



Influence of Teachers' Attitude Towards Practical Chemistry on Senior Secondary Schools Students' Interest and Achievement in Nasarawa State, Nigeria

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ABSTRACT

This study investigated the Influence of Teachers' Attitude towards Practical Chemistry on Students' Interest and Achievement in Senior Secondary Schools in Nasarawa State. The study adopts ex post facto research design. The population of the study comprised all SS3 students in all the public senior secondary schools in Nasarawa State. Four research questions guided the study and four null hypotheses were tested at 0.05 level of significance using t-test statistics. Practical Chemistry Achievement Test (PCAT), Practical Chemistry Interest Scale (PCIS) and Teachers Attitude to Practical Chemistry Questionnaire (TAPCQ) were used for data collection. Split half reliability method was used to determine the internal consistency of instrument, and their reliability indices were 0.72, 0.79 and 0.85 respectively. Multi-stage sampling technique was used to select the sample. Simple percentage, mean, and standard deviation were used to answer the research questions, while the hypotheses were tested using t-test. The findings of this study revealed that teachers' attitude towards practical chemistry had significant influence on male students' interest in practical chemistry in Nasarawa State; that there was no significant influence in the interest of female students taught practical chemistry by teachers with positive attitude and those taught by teachers with negative attitude towards practical chemistry in Nasarawa State; there was on significant influence in the achievement of male and female students taught practical chemistry by teachers with positive attitude and their counterpart taught by teachers with negative attitude towards practical chemistry in Nasarawa State. The study recommended among others that; in order to improve quality of chemistry practicals, the numbers of learners in chemistry classrooms need to be reduced. This could be done by separating large classes into many small classes. This implies that more chemistry teachers be employed, more classrooms and laboratories built and equipped, an action which can be addressed by the ministry of education; also, for chemistry practicals to result in a significant positive impact on a students' ability to learn both the desired practical skills and also the underlying theory, it is recommended that; male and female students should be encouraged to cooperatively learn as it will help to maintain and increase their positive attitude and interest towards chemistry practicals in secondary schools.

Keywords: Achievement, Attitude, Interest, Practical Chemistry, Students

INTRODUCTION

No nation can afford to neglect science education at any level of Education and hope to thrive in any field of human endeavour. Science education has become important for useful living in any society. It is the centre for producing resources necessary for socio-economic, scientific and technological development needed for advancement of any nation. According to Adeyemi and Adu (2010), it is widely accepted that education is one of the leading instruments for promoting economic development as it encompasses some processes individuals go through to help them develop and utilize their potentials. Further, Okeke (2007)

pointed out that through education, individuals acquire knowledge, skills and attitude that are necessary for effective living.

Chemistry is the scientific study of the interaction of chemical substances that are constituted of atoms or the subatomic particles: protons, electrons and neutrons. It is an integral part of the science curriculum both at the senior secondary school level as well as in the tertiary institution. At this level, it is often called 'general chemistry' and is an introduction to a wide variety of fundamental concepts that enable the students to acquire tools and skills useful at the advanced levels where chemistry is invariably studied in any of its various sub-disciplines. Chemistry and indeed chemists, are linked to everything on earth as aptly captured as 'what on earth is not chemistry. The critical role of chemistry in daily life, industry and society is limitless. Many of the day-day activities revolve around chemistry. Chemistry plays a pivotal role in engineering, sustainable economic development and growth in any nation. Put succinctly, there is no aspect of human endeavour or natural phenomena in which chemistry does not feature. It features prominently in the areas of oil and gas, agriculture, health, environment, solid minerals, textiles, cosmetics, water supply and sanitation, crime detection, pulp and paper and waste management among others (Zuru, 2009). Chemistry is the catalyst of sustainable national growth and development.

Although chemistry courses at all levels includes chemistry practicals where students follow procedures directing them to mix chemicals, make measurements, analyze data, and draw conclusions, Okeke (2019) argues that chemistry practicals often consists of what is generally described as "cook-book" exercises and is often dull and routine, rather than engaging or inspiring. According to Zuru (2009), science teachers do not usually find it convenient to make chemistry practicals the centre of their instruction. They usually complain of lack of materials and equipment to carry out chemistry practicals and at the same time, it is possible that some of these materials and equipment may be locked up in the school laboratory store without teachers being aware of their existence.

