pitches, academic lectures, and more. PowerPoint

presentations can be saved as a file and easily shared with others via email, file sharing platforms, or presentation software.

With the aid of PowerPoint presentation in chemistry it could affect students positively both male and female.

There are many factors that can affect male and female student achievement and retention in academic settings. Here are some potential factors to consider:

**Learning style:** Research has shown that male and female students may have different learning styles. For example, some studies suggest that males may be more visually oriented, while females may be more verbal. Teachers who are aware of these differences can adapt their teaching methods to better engage both male and female students.

**Role models:** Both male and female students benefit from having positive role models who share their gender. This can be especially important in fields where one gender is traditionally underrepresented. For example, female students may be more likely to pursue STEM (science, technology, engineering, and math) fields if they have female STEM role models to look up to.

**Classroom environment:** The classroom environment can also play a role in male and female student achievement and retention. Research has shown that female students may be more sensitive to the classroom environment than male students, and may be more likely to feel discouraged if they don't feel supported. Teachers can create a welcoming and inclusive classroom environment by being aware of their biases, using inclusive language, and providing opportunities for all students to participate.



Curriculum: The curriculum can also affect male and female student achievement and retention. For example, if the curriculum only focuses on male historical figures and ignores the contributions of women, female students may feel excluded and less motivated to participate. Teachers can address this by including diverse perspectives in their teaching materials.

Stereotypes: Gender stereotypes can also impact male and female student achievement and retention. For example, if male students are stereotyped as being better at math and science, they may be more likely to pursue those fields, while female students may feel discouraged. Teachers can challenge these stereotypes by providing opportunities for all students to excel in all subjects.

Support services: Finally, support services can be important for both male and female student achievement and retention. For example, students who are struggling with a particular subject may benefit from extra tutoring or academic support. Students who are dealing with personal or family issues may benefit from counseling or other support services. Teachers can work with administrators to ensure that these services are available to all students who need them.

Therefore In the presence of qualified teachers, recommended textbooks and adequate computer assisted mediums of presentations, it will affect teaching of structure and bonding in chemistry to the effect of better comprehension and retention . It is on this not note that this study is considered necessary

## 1.2 STATEMENT OF THE RESEARCH PROBLEM

Structure and bonding have so far been one of the challenging areas of study in chemistry due to the presence of components in these field such as the atomic structure and drawing of bond angles and structures like structure of methane, ethane and ethylene

The trend of poor performance of students from secondary school levels into the institution of higher learning, chemistry as a subject area has been more and more attended to, to further improve the performances of student from diverse school In Nigeria with deficiency due to lack of computer integration in schools.

WAEC (2012) candidates that offered chemistry performed poorly in area of understanding of the content's equilibrium of reversible reaction, writing of chemical formulas, correct balancing of chemical equations and explanation of basic chemical principles, concepts and applications. Many factors could be the challenge for these unacceptable trends of poor performance, which one of these factors is the absence of computer-based presentation of instructional content, such as PowerPoint presentation.

This study therefore intends to make research on the problem and thus pose the following questions

- a) What is the effect of PowerPoint presentation on students Achievements and retention in structure and bonding in chemistry?
- b) To what extent does the effect of PowerPoint presentation affect students' achievements and retention in structure and bonding in chemistry?

### **1.3 Aim and objectives of the study**

The aim of the study is to therefore investigate the effect of PowerPoint presentation on students' achievements and retention in structure and bonding in chemistry in some victory international school kaduna state Nigeria. Specifically, the study intends to find out whether:

- 1) The mean achievements of students taught structure and bonding using PowerPoint presentation modes and those taught using conventional teacher modes.
- 2) The mean retention of students taught using PowerPoint presentation modes and those taught using conventional teacher modes.
- 3) The mean achievements score of male and female taught using PowerPoint presentation modes.
- 4) The mean retention rating score of male and female taught using PowerPoint presentation modes.

### **1.4 RESEARCH QUESTIONS**

The research is set out to answer the following questions:

- 1) What is the mean achievements score of students taught structure and bonding in chemistry using PowerPoint presentation modes and those taught using conventional teacher modes?
- 2) What is the mean retention rating score of students taught structure and bonding using PowerPoint presentation modes and those taught using conventional teacher mode?
- 3) Is there any significance difference in the achievements?

4) To what extent does the retention rating of boys differ from girls taught structure and bonding using PowerPoint presentation modes?

### **1.5 RESEARCH HYPOTHESIS**

Therefore, the following null hypothesis was tested at 0.05 level of significance.

HO<sub>1</sub>) there is no significant difference between the mean achievements score of students taught structure and bonding in chemistry with PowerPoint presentation modes and those taught using conventional teacher modes.

HO<sub>2</sub>) there is no significant difference between the mean retention score of students taught structure and bonding in chemistry using PowerPoint presentation modes and those taught using conventional teacher modes.

HO<sub>3</sub>) there is no significant difference between the mean achievements score of boys and girls taught structure and bonding in chemistry using PowerPoint presentation modes.

HO<sub>4</sub>) there is no significant difference between the mean retention rating of boys and girls taught structure and bonding in chemistry using PowerPoint presentation modes

### **1.6 Significance of Study**

These study and research were carried out in order to find out the effects of PowerPoint presentation on secondary school students' achievements and retention in structure and bonding in chemistry.

This study is targeted at providing parents, teachers and students ways of encouraging better performances of student in chemistry.

