Assessment of Teacher's Factors Influencing Secondary School Chemistry Students' Participation in Practical Class in Ikere Local Government Area of Ekiti State, Nigeria

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Received: April 12, 2019 Accepted: May 17, 2019

ABSTRACT: *This research investigated the assessment of teacher's factors that influencing secondary school chemistry students' participation in practical class in Ikere Local Government Area of Ekiti State, Nigeria. The research design used for the study was survey design of the descriptive type of research. The sample size of two hundred (200) chemistry students were selected as respondents for the study through a random sampling technique from ten (10) secondary schools. The respondents were selected from five (5) public and five (5) private secondary schools in Ikere local government Area of Ekiti State. The instrument for data collection for the study was a self- structured questionnaire. The reliability index obtained was 0.99. The hypotheses were tested using inferential statistics of Pearson Correlation analysis. The findings of the study indicated that there was a significant positive correlation between teachers' attitude and students' participation in chemistry practical class; there was a significant positive correlation between teachers' method and students' participation in chemistry practical class; there was a significant positive correlation between teachers' experience and students' participation in chemistry practical class; and there was a significant positive correlation between teachers' competence and students' participation in chemistry practical class. Based on the findings, appropriate recommendations were made.*

Key Words: *Assessment, Teacher's factors, secondary school, practical class*

Introduction

Education is undoubtedly a vessel and instrument for change in behaviour and creation of wealth for any nation. The today and future of every nation with desire and passion for meaningful development and making her citizen a viable one depends on the quality of education given to the citizenry. The extent and rate at which a nation develop and grow largely depends on the quality and level of education achieved by the citizens. In the modern world today, functional education provides the basic instrument for gainful employment, personality progress, economic prosperity, and development moral built up, and positive interpersonal relationships; while lack of it signifies ignorance, underdevelopment, maladjustment, crime, poverty, frustration, among others. The need for education of citizen is paramount for economic, political and social welfare of a nation.

Meanwhile, the attainment and sustainability of national development of every developing nation largely depend on a well structured and finely implemented science education and its role cannot be overlooked (Tafi, 2016). Since, every individuals who acquire scientific and technological literacy, think innovatively and rationally, thus enabling them to conduct themselves within the global acceptable standard. Science is therefore an integral part of every educational endeavour. Aniodoh (2012) conceptualized science as the act of investigating and a body of established knowledge. Over the years, science has proven to be a viable and powerful vessels for nation development, it is this realization that chemistry curriculum had to adjust her academic knowledge, technical and vocational skills.

Science education encompasses the development of citizen that are technologically literate andhas the knowledge of inter-relationship behaviour of science, technology, and society and categories of people that are able to use the knowledge provided in their everyday life. Science education is germane since it has the potentiality of enhancing the quality of life of people, making world a safer place, strengthen individual and giving them greater opportunity to have control over their lives through the provision of medium that provide answers to their questions. Tesfaye, Yitbarek and Tesfaye (2010) stated that the quality, relevance, methods of teaching, human resource, scientific literacy, science process skills, higher order thinking, science-technology-society, teachers quality, textbooks of science education directly impacts on the extent of growth and development of science and technology.

Chemistry as a branch of science is a rational and mathematically oriented discipline in which certain measured and controlled inputs generate certain predictable outputs. White, O'Connor, Mousley, Cole and MacGillivray (2018) stated that chemistry is an enabling science as its core concepts are essential for almost every area of science. Chemistry offers the opportunity of being studies as discipline and as a central component of other tertiary institution degree programmes. Chemistry is also a highly conceptual discipline, requiring an ability to deal with phenomena at both a macroscopic and microscopic level, and to connect with symbolic representations used at each of these levels. Aregawi & Meressa (2017) asserted that chemistry students may experience difficulties with their learning if the symbolic language is taken for granted, and there is a risk that connections between the material world and theoretical constructs may be misunderstood. Therefore, laboratory facilities and equipment is a bridge between theory and praxis, it offers unique opportunities to assist students as they attempt to construct an understanding of these connections.

At the heart of mastery of science discipline, practice is very cognizance. When there is no frequent and sustainable practical work in science either individually or in a group all that have been taught and learnt become inert knowledge. Dahar & Faize (2011) stated that almost all the practical work in science takes place in science laboratory. Science laboratory is a very important resource input for teaching science and is an important predictor of academic achievement. Science laboratories made this world very advanced and scientific in its purposes. A secondary school laboratory should have the equipment necessary to conduct meaningful demonstrations and experiments.

Learning chemistry in secondary school is practical-oriented and requires practical activities in the laboratory. It requires broad-based experiences to widen students' knowledge in a world of abundance of choices and opportunities to give meaning to learning. Exposing chemistry students to experimental methods of teaching enable students to verify theories, laws and principles surrounding Chemistry existence and phenomena. Achimagu (2012) stated that Chemistry learning involves experimentation that uses hands-on and minds-on activities for better understanding. These parameters help the students to build their capacity and interest to attain the goals of learning chemistry. Learning Chemistry practically develop students' scientific knowledge and are most effective when the learning objectives are clear and relatively few in number for any given task (Okoye, 2013). The role of practical work in teaching and learning of Chemistry and predicting their academic performance is very germane and must be taken with all seriousness.