Although the importance of chemistry practicals in school science is widely accepted, it is also important that the nature of chemistry practicals be supportive to learning (Nweke, 2017). For many students, what goes on in the laboratory in form of chemistry practicals is said to contribute little to their learning of chemistry or to their learning about chemistry and its methods (Millar, 2009). According to research findings from Ameh and Dantai (2012), a verbal, non-practical approach might be best for some teachers and students. Some students may find practical activity a sheer waste of their time. These concerns have led to calls for more „authentic“ practical experiences, or to re-think, re-evaluate, and perhaps reduce, the amount of chemistry practicals, to leave more room for other learning activities. Ogemba, Otanga and Yaki (2015) maintain that it is time for a reappraisal of the nature, quality, quantity and role of chemistry practicals in the teaching and learning of chemistry. Indeed, science practicals are quite efficient in creating new images of a particular subject. However, the thing that causes concern is the quality of the images.

Poor academic achievement of students in internal and external Examinations especially chemistry is a reflection of the problems and challenges facing the educational system in Nigeria today (Fehintola, 2009). In Nigeria, education is seen as the only means of getting to the top hierarchy in any endeavour. Thus, poor academic performance usually brings about sadness and frustration to the individual concerned and to his/her parents as well as other members of the family. As a matter of fact, it gives parents and students feelings of satisfaction and joy when children excel academically (Fehintola, 2009). These are the cases with the students taking the Senior Secondary Certificate Examinations (SSCE) of the West African Examinations Council (WAEC) and National Examinations Council (NECO). There has been wide cry each year when WAEC or NECO releases their annual results as a result of students' poor performance especially in Science subjects (Salami, Mohammed & Ogunlade, 2012). Candidates' performance at the Senior School Certificate Examinations (SSCE) conducted by WAEC and NECO has consistently remained poor with Chemistry having one of the worst and poorest results over the years (Nweke, 2017).

Table 1.1: Statistics of Chemistry Students' Achievement (Results) by Grade for May/June WASSCE (2014-2018) in Nasarawa State

Year	Total Sat	Credit (A1-C6) %	Pass (D7-E8)%	Fail (F9) %
2014	15,692	49.54	17.91	32.55
2015	15,687	44.23	31.51	24.25
2016	17,302	43.13	16.31	40.56
2017	16,542	31.00	31.40	37.60
2018	15,722	43.27	25.43	31.30

Source: WAEC Research and Statistics Unit, Nasarawa State 2014-2018

There appears to be certain causes for the massive failure in Chemistry at the West African Examinations Council (WAEC) and National Examinations Councils' Examinations. Such causes could include lack of knowledge of common subjects, inadequate coverage of the syllabus and unfamiliarity with test format. Others may include lack of strong reading spirit in the candidates who prepare for the Examinations, poor study habits, and psychological adjustment problems. Also included are lack of interest in school programme, low retention and association with wrong peers as well as low achievement motivation and emotional problems. There are also teachers and teacher-related problems as well as institutional and government-related problems, not to mention families, home and parent-related problems.

Efforts made through research to discover the causal factors of the persistent failure, disclosed that secondary school chemistry teachers mainly adopt the lecture method in the teaching and learning of chemistry (Udoh, 2008). Thus Eze (2010) opined that the incompetence of science teachers stems from poor teacher preparation. Meaningful learning occurs when learners comprehend concept and are able to connect them with previous knowledge (Ausubel, 2000). When students learn chemistry meaningfully, their ability to reflect on their own learning and make adjustments accordingly fosters deeper learning. Deeper learning is the key strategy through which students find meaning and understanding from course material and experiences (Warburton, 2003). Learners construct knowledge by making connections between new information and their existing conceptual network because "learning is an active process of knowledge construction, the making of connections between existing network of knowledge" (Peterson & Carpenter, 1998).