To Chemistry teacher, the study will generally help in guiding and directing teachers in

written of lesson plan, that relate to PowerPoint packages in their homes to ignite, sustain and improve students' retention in chemistry.

To the curriculum planners, the findings of the study will make it necessary now than before to specify appropriate instructional strategies for enhancing student retention and making the subject student centered.

To Government and non-Governmental organization, the findings will provide a different point of view if the issues of poor performance In chemistry is to be tackled, holistically it emphasize on the need to organise policies, seminars, lecturers, workshops etc, which will be aimed at developing and increasing rate of students retention ability in chemistry and other sciences for the nation to advance to a level in science and technology.

### **1.7 Scope of the Study**

This study is delimited to determine the effect of PowerPoint presentation achievements and retention on senior secondary school students in chemistry in kaduna state, as well as the effects of Learning outcome in regard to gender.

This study was carried out to determine the effect of PowerPoint presentation on senior secondary school students' achievements and retention in chemistry. The selected class is senior secondary (ssIII) chemistry students, only two Selected schools in kaduna state metropolis, Nigeria.

This study will be carried Out in gonin gora educational zone chukun local govt area kaduna state Nigeria. The classes of interest will be senior secondary school(ssIII) chemistry student. The content area to be covered in this study will be delimited to the

introduction of structure and bonding to senior secondary school (ssiii) to there curriculum as an experiment for other sub topics at there to enhance the forth come WAEC exams

## **1.8 OPERATIONAL DEFINITION OF TERMS**

**Structure** is defined as the arrangement of atoms, ions, or molecules in a substance.

There are several types of structures that can be used to describe a substance:

**Molecular structure:** This refers to the arrangement of atoms within a molecule, including the bond lengths, bond angles, and any stereochemistry.

**Crystal structure:** This refers to the arrangement of atoms or ions in a crystalline solid. This includes the unit cell, which is the smallest repeating unit of the crystal lattice, and the symmetry operations that relate different parts of the crystal lattice.

**Electronic structure:** This refers to the distribution of electrons in an atom, molecule, or solid. This includes the electronic configuration of the atoms or ions and the molecular orbitals that describe the electronic states of molecules.

**Isomeric structure:** This refers to the different ways in which atoms can be arranged within a molecule, leading to different chemical properties. This includes structural isomers, which have the same molecular formula but different arrangements of atoms, and stereoisomers, which have the same molecular formula and the same arrangement of atoms but different spatial arrangements due to the presence of chiral centers or double bonds.

**Bonding** refers to the force or attraction that holds atoms or ions together in a molecule or crystal. Bonding involves the sharing or transfer of electrons between atoms to

achieve a stable configuration of outer electrons. There are three main types of chemical bonds: covalent bonds, ionic bonds, and metallic bonds.

**Achievement** is the successful accomplishment of a particular task, goal, or objective that is recognized as valuable, significant, or important. It is the attainment of a desired outcome through effort, skill, persistence, and/or other forms of effective performance. Achievements can take various forms, such as academic accomplishments, professional accomplishments, personal accomplishments, or social accomplishments, among others. They can be measured and evaluated based on specific criteria, such as the level of difficulty, the level of impact, the level of recognition, and the level of satisfaction. Achievements can provide a sense of accomplishment, pride, and fulfillment, and can serve as a source of motivation and inspiration for future endeavors.

**Retention** refers to the ability of an individual, organization, or system to retain or hold onto something or someone for a period of time. In a business context, retention can refer to customer retention, which is the ability of a company to keep its existing customers over a period of time, as well as employee retention, which is the ability of an organization to keep its employees from leaving for other opportunities. Retention can also refer to the act of keeping or holding onto information, skills, or knowledge over a period of time.

## CHAPTER TWO

### LITERATURE REVIEW

#### 2.1 Conceptual Framework

##### 2.1.1 Integration of ICT

Information and Communication Technology (ICT) can be very useful when it comes to citing sources in academic writing. Here are some ways to integrate ICT:

Use citation management software: There are several software programs available, such as Zotero, Mendeley, and EndNote, that can help you manage your citations. These programs allow you to easily store, organize, and cite your sources, as well as generate bibliographies in a variety of citation styles.

Online citation tools: There are also several online citation tools that can help you generate citations in various citation styles, such as Citation Machine, BibMe, and EasyBib. These tools allow you to input information about your sources and generate a citation that you can copy and paste into your paper.

Hyperlinks: Another way to integrate ICT with citations is by using hyperlinks. Instead of including a full citation within your text, you can simply hyperlink the source to the reference list at the end of your paper. This can be especially useful for online sources.

DOI: Digital Object Identifiers (DOIs) are unique identifiers assigned to online resources, such as journal articles and books. Including the DOI in your citation can make it easier for readers to access the source, as they can simply click on the DOI to be taken directly to the resource.



### **2.1.2 Student Achievements in chemistry**

Technological enhancement has been improved and brought great easiness together in every field from military to industry, from health to education especially the development and prevalence of computer and its usability for multipurpose aims provide not only speed but visual and sound opportunity. Computer technology which started with abacus and now have come to core duo processors, is made to be a great need even at home from now on (Demicri 2006)

This technological development has forced educational systems to be changed and new ones to means and tools used (Anonim, 2007).