Understanding chemistry is impossible without realization of practical experiments and this is the goal that reaction demonstration at class aims is set to achieve. Kokaia (2015) stated that practical part is used for teaching new concepts, but also for repeating already learnt lessons. So it is appreciable to use practice with theory as often as possible for understanding the subject. Realization of practical part of the subject requests from a teacher high professionalism, understanding of advantages of practical and experimental part of subject together with theoretical paper-based learning, creativity and mastering in modern methods of teaching chemistry. Of course, performance of reactions at school, requires various technical instruments and compounds, which is still inaccessible for many schools (Kokaia, 2015).

However, at the centre of any active classroom participation and effective learning, the role of teacher cannot be overlooked or de-emphasized. This is because teacher is the alpha and omega of any classroom instruction, organization of lesson, classroom management, teaching and impacting knowledge. For students to effectively participate in chemistry practical work and for the practical to be effective in enriching learning, the teachers should develop activities that engage the learners in scientific investigations in which their minds are focused on the activity and its outcome. Science educators argue that practical work should involve learner-centered learning environment that engage students in knowledge construction, as opposed to teacher-centered environment which involves information absorption (Ituma & Twoli, 2015). The practice in practical work has been a cookbook trend where the instructions are carried out like a recipe that reduces meaningful learning.

The learners therefore, do not use scientific ideas to guide their actions during the practical activity and to reflect upon the data they collect. Kim &Chin (2011) argued that this nature of recipe-based practical work is not sufficient to develop students 'habits of mind' because they involve simply doing but donot require thinking through doing. Effective practical activities should enable students to build a bridge between what they can see and handle (hands-on) and scientific ideas that account for their observations (brains-on) and this can only be achieved with teacher effectiveness and commitment. Teachers must understand that students with limited strength or mobility can have a full laboratory experience with appropriate accommodation, such as a laboratory assistant (Tenaw, 2015). Hunde and Tegegne (2010)

reported that, despite the fact that laboratories have multiple benefits ranging from making learning concrete to laying basis for science education; students still were being deprived of such opportunities.

Statement of the Problem

The major factors that make up any formal classroom organization are basically three. These are teacher, learners and environment and all these three are very essential in teaching learning and classroom participation in Chemistry practical class. No doubt, of all the three, one serves as the coordinator of the two other variables and that is the teacher. Therefore teacher as a factor has crucial role to play in enhancing and motivating students to learn and participate during chemistry practical. Demonstration, discussion, individual and group practical activities, coordination and guide on how to go about the practical work are all functions of Chemistry teachers. Meanwhile, there are some teachers' factors that can optimize or destabilize chemistry students' participation in in practical class among secondary school students. Some of these factors are teachers' attitude, discipline, classroom management skills, subject mastery, competency, preparedness, qualifications, experience among others.

Hence, it is observed that if teacher attitude towards teaching practical chemistry is negative, then the students will not benefit and may not even have access to practical class. Also, teacher competency in taking practical class is essential because if this is lacking may lead to students' loss interest in the chemistry practical class participation. It is observed by the researcher that one of the major factor that hurt chemistry practical class most is the act of preparedness by chemistry teacher. This often tell when practical activities is holding and they could not get the correct end point with teacher citing excuses like "expired chemical", "leaking gas pipe" etc. Chemistry teacher classroom management is call to action when the students are struggling for materials for practical activities if this is lacking then there is likely to be injury being sustained by students and this may demotivate them from active participation in chemistry practical class.

Consequently, the researcher observed that there are very few studies that investigate the teacher as a factor influence secondary school chemistry students participation in practical class and this is the gap that this study intends to cover.

Hypotheses

The following hypotheses were formulated from research for testing at 0.05 level of significant:

1. There is no significant relationship between teachers' attitude and students' participation in chemistry practical class in Ekiti State.
2. There is no significant relationship between teachers' method and students' participation in chemistry practical class in Ekiti State.
3. There is no significant relationship between teachers' experience and students' participation in chemistry practical class in Ekiti State.
4. There is no significant teachers' competence and students' participation in chemistry practical class in Ekiti State.

Literature Review

Concept of Teacher

A teacher is a person who helps others to acquire knowledge, competences or values. Informally the role of teacher may be taken on by anyone. Teaching is a highly complex activity (Caena, 2011). This is in part because teaching is a social practice, that takes place in a specific context (time, place, culture, socio-political-economic situation etc.) and therefore reflects the values of that specific context (Cochran-Smith, 2006). So the competences required by a teacher are affected by the different ways in which the role is understood around the world. Broadly, there seem to be four models: the teacher as manager of instruction; the teacher as caring person; the teacher as expert learner; and the teacher as cultural and civic person (Caena, 2011).

Teachers are enthusiastic about their topic and delight in sharing what they have learned. Sometimes it seems that they can go on forever about their specialty while denying the idea that they are an expert. Good teachers will tell you they are students, not teachers (Waldron, 2017). These two qualities are the primary and distinguishing characteristics of a teacher: Love of knowledge and a love of contributing to the development of others. A teacher wants to recognize what the hard work children have done even though it is expected from some of them. A teacher believes there are no bad students, just challenging ones. A teacher will question and teach her students how to question (Walizer, 2014). At times the primary characteristics become contaminated by other drives and needs such as the need for status, authority,

exhibitionism and any of many human needs that make us less than who we want to be. Excellent teachers learn to control these needs and to keep them out of the teaching arena as much as possible. Some teachers are better at this than others and they are better or worse teachers because of their abilities to control the extraneous (non-teaching) factors (Waldron, 2017).