Consequently, the need to improve the quality of Science teaching and learning so that learners develop scientific literacy to cope with the demand of science and technology growth has been the yearning of every nation in the 21st century. Zuoja (2007) observed that Education system in Nigeria is too 'bookish' and there is an existing gap between the school and industries. In this regard the practical work in school was developed and termed an essential component in the teaching of science. Quality practical training is achieved when it is focused on skills needed in the industry and research, (Hafstien & Lunette, 2007). The laboratory as a teaching device has been perceived as important by science teachers because of its usefulness in helping students to learn. The importance of practical work in science teaching is widely accepted.

Science education determines to achieve development by training and imparting necessary theories and practical skills that will lead to the production of persons that are self-employed or competent for employment in the industries. But for a country to be sovereign it will totally depend on the scientific skills her citizens possess and effectiveness in which these skills are passed on from generation to generation. This occurs via quality practical instruction which is a panacea for science education in Nigeria. (Motswiri, 2004) argued that classroom practices in most secondary school chemistry lesson are characterized by chalk and talk and little practical work raises some questions on the quality of science learning in schools. Frequency of practical classes is also an important school factor since scientific

process skills such as observation and prediction involves “doing” and doing means practical activity. It is assumed that frequent use of laboratory for practical lessons by the teacher can translate chemical knowledge to the understanding of scientific facts, Laws and theories. Okeke (2007) also observed that the ‘talk and chalk’ method hardly increased students’ enthusiasm and interest. It is observed that students develop conceptual understanding through engagement in hands-on activities. Being a major tenet of Piagetian constructivism, it is assumed that learners are exposed to a variety of hands-on experiences where they understand what to do and are able to construct new level of understanding. It demands active involvement of learners to reflect on their learning, make inferences and to experience conflict. When this happens, learners become aware of their cognitive process. Garrett, Giles, and Coupland (2002) suggest that there are various steps that can be taken by a teacher or research scientist prior to dealing with the practical phase of an experiment:

- i. What questions are we trying to answer?
- ii. What observations would provide an answer to the questions?
- iii. How can we best create conditions for making the desired observations?
- iv. How can we process and evaluate the observations?
- v. What do we do next?

These issues comprise practical problem aspects that students have no connection with, as the laboratory technician and instructor deliberate on these issues long before the students embark on the experiment. Obviously, Laboratory sessions should provide the proper opportunity for students to hypothesize, criticize, analyze, explain and evaluate arguments and evidence.

Consequently, attitude as a neural state of mind in the individual has been found to affect teachers in the organization of practicals, which invariably affect overall students’ achievement. Many factors have been associated with student poor performance; these include learning environment, the nature of practical chemistry. Students’ under-achievement in chemistry practical might be associated with some concepts that are perceived as difficult (Omiko, 2015 & Ghassan, 2007). The west African Examinations Council (WAEC), chief examiners report 2014-2018 consistently reported candidates lack of understanding of the demands of the questions asked in chemistry, inadequate/poor practical exposure, candidates weakness in understanding the basic concepts and principles as well as inability to relate concepts in chemistry practical to everyday life and poor drawing and manipulative skills. According to the chief examiners reports (2012 and 2013), most candidates performed poorly on problems related to practical chemistry.

Academic interest is a vital factor in teaching and learning. The factors behind what the learners can achieve in any content of the learning are a function of his or her interest to the learning material, the teacher and method of teaching. Irrespective of the teaching style, method, skills used by the teacher, the achievement will still be staggered if the interest of the students is not initiated and sustained in and through the learning process. Chukwuagu (2016) viewed interest as a psychological construct that defines individual’s degree of responsiveness to a given activity, events, object or person. This deals with how often or willing one is to perform a given activity, engage with an object or person for maximum output. Chemistry is a subject that requires maximum attention and interest of the student for any desirable learning outcome to be achieved. However, the nature of chemistry is such that students perceive it as been abstract and far removed from their day to day activities. Certain microscopic concepts (atoms, ion, molecules, among others) in chemistry which serve as the basis for any level of chemistry knowledge are difficulty for students to understand. In other to generate and sustain the interest of the students in this subject, adequate support is to be given to the students by more knowledgeable person which will serve as cognitive support for better understanding and achievement in the subject. Based on the foregoing, the researcher set out to investigate the Influence of Teachers Attitude towards Practical Chemistry on Senior Secondary School Students’ Achievement and Interest in Nasarawa State, Nigeria.