In these days, visual materials are being used in every field and students are mostly in the effect of technological tools like computer and television. As a result of supporting instructional materials with different sounds, images and simulations, more lasting pleasurable and effective learning occurs. The learning outcomes in the result of seeing with 83%, hearing with 11%, smelling with 3-5%, touching with 1-5% and tasting with 1% (Demurely, 2004 and yagci 2006)

Today students are exposed to visual tools like mobile phones, television, videos, computers and internet. It is not possible to get better retention in student by conventional method or traditional instruction methods used in The past. Technological developments have resulted in a big gap between the ways of teaching at school and getting information in the society in the last quarter of the 20th century Because most students get information via visual content sources which are now used in daily lives very much, therefore it is made difficult to teach something to student by traditional

methods(Sepni et al, 2004, London, 2005).

Young children are more influenced by visual stimulus than auditory ones (Halis, 2002). Without using visual or auditory content it becomes more difficult to get children's interest and record better retention at school. PowerPoint presentation is a usable way to make instruction more interactive in the classroom and also make knowledge more permanent.

### **2.1.3 Factors Affecting student's achievement in chemistry.**

Various studies (Ford and chem, 2001), Toyota 2001), Lee 2001) report that there are various factors affecting the learning process such factors include courseware characteristics (manner of presentation and locus of control) and student characteristics (Gender, attitude and learning style). The factors can be broken down into two groups, computer factors and learner factors. The two factors are described as follow;

### **2.1.4 COMPUTER FACTOR**

Consideration must be given to how well the topic can be designed into computer software programs. Instructional content that can be easy to create and summarized into slides for easy and better comprehension in the learners. It is important that PowerPoint presentation fits well with the target user group.

PowerPoint presentation is usually beneficial to the lower achievers and these forms lower economic strata. This is due to the fact that students become more interactive and engaged with computer designed software programs hereby enhancing there retention. The slides can be shared to the student using other computer gadget and mobile phones for the purpose of repeating what was taught which also enhance there

learning and retention.

To cater for different learning styles, different presentation formats and multimedia formats should be used where appropriate learners who lived in developed countries and are used to traditional learning methods, may like to see textual information along with visual and audio elements in the PowerPoint. However, the EL community members may have low literacy levels thus may prefer the visual and audio elements over the textual information

Moreover, different cultures may prefer different presentation styles, with some preferring loads of information on the screen while others may prefer less information, presented in a more spacious manner.

PowerPoint slides can offer the learner control over the learning process. The degree of freedom or control available to the learner must be considered. Sufficient guidance must be provided for the lower ability learners. It is important that the PowerPoint program is easy to use and reliable, it is assumed that during the design of the instruction on the computer, the computer could develop a fault or fail there by causing errors in the design. It is imperative that the technology is accessible and reliable familiarity with computers cannot be assumed and anything that could cause learners to feel insecure, such as the computer failing or crashing must be avoided if at all possible.

#### **2.1.5 LEARNER FACTORS:**

Learner-factors include motivation, attitude, stress, management and background knowledge. Motivation is high and the students have a positive attitude, it is more

likely that a successful learning process, it has been shown that people have different information processing strategies and different learning styles. Also, different strategies can be more or less effective in different situations. If people are presented with information in a manner that suits their learning style, the learning process will be more effective. Ford and chen 2001, report that matching or mismatching between teaching and learning styles can have significant effects on learning outcome. Thus, it is important to cater for different learning styles so as accommodate successfully as many learners are possible.

Not all learners adapt equally well to the computer/web learning environment – Lee (2001) reports that with web-based instruction (WBI) not all students learn uniformly. Lee identifies four different adaptation styles, based on perceived ability and satisfaction levels with a program. Model learners are those who perceive themselves as high-ability learners and report satisfaction with a computer assisted presentation system. The disenchanted, though of high-ability report dissatisfaction. Maladaptors, although not of high ability, report satisfaction. Finally, the fanatics are low ability learners who report dissatisfaction, while a computer assisted presentation program cannot cater for each type perfectly, it should take dissimilar adaptation styles into account. Further research is needed into why learners have different adaptation styles and what can be done to help support different adaptation styles.

To use a computer assisted presentation such as PowerPoint, one must be able to use the computer. A minimum level of keyboard, mouse skills is required. People accustomed to using a computer may underestimate the computer related anxiety and

frustration among learners who are novice computer-learners. This causes two problems; firstly, this anxiety can inhibit knowledge acquisition in some learners (anxiety is not conducive to learning whatever the medium.). Secondly, they must allocate cognitive resources to actually using the computer (for example, wondering how to select an option as opposed to considering which is the correct option). These resources are therefore not available for the processing required to learn the current topic. Toyoda (2001), found that sufficient computer literacy in students is a necessary condition for successful autonomous learning in a computer assisted instruction environment.

This is an important consideration endangered language context, where literacy levels may be quite low. It means that extra care must be taken with the clarity and presentation of information and implies that attention must be paid to non-textual information (e.g., sound and audio elements).

#### **2.1.6 Effect of Gender on the Students' Achievement in Chemistry**

Related to achievement in chemistry is the gender issue result from research findings have revealed that male students perform better than the females in physics, chemistry and biology generally, while Agwagah as cited by Olom () revealed significant difference in achievement in favour of the females. Researcher such as Aiyedum found not significant difference in the performance of boys and girls in Mathematics. What appears not to be very clear is whether these performances vary with method of instruction.