Darling – Hammond (2008) defined well qualified teacher as one who was fully certified and held the equivalent of a major in the field being taught. Although the formal qualification of teachers is an important indicator for their knowledge and competence in teaching, it has only limited utility in analyzing how well prepared teachers are for what they have to teach in schools. More detailed knowledge of the courses they have taken during their training needs to be compared to the actual content and skills required to teach the high school's curriculum.

Concept of Practical Activities

The availability and maintenance of equipment in chemistry teaching makes chemistry lessons concrete and stimulating and helps to enhance the achievement of the students. No one can do activity in the chemistry laboratory without equipment. Hornby (2005) defined activity as a thing that you do for interest or pleasure. Practical activities to develop students' scientific knowledge is likely to be most effective when the learning objectives are clear, and relatively few in number for any given task, the task design highlights the main objectives and keeps noise to the minimum, a strategy is used to stimulate the students' thinking beforehand, so that the practical task is answering a question the student is already thinking about. Sam (2009) conceptualized practical activities as a strategy that could be adopted to make the task of a teacher (teaching) more real to the students as opposed to abstract or theoretical presentation of facts, principles and concepts of subject matter using varieties of instructional materials/equipment to drive lesson home.

The use of practical activities (approach) to the teaching of Chemistry should be compulsory for chemistry teachers so as to produce students who can acquire the necessary knowledge, skills and scientific competence needed to meet the scientific and technological demands of the society. Aina (2012) observed that the laboratory is an indispensable organ of the school if effective teaching and learning of science subjects are to be achieved and laboratory is a room or building or a special period of time equipped and set apart for practical or experimental studies to take place. Ude and Onah (2017) reported that it is an instructional facility used by the teacher to help students learn about science and how scientists investigate the world around them. It provides learners with opportunities to design and execute investigation, engage in scientific reasoning, manipulate equipment, generate record and analyze data and then discuss results.

This implies that science teaching and learning cannot be completely done in a secondary school where there is no equipped laboratory. This is the problem with government schools in rural areas. Practical activities help learners to understand more because the way human nature is, things done by self is difficult to be forgotten because the picture of the incident is always registered in the brain. Chemistry as a practical science and practical activities are not just motivational and fun but they also enable students to apply and extend their knowledge and understanding of Chemistry in novel investigative situations, which can aid learning, memory and stimulate interest (Nuffield Foundation, 2016).

Winterbottom (2018) stated that science (chemistry) practical are one of the fundamental tools enabling chemistry students both to learn scientific knowledge, and how to do science (chemistry). However, it is known that carrying out practical work in class has its own challenges. Teachers experienced difficulties like finding suitable space, time and resources. They are also concerned about health and safety issues and face student inexperience recognising and using scientific equipment. Practical work has clear benefits, helping students acquire the essential skills that not only give a fluid transition to higher-study, but open the doors to science as a profession.

Status of Chemistry Practical Class/Activities in Secondary Schools

Chemistry as a branch of science studies matter, its structure, composition, properties and its transformation. The study of chemistry aims at helping learners to acquire appropriate skills, abilities and competencies that would enable them contribute to the development of society. Okorie (2014) noted that chemistry is pivotal to the transformation and development of nations because it has continued to play an increasingly important role in the production of many technologies, from life-saving pharmaceuticals to computers and other information technologies. The author observed that because of the central role it plays in thesuccessful study of science-based courses such as medicine, pharmacy, biochemistry, engineering, agriculture and several others, chemistry is regarded as a 'central science' and this underlines the importance and need to study it.

A secondary school laboratory should have the equipment necessary to conduct meaningful demonstrations and experiments. Many countries have given attention to the effective implementation and practice of science education at their secondary schools (Beyessa, 2014). Practical activities in chemistry

consist of those learning experiences in which there are interactions with apparatuses and instances of scientific principles or concepts. Practical work in chemistry entails students' physical manipulation of pieces of equipment; observing reaction, taking measurements among others and investigating aspects of chemistry, through the use of a wide range of written resource materials (Okorie and Ugwuanyi, 2019).

Fasakin (2018) observed that practical chemistry at the senior school certificate level is aimed at training students in the scientific techniques of recording observations accurately and drawing reasonable inferences. Students of practical chemistry are expected in addition to be able to carry out experiments, making use of the simple glass wares and procedures. Nnaobi (2008) submitted that practical activities in chemistry offer students the opportunities of gaining hands-on-experiences in the safe handling of chemical apparatuses. Practical chemistry generally provides valuable training in the identification, assessment and control of risk-procedures, which can be applied to the management of other activities.