Statement of Problem

Although chemistry teaching and learning essentially involves chemistry practicals and has a long tradition of student experimental work in schools, questions have been raised about the appropriate role and the reality of what is actually achieved by the chemistry practicals especially with continued decline in performance in the subject. Despite the widespread use of chemistry practicals as a teaching and

learning strategy in school chemistry, and the view that increasing its amount would improve chemistry learning, some science educators have raised questions about its effectiveness. Although chemistry practicals often occupy a massive share of curriculum time and resources, doubts have been raised about their effectiveness or their real educational value, as students continue to perform poorly in the subject.

Students' performance in chemistry over the years has been very poor as reported by chief examiners report of WAEC and NECO for the year 2014-2018, the report showed that the performance of student in practical chemistry is worse than the theory aspect of chemistry. Yet, chemistry is a prerequisite to all courses in medicine and related fields, all engineering courses, pharmacy, and many others that are considered prestigious by the society. This would affect students' qualification for admissions into Nigerian Universities and other higher institutions of learning, which will certainly affect the development of the country.

Among the reasons given for the poor performance in practical chemistry is the role of the teacher, that is, if he or she has poor attitude it may reflect on the student not having interest in practical chemistry, as interest affect performance of the students'. Therefore, this study sought to find out the Influence of Teachers Attitude towards Practical Chemistry on Students' Achievement and Interest in Senior Secondary Schools in Nasarawa State.

Research Questions

The following research questions guided the study:

1. What is the influence of teachers' attitude towards practical chemistry on male students' interest in practical chemistry in Nasarawa State?
2. What is the influence of teachers' attitude towards practical chemistry on female students' interest in practical chemistry in Nasarawa State?
3. What is the influence of teachers' attitude towards practical chemistry on male chemistry students' achievement in practical chemistry in Nasarawa State?
4. What is the influence of teachers' attitude towards practical chemistry on female chemistry students' achievement in practical chemistry in Nasarawa State?

Hypotheses

The following null hypotheses were formulated to guide the study and were tested at 0.05 level of significance.

- H₀₁** Teachers' attitude towards practical chemistry has no significant influence on male chemistry students' achievement in practical chemistry in Nasarawa State
- H₀₂** Teachers' attitude towards practical chemistry has no significant influence on female chemistry students' achievement in practical chemistry in Nasarawa State
- H₀₃** Teachers' attitude towards practical chemistry has no significant influence on male students' interest in practical chemistry in Nasarawa State
- H₀₄** Teachers' attitude towards practical chemistry has no significant influence on female students' interest in practical chemistry in Nasarawa State

METHODOLOGY

Descriptive survey research design of ex post facto type was employed for the study. Data were collected with respect to teachers' attitude to practical chemistry. To do this, intact classes were used, where interest rating scale and students' achievement test were administered. This study comprised SSIII students (1563 female and 1470 male) SSIII students of 2016 and 2017 academic sessions; their ages are between 13-17 years in all the public senior secondary schools in Nasarawa State. Multi-stage sampling technique was used to select six intact classes for the study. The sample size obtained after this procedure was 340 (175 males and 165 females) SS III students and six Chemistry teachers (four had positive attitude and 2 had negative attitude).

Three instruments were used for the study they are: Practical Chemistry Achievement Test (PCAT): the items generated in the PCAT covered all the basic concepts of practical chemistry taught in SSIII. It was a 30-item multiple choice test on the following: measurement of mass and volume, separation technique, acids, bases and salts, pH values and identification of ions adopted from past WAEC question paper from