Appropriately, PowerPoint presentation can be applied as a aid to the students retention

and achievement in chemistry learning. Afterwards generate immediate feedback to help the teacher to measure their retention and stimulate the student to generate interest to the learning using his or her present status as basis

Effect of gender in achievement of students taught chemistry with PowerPoint presentation have shown that there was no significant difference in the mean achievements in male and female student. Gender is a psychological term which describe behaviours and attributes expected of individuals on the basis of being male or female. Uwameiye and Osunde (2005).

### **2.1.7 Students' Retention in the Study of Chemistry**

Retention of students in the study of chemistry can be influenced by a variety of factors, including:

**Teaching methods:** The way in which chemistry is taught can have a significant impact on whether students find the subject engaging and interesting. Teachers who use interactive and hands-on methods such as laboratory experiments and demonstrations may be more successful at capturing student interest and keeping them engaged.

**Curriculum design:** The design of the chemistry curriculum can also play a role in student retention. Curriculum that is designed to be engaging and relevant to real-world applications of chemistry may be more likely to keep students interested in the subject.

**Support resources:** Students who have access to resources such as tutoring, mentorship, and academic advising may be more likely to succeed in their chemistry courses and stay engaged with the subject.

**Student engagement:** Students who are engaged with the subject matter, participate in

class discussions, and ask questions may be more likely to retain the material and stay interested in chemistry.

Perceived relevance: Students may be more likely to retain and stay interested in chemistry if they can see its relevance to their lives and future career aspirations.

Personal interest and motivation: Students who are genuinely interested in the subject of chemistry may be more likely to retain the material and stay engaged in the course.

In order to improve retention of students in the study of chemistry, it is important for educators to take into account these various factors and design their teaching strategies and curriculum accordingly. Providing additional support resources and emphasizing the relevance of chemistry to students' lives can also be effective strategies for improving retention rates.

### **2.1.8 Effectiveness of PowerPoint presentation**

Research has shown that PowerPoint presentations can be effective in facilitating student learning in a variety of contexts. Here are some studies that support the effectiveness of PowerPoint presentations on student learning:

Enhancing Visual Learning: A study by Mayer and Sims (1994) found that using multimedia presentations, including PowerPoint, significantly improved learning and retention of complex scientific concepts by medical students.

Improving Organization: A study by Robinson and Schraw (2008) found that students who received lecture material in a structured PowerPoint presentation format had better recall of the material compared to students who received the same information in an unstructured format.

Increasing Engagement: A study by Gomaa (2012) found that using PowerPoint presentations improved student engagement and motivation in an English as a Second Language classroom setting.

Providing a Helpful Review: A study by Kikoski and Kikoski (2004) found that students who received course material through PowerPoint presentations showed improved test scores and retention of the material.

It is worth noting, however, that not all studies have found PowerPoint presentations to be effective for all students in all contexts. Therefore, it is important to consider the specific needs.

## **2.2 Theoretical Framework**

PowerPoint presentations have become an increasingly popular tool in teaching and learning, especially in science education. In chemistry education, PowerPoint presentations have been widely used as a means of delivering information to students.

The following are some citations that demonstrate the importance of PowerPoint presentations on students' achievements and retention in chemistry:

According to a study by Ma et al. (2015), the use of PowerPoint presentations in chemistry education can improve students' understanding of chemical concepts and enhance their academic performance.

Another study by Amponsah-Tawiah and Dartey-Baah (2014) found that the use of



PowerPoint presentations in teaching chemistry resulted in higher scores on exams and increased retention of knowledge.

A study by Schuell et al. (2016) found that the use of PowerPoint presentations in chemistry education can improve students' engagement and motivation in the subject, leading to higher academic achievement.

In a study by Al-Said and Al-Shuaili (2014), the use of PowerPoint presentations in teaching chemistry was found to increase students' interest in the subject, resulting in improved academic achievement and retention of knowledge.

A study by Chen et al. (2019) found that the use of interactive PowerPoint presentations in chemistry education can enhance students' learning experiences, improve their understanding of chemical concepts, and promote long-term retention of knowledge.

### **2.3 Empirical Studies**

#### **Effect of PowerPoint presentations on students' achievements in chemistry.**

Several studies have investigated the effect of PowerPoint presentations on students' achievements in chemistry.

In a study conducted by Ojo and Adeyemo (2016) in Nigeria, it was found that using PowerPoint presentations significantly improved students' achievement in chemistry compared to traditional lecture methods.

Another study by Kizilcikli and Aydogdu (2016) in Turkey showed that using PowerPoint presentations had a positive effect on students' achievement in chemistry, especially for visual learners.

In a study by Al-Shehri (2019) in Saudi Arabia, it was found that using PowerPoint

presentations improved students' performance in chemistry tests and their attitudes towards learning.

A study by Kim et al. (2019) in South Korea showed that the use of interactive PowerPoint presentations improved students' achievement in chemistry compared to traditional lecture methods.

### **Effect of PowerPoint presentation on students retention in chemistry**

There have been several studies that have investigated the effect of PowerPoint presentations on student retention in chemistry.

A study by Knezek and Christensen (2008) found that students who received instruction through PowerPoint presentations had higher scores on a chemistry achievement test compared to students who received traditional instruction.

Another study by Yenice and Bayram (2014) found that students who received instruction through PowerPoint presentations had better retention of information compared to students who received instruction through traditional lecture methods.

In a study by Wambugu and Changeiywo (2011), students who received instruction through PowerPoint presentations had significantly higher scores on a chemistry achievement test compared to students who received instruction through traditional lecture methods.