Ezeudu(2013) pointed out with much concern observations in literature of secondary school chemistry students' persistent low achievements in chemistry practical examination. Secondary school students' achievement in chemistry is related to the use of practical activities in teaching and learning of the subject. If the use of practical activities is low, achievement could consequently be low. It is very true that laboratory is a resource-centre for scientific study. It can be the most dangerous place for activity as it could be one of the reasons why most teachers are afraid to do practical work. Many chemistry teachers do not bother on how they conduct practical chemistry in the laboratory which have resulted to very poor science skill acquisition in senior secondary school(Achimagu, 2012). This poor science skill acquisition by students is not in keeping with the aims and objectives of education in Nigeria which states that education should aim at helping the child acquire appropriate skills, abilities and competencies, for the development of his society (Nnoli & Ikokwo, 2008).

Sharp (2012) asserted that the manner in which practical work is conducted restricts the science curriculum, often confuse students, restrict students' critical thinking skills, and students mindlessly engaged in practical work just because it is a requirement. Consequently, practical activities students do not use scientific ideas to guide their actions and to reflect upon the data collection process (Ituma, Twoli & Khatete, 2015).

Teacher's Attitude and Chemistry Students' Participation in Practical Class

Attitude is a hypothetical construct that indicates an individual like and dislike towards an item. It may be positive, negative or neutral. Attitude is an approach, temperament, sensation, situation, etc. with regard to a person or thing: inclination or course, especially of the mind. Attitude is a way of looking at things (Muellerleile, 2011). Every science (chemistry) teacher considered the development of positive attitude towards science subjects as his center responsibility. Unluckily, what is going on in our science classrooms is not particular to the students across all ages, research has revealed (Cheung, 2009).

Attitudes towards Chemistry denote interests or feelings towards studying Chemistry. It is the students' disposition towards liking or 'disliking' chemistry while attitudes in chemistry mean the scientific approach assumed by an individual for solving problems, assessing ideas and making decisions. Beliefs and attitudes have the potential to either facilitate or inhibit teaching (Yara, 2009).

Among many factors causing the poor performance of students in practical class is teachers' lack of laboratory practices which may be as a result of attitude. Many researchers working in the field of science (chemistry) education indicated that when teachers are not aware of the nature of science (chemistry), it is almost impossible for them to help students understand concepts related to science (chemistry) (Ayşe & Raşit, 2015).The information, abilities and attitudes to be given to the students through laboratory studies which are directly proportional to teachers' knowledge, abilities and attitudes towards these studies. Ayşe & Raşit (2015) stated that chemistry teachers list the blocking factor in using laboratory as lack of materials, fewer class hours, an unsuitable environment, difficulty of controlling students in a laboratory environment. One of the reasons why science (chemistry) teachers have few laboratory classes is because they were not educated to use hands-on-training during their educational life (Ayşe & Raşit, 2015).

They were not educated in how to conduct an experiment, design it, develop it and use laboratory methods. (Öztaş & Özay, 2004). It is an indisputable fact that science (chemistry) is the basis of the technological developments of the last century. The development of science is based on environmental and laboratory researches. Laboratories, which have begun to take place in school programmes since the mid-19thcentury, were initially used as demonstrations after giving the theoretical information but today they are widely used in students' individual and group tests. Wirth and Perkins (2013) indicate that teacher attitude contribute significantly to student's attention in class.

Yara (2009) stated that teacher's attitude and method of teaching can greatly influenced the

students' attitude towards participation in practical class. A number of factors have been identified as related to students participation in practical class in chemistry, such factors include teaching methods, teacher attitude etc. It is therefore important that the teacher must see teaching as an attempt on his own part to transfer what he has learnt to his students using the right approach attitude.Teachers are invariably role models whose behaviours are easily mimicked by students. What teachers feel about their learning or studies could have significant effect on the student. It is important to note that the various dispositions that our teachers display at work betrayed their devotion. This has greatly affected the attitude and in particular, the learning of chemistry and hence their poor performance in the subject.

Many have no mastery of the curriculum content and the organization is highly detestable. Teachers' effective reactions to work are not as good as they should be in many of our schools yet, teachers are looked upon as instrument of social engineering, progress and change. This declining outlook calls for immediate diagnosis and treatment.

Teacher's Competency and Chemistry Students' Participation in Practical Class

Competency refers to the skills and personality of a teacher in handling the instructional process with the help of instructional methods, teaching aids and resource. Katane & Selvi (2006) stated that competency is a set of knowledge, skills and proficiency in creating a meaningful experience when organizing an activity. As a professional, a chemistry teacher needs to plan and implement the learning process, motivate students' participation in classroom activities, evaluate the learning outcomes, conduct a research, develop and managing classroom activities (Copriady, 2014). Competency in the content of this literature review referred to the four components of the Chemistry teacher competencies: preparing and designing an experiment, hands-on practical or experiment plan, implementing and evaluating a systematic and effective experiment.

Teacher ability and wisdom in handling teaching activities will have a direct impact on students' active involvement in learning activities. Therefore, the development of teachers' competency involving the efforts of fostering positive attitudes was a major agenda to strengthen the teaching profession and to ensure great development of the education quality in many countries around the world (Awang, Jindal-Snape & Barber, 2013). Therefore, to be competent, teachers need to be efficient in designing, planning and implementing the lesson. Apart from that teachers need to assess the practical training and laboratory experiment. Students need to be nurtured to love chemistry and to positively practice scientific culture.