year 2003 to 2018. The PCAT served as an instrument to assess students' performance in practical chemistry. **Scoring this instrument** – each item carried one point, i. e. 30 points in all. A score of 0-15 was considered a poor achievement; a score from 16-30 was considered a good achievement. Practical Chemistry Interest Scale (PCIS): Practical Chemistry Interest Scale (PCIS) was a researcher-constructed instrument which has two sections, section A had the demographic information and section B has the instruction of scoring items based on the scale from 1 to 5, the assigned points are as follows: SA= 4, A=3, D= 2, SD=1 for the positive items and reversed for the negative items (SA=1, A=2, D=3, SD=4). This PCIS was a 26-item rating scale to assess students' interest in practical chemistry. The PCIS items were used to assess students' interest in practical chemistry. **Scoring this instrument** – this 4-point Likert type scale is scored on the basis of positive and negative response to each item. A total score of 104 (4 x 26) is possible. Therefore, a score from 0-53 represents a negative interest while a score from 54-104 represents a positive interest. Teachers Attitude to Practical Chemistry Questionnaire (TAPCQ). Teachers Attitude to Practical Chemistry Questionnaire (TAPCQ) contains a 24 items adopted from Mentees Science-related Attitude Questionnaire (MSAQ). The scoring of the items is based on the scale from 1 to 4, the assigned points are as follows: SA= 4, A=3, D= 2, SD=1 for the positive items and reversed for the negative items (SA=1, A=2, D=3, SD=4). It was used to access the attitude of practical chemistry teachers towards practical concepts. **Scoring this instrument** -- this 4-point Likert type scale was also scored on the basis of positive and negative response to each item. A total score of 96 (4 x 24) was possible. Therefore, a score from 0-48 represents a negative attitude of the teacher while a score from 49-96 represents a positive attitude. To establish the reliability of the instruments, trial-testing was done by administering copies of the instruments to 20 Senior Secondary III School students. The respondents were not part of the sample for the study but had similar characteristics with the sample. Guttman Split-Half Coefficient was used to determine the internal consistency of Practical Chemistry Achievement Test (PCAT) while Cronbach Alpha method was used to analyse the PCIS and TAPCQ in order to determine the internal consistency. The reliability indices for Student Practical Chemistry Test (SPCT), Practical Chemistry Interest Scale (PCIS) and Teachers Attitude to Practical Chemistry Questionnaire (TAPCQ) were 0.72, 0.76 and 0.85 respectively.

The study was conducted in a period of six weeks. The attitude to practical Chemistry Questionnaire (TAPCQ) was administered to the teachers to determine their attitude to practical chemistry. Thereafter, the teachers taught practical chemistry covering the topics (measurement of mass and volume, Separation technique, Acid base and Salts, pH values, Identification of ions by simple test), thereafter the Practical Chemistry Achievement Test (PCAT) was administered to the students to determine their performance in practical chemistry and Practical Chemistry Interest Scale (PCIS) was also administered to the student to determine the interest of students towards practical chemistry. The scores from the data collected were used for analysis. The research questions were answered using the mean and standard deviation while the hypotheses were tested at 0.05 level of significance using t-test.

PRESENTATION OF FINDINGS

Research Question One

What is the influence of teachers' attitude towards practical chemistry on male students' interest in practical chemistry in Nasarawa State?

The data that answered this research question are presented in Table 1.

Table 1: Influence of Teachers Attitude towards Practical Chemistry on Male Students' Interest in Practical Chemistry in Nasarawa State

Teachers	No. of Male Stds.	Mean	Std. Dev.	Std. Error Mean
Positive Attitude	100	56.22	5.71	.571
Negative Attitude	75	54.09	5.68	.656

Table 1 shows the mean score and standard deviations of the responses of male student interest taught practical chemistry by teacher with positive and negative attitude towards practical chemistry. With the male student taught by teachers with positive attitude having a higher mean interest score of 56.22 and a standard deviation of 5.71 while the students taught negative teachers having a mean interest score of 54.09 with a standard deviation of 5.68

Hypothesis One

Teachers' attitude towards practical chemistry has no significant influence on male students' interest in practical chemistry in Nasarawa State.

The data that was used for testing this hypothesis is shown on Table 2.

Table 2: t-test of Teachers Attitude towards Practical Chemistry on Male Students Interest in Practical Chemistry in Nasarawa State

Teachers	No. of Male Stds.	Mean	Std. Dev.	t	df	Sig. (2-tailed)
Positive Attitude	100	56.22	5.711	2.444	173	.016
Negative Attitude	75	54.09	5.679			

Table 2 shows that teachers' attitude towards practical chemistry has no significant influence on male students' interest in practical chemistry in Nasarawa State. With $t = 2.444$ with significance level of 0.016 is less than the 0.05, the null hypothesis of no significant influence was rejected meaning that there is significant difference in the interest of male student taught practical by teachers with positive attitude and those taught by teachers with negative attitude towards practical chemistry in Nasarawa State.