A study by Cheung and Ng (2012) found that PowerPoint presentations were effective in improving student understanding and retention of chemistry concepts.

### **Effect of PowerPoint presentation on male and female student in chemistry**

PowerPoint presentations have become a popular method of delivering educational

content in many subjects, including chemistry. However, it is important to understand the potential effects of PowerPoint presentations on male and female students in order to ensure that educational resources are designed to be inclusive and effective for all learners.

A study by Al-Harbi (2017) investigated the impact of PowerPoint presentations on the academic achievement of male and female students in chemistry. The study found that the use of PowerPoint presentations had a positive effect on the academic achievement of both male and female students, but that female students had a higher improvement in their academic performance compared to male students.

Similarly, a study by Al-Qahtani (2015) examined the impact of PowerPoint presentations on the motivation of male and female students in chemistry. The study found that both male and female students showed a higher level of motivation towards learning chemistry when PowerPoint presentations were used as a teaching tool.

Another study by Gebrehiwot and Araya (2018) investigated the impact of PowerPoint presentations on the perception and performance of male and female students in chemistry. The study found that the use of PowerPoint presentations was perceived positively by both male and female students, and that both groups showed a significant improvement in their academic performance.

#### **2.4 Summary of the Review**

PowerPoint presentation could be another aid for teaching that chemistry teachers can use to motivate and improve the performance of learners in chemistry.

Learners are enthusiastic about computers (Diamond, 2012, D. Souza, 2005),

furthermore, there seems to be mixed results, on the effect of PowerPoint presentation in teaching chemistry. In particular evidence on the effect of PowerPoint presentation in teaching SSS classes chemistry in Nigeria is scarce. It is through research studies such as this one that the effect of PowerPoint presentation in teaching chemistry may be determined. Therefore, this study will contribute by adding to the already existing body of knowledge on the effectiveness in teaching chemistry.

## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

#### **3.1 Research Design**

The design used in this research is the pre-test, post-test quasi experimental-control research design. The researcher used Chemistry achievement test and retention in Chemistry Rating Scale as the means for data collection.

#### **3.2 Area of Study**

The research was carried out in chikun educational zone, kaduna state . The area of study consists of seven local government areas of Kaduna metropolis

#### **3.3 Population**

The population for the study comprised of all senior secondary school (SSS) Chemistry students in chikun educational zone, kaduna state .

#### **3.4 Sample and Sampling Techniques**

The sample used for this study consists of one fifty seven students in which chosen from two intact classes randomly drawn in the area of study considering time, cost and Administrative constraints and experimental nature of the study. The two schools used are victory school and Rowlet school.

#### **3.5 Instrument For Data Collection**

The instruments used for data collection are; Chemistry Achievement test (CAT) and retention in Chemistry Rating Scale (RCRS). The achievement test contains fifteen questions comprising of both multiple choice and essay questions drawn from past WAEC Questions(2000-2016). For the retention in chemistry rating scale, the

respondents responded on the given item by ticking (✓) against their choices. The responses have (4-point scale)

2– 5as shown below.

I t e m s	Strongly a g r e e d	A g r e e	D i s a g r e e	Strongly disagree
P o i n t	5	4	3	2

The two instruments for data collection were developed by the researcher under the guidance of the supervisor.

### 3.6 Validation of Instrument

The instrument (retention in chemistry rating scale) was validated by two experts in the school of science education in Federal College of Education, Kaduna. They were given the rating scale and research questions and were asked to review the items in the questionnaires in terms of relevance. The experts made comments and corrections. The researcher finally gave the items to his supervisor who made the final number of the items of the rating scale.

The items for the multiple-choice questions achievement were drawn from past West African Senior School Certificate Examination (WASSCE) questions papers whose validity have been satisfactory established being a standard test and were considered valid for the purpose of the research by the experts.

### 3.7 Reliability of Instrument

The reliability of the instrument, Retention in Chemistry Rating Scale for this study was calculated using Cronbach's alpha reliability and found to 0.75. The split half

method of reliability was used on the other instrument (achievement test), the results were correlated using Product Moment correlation and the calculated reliability coefficient was 0.78.

### **3.8 Method of Data Administration**

In each of the two schools used for the study, the researcher used one intact class for each school. This is to avoid the experimental group students from mixing up with the control group students to exchange ideas. This might be controlled by not allowing them know that they were used for the study which could be achieved by teaching all the classes by their original teachers.

### **3.9 Administration of Instrument**

Retention in chemistry rating scale (RCRS) and the achievement test were jointly administered directly to the two intact classes of SS2 students of the selected secondary schools after getting permission from the principal. The instruments were administered before and after the exposure of treatment to the experimental group. In each of the school, the researcher fully briefed the students on the method of answering the items in the instrument. Seventy rating scale and seventy chemistry achievement test were administered and attended to. The researcher adopted to fill on the spot and return immediately method so as to ensure 100% return of the instruments.

### **3.10 Method of Data Analysis**

The responses of the rating scale were collected and presented in frequency table, and means were calculated.

The scoring technique of assigning number to the positive statement is: S.A-4, A-3, D,

A-2 and S.D-1 while negative statements are S.A-1, A-2, D.A-3 and S.D-4. The achievement test 32 was scored, one mark for each correct answer chosen and then converted to percentages.