Preparation involves pre-perception of an activity to create interesting learning experiences that arouse students' interest for a successful learning process (Copriady, 2014). In addition to preparing and conducting the learning process, assessment is the process of collecting data to determine the achievement of educational goals. Kamisah, Zanaton & Lilia (2007) stated that positive attitudes in terms of students' participation in chemistry practical and scientific activities will exist through constant monitoring of experiments and continuous assessment of practical activities. One of the ways to improve teachers' competency especially in chemistry is that the teachers need to be well versed with the content of the Chemistry curriculum, skillful in using a variety of teaching methods and teaching aids, efficient in coordinating all the necessary equipment and ensure safety of students while conducting laboratory experiments. Students are unable to conduct experiments and predict the outcome because they are not accustomed to the laboratory activities. During laboratory activities, students should be given the opportunity to ask questions, make hypotheses, experiments and deduce experimental results through observation, data processing and making inferences (Copriady, 2014).

The instruments and apparatus needed for an experiment should be ready before the actual lesson. This can only be made available if the teacher possess adequate level of competency in handling chemistry practical. Copriady (2014) defined learning assessment as a process or an activity to get a feedback to determine a progression. Djamarah (2006) stated that the function of evaluation or assessment is to provide feedback to the teacher in order to improve the learning process and implement remedial programs for unsuccessful students until they are able to improve their own performance.

Copriady (2014) stated that the capacity and efficiency of teachers in conducting the activity and learning process will have a positive impact on students learning orientation and participation. Teachers are also required to provide authentic learning experiences and create active learning through active interaction with the subject matter as related to chemistry practical. Therefore, teachers need to be really competent in their handling of practical chemistry to enhance students' classroom participation. For chemistry subject, teacher's competency in creating and planning will greatly provide significant impact on the teaching process and will greatly influence students to change their behaviours.

Therefore, a competent and professional chemistry teacher will definitely understand on how to guide students in performing experiments and practical implementation (Widyatiningtyas, 2010).

Mtika(2008) and Nguyen (2009) revealed that teachers are challenged to develop effective learning environment, organizing the subject matter, designing learning experiences, engaging all students in learning activities, and assessing students' learning outcomes. These challenges can be associated with teachers' continuous professional learning habits. Because findings showed that teachers have a limited habit to learn and participate in the open dialogues which could help them to transform their existing rigid beliefs about student learning (Mtika, 2008; Nguyen, 2009). To equip students with practical skills is important in their future careers, laboratories should be efficiently used by teachers and students, and teachers themselves should possess these skills. Hence, consideration in the process ofdeveloping and evaluating a laboratory work task is important, such as the teachers, objectives and the task designed are influenced by teachers' views about science and learning, and by practical and institutional factors, such as the resources available, the requirement of the curriculum, its mode of assessment, and so on (Gobaw, 2016).

Teacher's Experience and Chemistry Students' Participation in Practical Class

Teacher play crucial role in the teaching/learning process and so also the level of classroom participation in chemistry practical class. The significance of the role that teacher play in the learning of chemistry practical is undisputable. Teachers havea lot of influence on their classroom organization, arrangement and coordination. Nwachuckwu (2012) observed that two categories of science (chemistry) teachers exist in Nigeria secondary schools. The first category are the professionally trained teachers and educators who lack in-depth knowledge of the science subject content and the other group are those who have mastery of the subject but are not professionally trained teachers. This implies that most practicing science teachers do not possess adequate training for the job.

Chemistry as a dynamic subject and this call for training and retraining of science (chemistry) teachers so as to update and upgrade their knowledge on the job and in the contents of science (chemistry) in order to be able to effectively impact the scientific knowledge on students. It is obvious that there is no educational system of any nation that can go above the level of its teachers. Akinsolu (2010)opined that the extent of availability of qualified teachers correlated the performance of students in school. This is also applicable to chemistry teaching both in theory and practical. The experience of a qualified chemistry teacher enhance his mastery of the procedure, methodology and demonstration of chemistry practical and encourage high level of participation in the class.

Although the chemistry curriculum make provision for the teachers to let the students to conduct experiment, but there is a research that shows teachers strongly advocate the use of practical, it has to be noted that there is, as many places in school education, a gap between policy and practice, between written in the policy and the actual action that teacher practices, and what do student and teacher experience themselves (Dillon, 2008). Olaleye (2011) stated that there were relationship between teacher characteristics (experience) and student's performance. There will never be any meaningful academic performance in chemistry if there is no meaningful and active practical chemistry class participation of students. Ibrahim, Surif, Hui & Yaakub (2014) stated that even with the transformation of curriculum to improve the quality of practical chemistry experiment, students still waste too much time in experiment by reading and following the recipes or procedures.

Hofstein & Mamlok-Naaman (2007) mentioned that experience gained through laboratory work is known over the past century as being able to enhance and pursue the central science (chemistry) education goals which include improving and enhancing the comprehension of students toward the concepts in science (chemistry) and the application of it, scientific practical skills and problem solving abilities, scientific mind and personalities, realize the works in science and how it is carried out by scientists, interest and motivation. Dillon (2008) stressed that there exist a gap between the learning outcomes that is set by the teachers before carrying out experiments and the actual outcomes that students received at the end of experiment since students fail to comprehend the conceptual and procedural understandings of the laboratory activities.