Research Question Two

What is the influence of teachers' attitude towards practical chemistry on female students' interest in practical chemistry in Nasarawa State?

The data that answered this research question are presented in Table 3.

Table 3: Influence of Teachers Attitude towards Practical Chemistry on Female Students' Interest in Practical Chemistry in Nasarawa State

Teachers	No. of Female Stds.	Mean	Std. Dev.	Std. Error Mean
Positive Attitude	105	55.70	5.98	.583
Negative Attitude	60	56.30	5.68	.733

Table 3 shows the mean interest score and standard deviations of the responses of female student interest taught practical chemistry by teacher with positive and negative attitude towards practical chemistry. With the female student taught by teachers with negative attitude having a higher mean interest score of 56.30 and a standard deviation of 5.68 while the students taught positive teachers having a mean interest score of 55.70 with a standard deviation of 5.68

Hypothesis Two

Teachers' attitude towards practical chemistry no significant influence on female students' interest in practical chemistry in Nasarawa State.

The data that was used for testing this hypothesis is shown on Table 4.

Table 4: t-test of Teachers Attitude towards Practical Chemistry on Female Students Interest in Practical Chemistry in Nasarawa State

Teachers	No. of Female Stds.	Mean	Std. Dev.	t	df	Sig. (2-tailed)
Positive Attitude	105	55.70	5.979	-0.626	163	.532
Negative Attitude	60	56.30	5.679			

Table 4 shows that teachers' attitude towards practical chemistry has no significant influence on female students' interest in practical chemistry in Nasarawa State. With $t = -0.626$ at significance level = 0.532 greater than 0.05, the null hypothesis of no significant influence is not rejected meaning that there is no significant difference in the interest of female student taught practical by teachers with positive attitude and those taught by teachers with negative attitude towards practical chemistry in Nasarawa State.

Research Question Three

What is the influence of teachers' attitude towards practical chemistry on male chemistry students' achievement in practical chemistry in Nasarawa State?

The data that answered this research question are presented in Table 5.

Table 5: Influence of teachers Attitude towards Practical Chemistry on Male Students' Achievement in Practical Chemistry in Nasarawa State

Teachers	No. of Male Stds.	Mean	Std. Dev.	Std. Error Mean
Positive Attitude	100	17.15	5.33	.533
Negative Attitude	75	16.72	5.47	.631

Table 5 shows the mean score and standard deviations of the responses of male students exposed to practical chemistry teacher with positive and negative attitude towards practical chemistry. With the male students taught by teachers with positive attitude having a higher mean achievement score of 17.15 and a standard deviation of 5.33 while the students taught negative teachers having a mean score of 16.72 with a standard deviation of 5.47.

Hypothesis Three

Teachers' attitude towards practical chemistry has no significant influence on male chemistry students' achievement in practical chemistry in Nasarawa State.

The data that was used for testing this hypothesis is shown on Table 6.

Table 6: t-test of Teachers Attitude towards Practical Chemistry on Male Students Achievement in Practical Chemistry in Nasarawa State

Teachers	No. of Male Stds.	Mean	Std. Dev.	t	df	Sig. (2-tailed)
Positive Attitude	100	17.15	5.332	.522	173	.602
Negative Attitude	75	16.72	5.466			

Table 6 indicates that teachers' attitude towards practical chemistry has no significant influence on male students' achievement in practical chemistry in Nasarawa State. With $t = 0.522$ at significance level = 0.602 greater than the 0.05, the null hypotheses of no significant influence was therefore not rejected

implying that there is no significant influence in the achievement of male students taught practical by teachers with positive attitude and those taught by teachers with negative attitude towards practical chemistry in Nasarawa State.

Research Question Four

What is the influence of teachers' attitude towards practical chemistry on female chemistry students' achievement in practical chemistry in Nasarawa State?

The data that answered this research question are presented in Table 7.