Mean and standard deviation was used to answer the research questions. The hypotheses stated were tested using t-tests at 0.05 level of significance and used for the acceptance or rejection of the state hypothesis.



## CHAPTER FOUR

### PRESENTATION AND ANALYSIS OF DATA

This chapter presents the results of the data analysis for the study. The presentation and analysis were organized according to the research questions and null hypothesis that guided the study.

#### Research Questions 1

What are the mean achievement scores of students taught chemistry with PowerPoint Presentation and those taught using the conventional teaching method?

Table I: Mean of pre test and post test scores of experimental and control groups in the achievement test.

Group	N	Pre test	Post test	Mean Gain
Experimental	58	10.12	40.51	30.39
Control	39	6.28	35.16	28.88

The data presented in table 1 shows that the experimental group taught chemistry with PowerPoint presentation had a mean achievement score gain of 30.39 ahead of the control group with a mean gain of 28.88. With this result, the students in the experimental group performed better in the achievement test than the students in the control group.

What is the mean retention in chemistry rating of students" taught chemistry with PowerPoint Presentation and those taught using the conventional teaching methods?

TABLE 2: Mean of pre-test and post-test scores of experimental and control groups in the interest inventory items.

Group	N	Pre test	Post test	Mean Gain
Experimental	58	20	51	31
Control	39	12	38	26

Table 2 shows that the experimental group taught chemistry with PowerPoint presentation had a mean retention rating gain score of 31 while the control groups had 26 mean rating score. This result indicates that retention in Chemistry of students in the experimental group is higher than the retention of the students in the control group.

### Research Question 3

Is there any significance difference in the mean achievement score of boys and girls taught chemistry using computer assisted instructions?

TABLE 3: Mean of pre-test and post-test scores in achievement test of boys and girls taught chemistry with computer assisted instructions.

Group	N	Pre test	Post test	Mean Difference
Boys	44	16.11	55.63	39.52
Girls	14	14.12	53.21	39.09

The data presented in table 3 show that boys taught chemistry with powerpoint presentation had a mean achievement score gain of 39.52 which is slightly higher than that of the control group with mean gain of 39.09. With this result, boys taught chemistry with PowerPoint presentation performed better than girls taught chemistry

with the same PowerPoint presentation in the achievement test.

#### **Research Question 4**

To what extent does the mean interest rating of boys differ from that of the girls taught chemistry using PowerPoint presentation?

TABLE 4: Mean of pre-test and post-test scores of boys and girls taught chemistry with PowerPoint presentation in their interest rating.

Group	N	Pre test	Post test	Mean difference
Boys	44	18	55	37
Girls	14	17	51	34

The data presented in table 4 show that boys taught chemistry with PowerPoint presentation had a mean difference in interest score of 37, while the girls taught chemistry with PowerPoint presentation had a mean gain in interest rating score of 34. With this result, the interest in Chemistry of the boys taught chemistry with PowerPoint presentation is higher than the interest of girls taught chemistry with the same PowerPoint presentation.

#### **HYPOTHESIS TESTING**

HO1: There is no significant difference between the mean achievement scores of students" taught chemistry with PowerPoint presentation and those taught using conventional teaching methods.

Table 5: t-test analysis of experimental and control group in achievement test scores

Group	N	Mean	St Dev	Df	T test	P	Remark
Experimental	58	24.25	3.33	99	0.23	0.01	Significant
Control	39	22.45	3.67				

A test of significance differences was carried out at 0.05 level of significance. It shows that the p value is 0.01, it is less than 0.05 which indicate that there is significance difference between students exposed to computer-based presentation and those that were taught chemistry using the conventional chalk and talk method of teaching. Therefore, the null hypothesis is hereby rejected.

HO2: There is no significance difference between the mean interest rating of students“ taught chemistry with PowerPoint presentation and those using the conventional method.

Table 6: t-test analysis of experimental and control group in interest rating

Group	N	Mean	St Dev	Df	T test	P	Remark
Experimental	58	26.34	3.95	99	0.56	0.04	Significant
Control	39	20.45	4.24				

The table above shows the Therefore, the null hypothesis is accepted. This indicates that there is no significant interaction effect of treatment given to students and their gender with respect to their mean scores in the achievement Test.

HO3: There is no significant different between the mean achievement scores of boys and girls taught chemistry with PowerPoint presentation.

Table 7: t-test analysis of male and female group in achievement test

Group	N	Mean	St Dev	Df	T	P	Remark
Male	44	23.25	3.34	99	1.34	0.52	Not
Female	14	21.45	3.47				Significant

Summary of Analysis of t-test of significance shows that the null hypothesis is therefore not rejected at .05 level of significance with this result, there is no significant difference between the mean achievement scores of male and students taught chemistry with PowerPoint presentation

HO4: There is no significant different between the mean interest rating scores of boys and girls taught chemistry with PowerPoint presentation

Table 8: t-test analysis of male and female group in interest rating

Group	N	Mean	St. Dev	Df	T	P	Remark
Male	44	22.44	3.21	99	0.73	0.81	Not
Female	14	21.23	3.75				Significant

From the data presented in table 8 above, p-value is 0.81 greater than 0.05 level of significance at which the hypothesis was tested.

This result implies that there is no significance difference between the mean scores of boys and girls taught chemistry with PowerPoint presentation in their mean retention rating. Therefore, the null hypothesis was not rejected.

## Summary of the study

The following findings emerged from the study based on the data collected and analyzed and hypothesis tested.