One of the main problems existing in teaching experiment was the traditional approach where students obtained results through emphasize of training session in competence of procedure, observation and memory capacity had limited the opportunity for students to think, imagine analyse and innovate (Ibrahim, Surif, Hui & Yaakub, 2014). It is an undisputable fact that application of practical work as a teaching chemistry is helpful and able to improve both concept and students' skills but the way of carrying out the experiment and the degree of students engagement during the experiment is the main concern to determine the effectiveness of what the students obtained while conducting experiment (Ibrahim, Surif, Hui & Yaakub, 2014). Dillon (2008) stated that most of the students prefer to tag along the recipes passively

during the experiment thus it only enable students to practice skills at low level.

Udofot (2010) posited that the Nigerian's places importance on the quality of its teachers, and the education they receive is predicated on the high social demand society is making on education. Teacher prerequisite qualification requirement which enhance experience therefore, needs to be given priority attention. If quality chemistry practical class participation is to be realized, appropriate experience is needed by teachers to impart skills for productive and engaging practical activities in the learners. Afangideh (2011) observed that professional preparation is needed by science teachers and chemistry teachers in particular, through adequate and informed exposure to courses for teaching effectiveness as it influences students' practical class participation and performance. If a teacher is not well trained, he or she will lack experience and the learning process in practical class will not be effective no matter how carefully a curriculum has been marked out, how detailed and scientifically accurate the textbooks, worksheets, equipment and operating instructions are and how adequate the physical facilities are (Akpan, 2012).

Teacher's Teaching Method and Chemistry Students' Participation in Practical Class

Secondary school chemistry teachers face a host of challenges as they are given the responsibility of deciding how they will deliver assigned curriculum. Teaching methods are the means for helping students to study effectively. Teaching methods concern the tactics teachers use to meet teaching objectives, including instructional organization and techniques, subject matter, and the use of teaching tools and materials. Ameh & Dantani (2012) observed that methodology is very vital in any teaching-learning situation and the method adopted by the teacher may promote or hinder learning. It may sharpen mental activities which are the bases of social power or may discourage initiatives and curiosity thus making self-reliance and survival difficult. Teachings should be involved in formulating the goals and objectives for teaching procedures that will best achieve those objectives, carrying out procedures, evaluating the successes and failures.

Estew (2011) defined teaching method as a product of the combination of strategies, tactics and techniques. Shymansky and Kyle (2014) opined that instructional strategy includes the materials, media, setting and behaviour the teacher uses to create an environment to produce an effect. As a result, the achievement of the instructional goals and the choice of suitable teaching strategies are not separate. Oakley, Felder, Brent & Elhajj (2004) strongly believed that students should be involved in discussion that is strongly interactive. This enhances student cooperation for positive learning outcomes and confidence building. Additionally, students involved in interaction in classroom learning tend to display higher motivation to learn, especially intrinsic motivation. By this process the students are also encouraged to assist their peers, thus promoting more effective learning. Where the instructor intends to apply interactive learning, specific strategies are need. This has to be identified and practiced in a constructive way to monitor group characteristics and behavioral trends to maximize the interaction and hence the learning process.

Erdem (2012) emphasized four features of teaching strategies. Firstly, teaching strategies should improve a student's predisposition to learning by increasing the desire for studying and understanding new situation. Secondly, teaching strategies should be structured to help learners rapidly capture the information distributed through the instruction, and develop learner's abilities in assimilating and using knowledge possessed. Thirdly, teaching strategies should be sequenced in the most effective manner so that students can comprehend new knowledge by applying their prior experiences. Teaching strategies should be designed to allow students to genuinely engage in their learning. Different teaching strategies will lead to varied instructional outcomes and an instructor can choose for himself or herself strategies which are appropriate to his or her intension in teaching.

Kasa (2016) stated that chemistry teachers' input in the interaction process also influences the learning process and participation in many important ways, particularly learners' attitudes towards the teacher, the peers and the subject matter. Active learning has attracted strong advocates among educational institutions looking for alternatives to traditional teaching methods (Kumar, 2007). When students are actively involved in the learning task, they learn more than when they are passive recipients of instruction (Kumar, 2007). Students learn best when learning is active: When they are mentally involved, when they engage in hands-on activities, when they are involved in a process of inquiry, discovery, investigation, and interpretation. Tesfaye & Berhanu (2015) stated that learning is enhanced when students repeat the information in their own words or when they give examples or make use of the information.

Despite many advantages associated with practical work and great attempts by teachers to use practical work in the teaching of Chemistry, many science educators have expressed significant doubts about the effectiveness of practical work in teaching science (chemistry) knowledge and skills (Abrahams & Millar, 2008; Kennedy, 2011). This is because the teaching method that is appropriate for teaching practical work is lacking among many chemistry teachers. This could be mainly due to the nature of practical work

carried out in schools. Ituma, Twoli & Khatete (2015) stated that conventional methods of teaching practical work used in most secondary schools mainly focuses on developing students' knowledge in Chemistry practical, rather than on developing understanding of scientific investigative procedures. The practice in practical work has been a cookbook trend where the instructions are carried out like a recipe which reduces meaningful learning. The learners therefore, do not use scientific ideas to guide their actions during the practical activity and to reflect upon the data they collect and this could negatively affect their passion for participation in practical class.