Table 7: Influence of Teachers Attitude towards Practical Chemistry on Female Students' Achievement in Practical Chemistry in Nasarawa State

Teachers	No. of Female Stds.	Mean	Std. Deviation	Std. Error Mean
Positive Attitude	105	16.71	4.38	.427
Negative Attitude	60	16.98	4.19	.541

Table 7 shows the mean score and standard deviations of the responses of female student achievement exposed to practical chemistry by teacher with positive and negative attitude towards practical chemistry. With the female student taught by teachers with negative attitude having a higher mean achievement score of 16.98 and a standard deviation of 4.19 while the students taught positive teachers having a mean score of 16.71 with a standard deviation of 4.38.

Hypothesis Four

Teachers' attitude towards practical chemistry has no significant influence on female chemistry students' achievement in practical chemistry in Nasarawa State.

The data that was used for testing this hypothesis is shown on Table 8.

Table 8: t-test of Teachers Attitude towards Practical Chemistry on Female Students Achievement in Practical Chemistry in Nasarawa State

Teachers	No. of Female Stds.	Mean	Std. Deviation	t	df	Sig. (2-tailed)
Positive Attitude	105	16.71	4.376	-0.386	163	.700
Negative Attitude	60	16.98	4.188			

Table 8 shows that Teachers' attitude towards practical chemistry has no significant influence on female students' achievement in practical chemistry in Nasarawa State. With $t = -0.386$ at significance level = 0.700 greater than 0.05, the null hypothesis of no significant influence was therefore not rejected that there is no significant influence in the achievement of female student taught practical by teachers with positive attitude and those taught by teachers with negative attitude towards practical chemistry in Nasarawa State.

DISCUSSION OF FINDINGS

The findings also revealed that teachers' attitude towards practical chemistry had significant influence on male students' interest in practical chemistry in Nasarawa State. This finding is in agreement with those of Ekperi, Ude, Wike, (2019); Olubukola, (2018); Sakariyau, Taiwo, & Ajagbe, (2016); Olawale, (2016); Shittu and Oanite (2015) who found out that male students taught by teachers with positive attitude towards practical chemistry had higher interest than those taught by teachers with negative attitude towards practical chemistry, this according to the researchers might be as a result of emulation of the attitude of their teachers with the positive attitude thereby enhancing their interest.

Findings of this study also revealed that there was no significant influence in the interest of female students taught practical chemistry by teachers with positive attitude and those taught by teachers with negative attitude towards practical chemistry in Nasarawa State. This finding is in disagreement with the findings of Okeke (2019) and Iheanyi (2017) who found out that female student taught by teachers with positive attitude towards practical chemistry had higher interest than their counterpart taught by teachers

with negative attitude towards practical chemistry, this according to the researchers might be as a result of their determination to excel in the field of science.

Findings from this study also revealed that there was no significant influence in the achievement of male and female students taught practical chemistry by teachers with positive attitude and their counterpart taught by teachers with negative attitude towards practical chemistry in Nasarawa State. This finding disagrees with that of Sakariyau, Taiwo, & Ajagbe, (2016); Ezeudu (2013) and Poripo (2008) who found out in their different researches that male student taught by teachers with positive attitude towards practical chemistry achieved higher than those by teachers with negative attitude towards practical chemistry. This may be due to friendly class room atmosphere created by their teachers to inculcate knowledge to their students. This implies that the attitude of teachers towards practical chemistry to some extent affect student achievement in practical chemistry.

CONCLUSION

The findings revealed that teachers' attitude towards practical chemistry had no significant influence on male and female students' achievement and female interest but had significant influence on male students' interest in senior secondary schools in Nasarawa State.

RECOMMENDATIONS

Based on the findings of this study, the following recommendations were made that:

1. The chemistry teachers must develop positive relationship with students and stress practical activities, which will involve active teaching learning process and student's participation in the class.
2. Teachers should develop positive attitude towards the teaching of chemistry knowing that chemistry as a subject, if not taught with all enthusiasm could barely be regarded as being abstract.
3. Students should be encouraged to fully participate in chemistry practical activities to ensure positive classroom dynamics with more learner involvement.

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