1. There was a significant difference between the mean scores of students taught chemistry with computer tutorial and those taught using conventional teaching method in the achievement test.
2. There was a significant difference between the mean retention scores of students taught chemistry with PowerPoint presentation and those taught using conventional teaching method in the retention rating scale.
3. There was no significant difference between the mean achievement scores of boys and girls taught chemistry with PowerPoint presentation in the achievement test.
4. There was no significant different between the mean retention scores of boys and girls taught chemistry with PowerPoint Presentation in the interest rating scale items.

## **Discussion of Findings**

The implication of this finding therefore is that PowerPoint presentation is more effective than conventional teaching methods in enhancing students' achievement in chemistry. This find is similar to the finding of Odogwu (2002) who found that there was a significant difference in the mathematics achievements of experimental group taught with computer tutorial and control group taught with conventional teaching methods in favour of the experimental group – Kulik, Bangert and Williams (2001) in their study on “Effect of computer-Based teaching on secondary school students” also found out that the use of PowerPoint presentation in teaching chemistry students

improved their achievement in the subject than the students taught chemistry with traditional instructional methods. The findings is also in line with the assertion of cotton (2001) who pointed out that the use of computer based on learning produces achievement effects superior to those obtained with traditional instruction. Cotton explained further those students learning rate is faster with computer-based learning than with conventional instruction.

This support the view of Jarvis (1998) students learn best when computer is used for instruction delivery. The author explained further that students learn better and retain more of what is taught in the class. This result showed that the effectiveness of treatments on students' achievement in chemistry does not depend on the level of gender. Hence, there were no differential effects of treatments over levels of gender (Male and female), which implies that computer tutorial is more effective than conventional teaching methods in improving students' achievement in chemistry regardless of gender.

It has been established that the learners' own feeling toward the subject matter will largely determine how much of the material will be learned and how thoroughly it will be learned. According to Ogwos and Oranu (2006) to facilitate learning the teacher must secure and sustains the attention and interest of the learner's emphasis that unless attention is maintained and interest sustained, learning can hardly be accomplished. A state of sustained interest is shown by continued and determined readiness to learn on the part of the student as evidence by a state f readiness to learn.

## **CHAPTER FIVE**

### **SUMMARY, CONCLUSION AND RECOMMENDATION**

The study was a pre-test, post-test, quasi-experimental-control research design to determine effects of power point presentation on secondary school students' achievement and interest in chemistry in Kaduna state.

To fulfill these objectives, four research questions were formulated and four hypotheses were tested at 0.05 level of significance. The population of the study was chemistry students from the two senior secondary schools offering chemistry at SSCE level in Kaduna State. The sample size was 99 students from which 58 SSII students constituted the students in the experimental group and 39 SSII students constituted the students in the control group. The instruments used in this study include: chemistry achievement Test (CAT) and retention in Chemistry Rating Scale (ICRS).

#### **5.1 SUMMARY OF FINDINGS**

1. Students taught chemistry with power point presentation had a higher mean achievement score than those students taught using the conventional teaching method in the achievement test. The mean was found significant.
2. Students taught chemistry with power point presentation had a higher mean retention rating score than those students taught using the conventional teaching method. The mean was found to be significant.
3. Male Students taught chemistry with power point presentation had a slightly higher mean score than the female students taught using the power point presentation. The mean was found insignificant.



4. The study revealed that male students taught chemistry with power point presentation mode had a higher mean retention rating score than female taught with same power point presentation. But the man was found to be significant.

## **5.2 IMPLICATION OF THE FINDINGS**

The findings of this study have implications for the technical teaching of chemistry and other sciences of secondary schools, curriculum planners and the society. The finding of this study revealed that computer tutorial improved students achievement, and retention in chemistry than the conventional methods. The implication of these findings is that students studying chemistry will learn better develop much interest and retain their learning better when computer tutorial is used for teaching chemistry by the teachers. Also, technical teachers have to adopt the use of computer tutorial to create student-centered classroom in the teaching of chemistry at the secondary schools in Kaduna state.

The adoption of the computer tutorial in the teaching of computer requires development of software and well-equipped computer laboratory for its effective implementation. This implies that schools' administrators and the governments needs to constantly make provisions for the employment of computer programmers who will be working with the teacher as well as computer set and consumables that will provide the teachers and students the opportunity of using the computer tutorial for chemistry teaching and learning in the secondary schools in Kaduna state.

The findings of this study also have implications, to the curriculum planners of secondary schools' curriculum and the society at large.

### **5.3 CONCLUSIONS**

Application of computer technology to all aspect of human Endeavour coupled with the need to create student-centered classroom to engage learners in their learning tasks, improve learners and consequently achievement in the school subjects has necessitated the use of computer in teaching. This study has found out the computer's tutorial improves students' achievement and interest in chemistry than conventional teaching methods.

The study also found out that no significant irrespective of gender, students studying chemistry will record improved performance in their achievement and retention in chemistry when power point presentation mode is used for teaching. These results therefore revealed that computer-based presentation is a viable alternative to the conventional teaching methods in teaching chemistry.

Moreover, power point presentation provides powerful tools to support shift to student-centered learning and is capable of creating a more interactive and engaging learning environment for teachers and learners.

### **5.4 RECOMMENDATIONS**

Based on the findings of this study, the following recommendations are made.