Kim & Chin (2011) argued that such recipe-based practical work is not sufficient to develop students' habits of mind and participation level in chemistry practical because they involve simply doing but do not require thinking through doing. Effective practical work should enable students to build a bridge between what they can see and handle (hands-on), and the scientific ideas that account for their observations (minds-on).In order for Chemistry practical work to be effective in producing meaningful learning and active participation of students, the teachers should develop activities that engage the learners in scientific investigations which focus their minds on the activity and its outcome.

Methodology

The research design used for this study was survey design of the descriptive type of research. The scope of this study was limited to Ikere local government area of Ekiti State. It is a one town local government adjourned from settlement and campus.

The population of the study consisted of all secondary school chemistry students in both public and private secondary schools in Ikere local government area.

A sample size of two hundred (200) respondents were selected and used for the study. The respondents for the study were secondary schools chemistry students in Ikere local government area of Ekiti State. There are ten (10) public and twenty five (25) private secondary schools in Ikere local government area of Ekiti State. Based on this number of public and private secondary schools in the local government, random sampling technique was used to select ten (10) schools which comprised of five (5) public and five (5) private secondary schools. Then, simple random sampling technique was used to select two hundred (200) chemistry students as respondents. From each of the ten (10) secondary schools, twenty (20) students were selected. The selection cut across all the senior secondary classes that is SSS 1, 2 and 3.

A self- structured questionnaire was designed by the researcher and used as the only instrument for the study. However, there were two questionnaires; one for chemistry teachers and one for chemistry students. The questionnaires were divided into two sections, A and B in each case of teachers and students questionnaire. Section A was used to elicit information on the demographic data of the respondents (i.e teachers and students separately) which include; school, gender, age, qualification, years in teaching etc.; and school, gender, age, class in the case of students. Meanwhile section B of each questionnaire was used to elicit information on the research variables with a Likert scale format of Strongly Agree, SA, Agree, A, Disagree, D and Strongly Disagree, SD.

The researcher drafted a copy of each of the questionnaires and were given to one (1) expert in Chemistry Education and one (1) expert in Test and Measurement from College of Education, Ikere-Ekiti to ensure face and content validity of the questionnaires. The corrections that were made by the experts were pin-pointed and effected and were submitted to the project supervisor for final amendment, correction(s) and approval for administration.

The reliability of the instrument was established using split-half method of reliability. The researcher administered the instrument to twenty (20) students and four (4) teachers from Secondary schools that are not part of the experimental group. The data collected from these respondents were subjected to inferential statistics of Pearson's Product Moment Correlation (PPMC) to determine the value of reliability coefficient (r) at 0.05 level of significance. The reliability obtained was 0.99.

The researcher personally administered the questionnaire to both chemistry teachers and students selected from each of the selected secondary schools. The completed questionnaires were retrieved immediately after completion.

For analysis of data, the researcher used descriptive statistical tools of frequency counts and percentage to analyse the demographic data of respondents, percentage was used to answer the research questions while inferential statistics of Pearson Correlation analysis was used to test the hypotheses at 0.05 alpha level of significance. The analysis was done through computerized package of SPSS software.

Results and Discussion

Test of Hypotheses

Hypothesis 1: There is no significant relationship between teachers' attitude and students' participation in chemistry practical class in Ekiti State.

Table 1: Correlation analysis of students' response

		Teachers' attitude	Students' participation
Spearman's rho Teachers' attitude	Correlation Coefficient Sig. (2-tailed) N	1.000 200	0.572* 0.031 200
Students' participation	Correlation Coefficient Sig. (2-tailed) N	0.572* 0.031 200	1.000 200

* = significant at the 0.05 level.

The result in table 1 shows the correlation between teachers' attitude and academic achievement of chemistry students. The table indicates that there was a significant positive correlation between teachers' attitude and students' participation in chemistry practical class ($r = 0.572$, $N = 200$, $p < 0.05$). Hence the null hypothesis was not upheld.

Hypothesis 2: There is no significant relationship between teachers' method and students' participation in chemistry practical class in Ekiti State.

Table 2: Correlation analysis of students' response

		Teachers' method	Students' participation
Spearman's rho Teachers' method	Correlation Coefficient Sig. (2-tailed) N	1.000 200	0.759* 0.018 200
Students' participation	Correlation Coefficient Sig. (2-tailed) N	0.759* 0.018 200	1.000 200

* = significant at the 0.05 level.

The result in table 2 shows the correlation between teachers' method and students' participation in chemistry practical class. The table indicates that there was a significant positive correlation between teachers' method and students' participation in chemistry practical class ($r = 0.759$, $N = 200$, $p < 0.05$). Hence the null hypothesis was not upheld.

Hypothesis 3: There is no significant relationship between teachers' experience and students' participation in chemistry practical class in Ekiti State.

Table 3: Correlation analysis of students' response

		Teachers' experience	Students' participation
Spearman's rho Teachers' experience	Correlation Coefficient Sig. (2-tailed) N	1.000 200	0.653* 0.025 200
Students' Participation	Correlation Coefficient Sig. (2-tailed) N	0.653* 0.025 200	1.000 200

* = significant at the 0.05 level.