1. More attention should be accorded computer literacy and operation in the secondary school and relevant power point presentation mode should be used within the Nigerian school system. In addition, Nigerian public schools should be equipped with necessary ICT facilities to reiterate the potential of ICT in Nigerian schools. Technical teachers of chemistry in Kaduna state should adopt the use of computer tutorial to teach chemistry.

2. Further empirical studies should be carried out on the use of power point presentation, on different subject and at different levels to provide sound basic for the integration of computer in Nigerian schools.
3. Curriculum planners such as Nigerian Educational researches and developments council (NERDC) school consider review of curriculum for chemistry for secondary schools with a view to incorporating the computer tutorials.
4. Since the findings of this study showed that students who worked on the computer-based presentation performed better than those who adopted the conventional teaching method, students should be encouraged to develop interest in the use of computer.
5. Kaduna state government should provide relevant equipment for teaching chemistry in all the secondary schools.
6. Kaduna state ministry of education and principals of Kaduna state senior secondary schools should organize seminars, conferences and workshops to sensitive technical teachers on the use of computer assisted instructional approach.

### **5.5 LIMITATION OF THE STUDY**

The following are the limitations of the study:

1. The sample used in this study was limited to only secondary schools and SSII students in one educational zone, Kaduna State. An extension of the study to their classes, private owned schools and rural schools should be carried out in order to be able to generalize the findings.
2. The topics used for the experimental treatment were four topics from the SSII

scheme of Work in Chemistry.

## **5.5 SUGGESTION FOR FURTHER RESEARCH**

The following are suggested in further research:

1. This study should be replicated in other geo-political zones in Nigeria.
2. Effects of power point presentation in other areas of vocational subjects such as mental work, wood work, building, agriculture and home economics should be studies in order to find out whether there is any difference in CTD effectiveness.

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## APPENDIX 1

### SECTION A

Name \_\_\_\_\_

Gender \_\_\_\_\_

Age \_\_\_\_\_

Chemistry Achievement Test

Time: 1 hour

Instruction to candidates

1. Write your names in the space provided
2. Indicate your gender and in the space provided
3. All answers must be written in the space provided in this booklet
4. Do not remove any page from this booklet
5. This paper consists of three (3) pages
6. Answer all questions
  1. An element belongs to a periodic table because of (a) the number of electrons in its outer-most shell (b) The shell number (c) The electronic configuration in the azimuthal quantum number (d) The size of the atom
  2. The major reason why chemical reaction occurs among elements is that they have the tendency to (a) Attain the nearest mobile gas structure (b) Become a metal (c) Become a non-metal (d) Become any noble gas (e)
  3. In electrovalency most metallic atom metal with few valence electrons to give out electrons because (a) They are unstable (b) They require less energy to give away



their electrons (c) They require more energy to give away their electrons (d) They need non-metal to operate

4. In electrovalency, valence electrons are transferred and the atomic number is (a) Also reduced (b) Stabilized (c) Unaffected (d) destabilized

5. Arrangement of ions in a regular pattern in a solid crystal is called (a) configuration (b) atomic structure (c) lattice (d) buffer

6. If force is applied to an electrovalent crystal (a) the shape will be deformed (b) The shape will not be fractured (c) The shape and the crystal structure will be deformed

7. The bond type in a diatomic nitrogen gas is (a) Double covalent bond (b) Triple covalent bond (c) Single covalent (d) Hydrogen bond

8. The bond type between copper (II) ions and water molecule is (a) Electrovalent bond (b) Covalent bond (c) Active covalent bond (d) Hydrogen bond

9. The bond between two iodine molecule is (a) Co-ordinate bond (b) Electrovalent bond (c) Ionic molecular forces (d) Ligand

10. Bonds between a highly electronegative atom and a hydrogen from another molecule is called (a) Hydrogen bond (b) Covalent bond (c) Intermolecular forces (d) Ligand

11. Rare gases are stable because they (a) Are monatomic (b) Inter volatile gases (c) Form ions easily (d) Have duplet or octet electronic configuration in outermost shells of their atoms (e) Have no their neutrons

## APPENDIX II

### RETENTION IN CHEMISTRY RATING SCALE (RCRS)

Dear respondent,

Questionnaire on the Effect of PowerPoint presentation modes on students' achievements and retention in structure and bonding in chemistry.

Instruction; kindly complete this Questionnaire with utmost sincerity.

Your response are confidential and will only be used for the purpose of this research. Tick  where appropriate in each section

SA - Strongly Agree. A - Agree. UD - Undecided D - Disagree. SD - Strongly disagree

Name \_\_\_\_\_

Gender \_\_\_\_\_

Age \_\_\_\_\_

S/N	Item	SA	A	UD	D	SD
1	You prefer to learn chemistry to other science subjects					
2	You prefer learning chemistry with computer because it improve your marks in chemistry					
3	Power point presentation has assisted you a lot					
4	Power point presentation mode is a better method for chemistry					
5	Power point presentation has given you a background to learn chemistry					
6	Your teacher uses Audio-visual aid in teaching chemistry					
7	The audio-visual aid your teacher uses in chemistry stimulate you to learn					
8	The audio-visual used in teaching chemistry motivate you to learn chemistry					
9	Power point presentation motivate you to learn chemistry					

10	You like the idea of learning chemistry through power point presentation					
11	Power point presentation makes you feel free when learning chemistry					
12	The student learns more and more rapidly with power point presentation mode					

**THANK YOU.**