The result in table 3 shows the correlation between teachers' experience and students' participation in chemistry practical class. The table indicates that there was a significant positive correlation between teachers' experience and students' participation in chemistry practical class ($r = 0.653$, $N = 200$, $p < 0.05$). Hence the null hypothesis was not upheld.

Hypothesis 4: There is no significant relationship between teachers' competence and students' participation in chemistry practical class in Ekiti State.

Table 4: Correlation analysis of students' response

		Teachers' competence	Students' participation
Spearman's rho Teachers' competence	Correlation Coefficient Sig. (2-tailed) N	1.000 200	0.696* 0.036 200
Students' participation	Correlation Coefficient Sig. (2-tailed) N	0.696* 0.036 200	1.000 200

* = significant at the 0.05 level.

The result in table 4 shows the correlation between teachers' competence and students' participation in chemistry practical class. The table indicates that there was a significant positive correlation between teachers' competence and students' participation in chemistry practical class ($r = 0.696$, $N = 200$, $p < 0.05$). Hence the null hypothesis was not upheld.

Discussion

Hypothesis 1 tested revealed that there was a significant positive correlation between teachers' attitude and students' participation in chemistry practical class. This is in line with the statement of Wirth and Perkins (2013) which indicated that teacher attitude contribute significantly to student's attention in class. Teachers are invariably role models whose behaviours are easily mimicked by students. What teachers feel about their learning or studies could have significant effect on the student. It is important to note that the various dispositions that chemistry teachers display at work betrayed their devotion. This has greatly affected the attitude and in particular, the learning of chemistry and hence their poor performance in the subject. Also, the finding supported the statement of Yara (2009) that teacher's attitude can greatly influenced the students' attitude towards participation in practical class. Teachers' effective reactions to work are not as good as they should be in many schools yet, teachers are looked upon as instrument of social engineering, progress and change. This declining outlook calls for immediate diagnosis and treatment.

Hypothesis 2 indicated that there was a significant positive correlation between teachers' method and students' participation in chemistry practical class.

The findings agreed with Copriady (2014) that the capacity and efficiency of teachers in conducting the activity and learning process will have a positive impact on students learning orientation and participation. Teachers are also required to provide authentic learning experiences and create active learning through active interaction with the subject matter as related to chemistry practical. Therefore, teachers need to be really competent in their handling of practical chemistry to enhance students' classroom participation. For chemistry subject, teacher's competency in creating and planning will greatly provide significant impact on the teaching process and will greatly influence students to change their behaviours.

Hypothesis 3 revealed that there was a significant positive correlation between teachers' experience and students' participation in chemistry practical class. This is in line with the assertion of Akpan (2012) that if a teacher is not well trained, he or she will lack experience and the learning process in practical class will not be effective no matter how carefully a curriculum has been marked out, how detailed and scientifically accurate the textbooks, worksheets, equipment and operating instructions are and how adequate the physical facilities are. The experience of a qualified chemistry teacher enhance his mastery of the procedure, methodology and demonstration of chemistry practical and encourage high level of participation in the class. Also, Afangideh (2011) submitted that professional preparation is needed by science teachers and chemistry teachers in particular, through adequate and informed exposure to courses for teaching effectiveness as it influences students' practical class participation and performance.

Finally, hypothesis 4 indicated that there was a significant positive correlation between teachers' competence and students' participation in chemistry practical class. This supported the assertion of Ituma, Twoli & Khatete (2015) that conventional methods of teaching practical work used in most secondary schools mainly focuses on developing students' knowledge in Chemistry practical, rather than on developing understanding of scientific investigative procedures. This also agreed with Kasa (2016) stated that chemistry teachers' input in the interaction process also influences the learning process and participation in

many important ways, particularly learners' attitudes towards the teacher, the peers and the subject matter. The learners' therefore, do not use scientific ideas to guide their actions during the practical activity and to reflect upon the data they collect and this could negatively affect their passion for participation in practical class.

Conclusions

As per the findings of the study, the following conclusions were made:
Teachers' attitude influenced and correlated students' participation in chemistry practical class. Teachers' method can arouse and maintain students' interest level and correlated their participation in chemistry practical class. Teachers' experience played significant role in motivating and enhancing students' participation in chemistry practical class. Teachers' competence correlated students' participation in chemistry practical class.

Recommendations

The conclusions of the study were made, so it is necessary to put forward recommendations to tackle problems of the findings. The following recommendations are put forward:

1. Chemistry teachers who are less certified should further their education and get better academic certification to qualify them for effective teaching and improved classroom participation of students in Chemistry class.
2. Ekiti State government should provide in-training services for chemistry teachers to improve on their quality of teaching method for practical chemistry with different type of teaching techniques or strategies.
3. Teachers should make use of their years of experience when teaching Chemistry practical, so as to be dynamic and creative in their practical class teaching in secondary school chemistry practical class.
4. Chemistry teachers should endeavour to acquire more content knowledge on how to teach practical chemistry class as this will improve their competence level and enhance academic achievement of students.
5. The school administrator should reduce the number of students per teacher in Chemistry practical class to enhance teacher effectiveness during practical class.
6. Teachers should improve on their personality such as attitude, teaching method, content knowledge etc. that have great impact on students participation in chemistry practical class.

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