



Senior Secondary School Students' Attitude To Chemistry Practical Work As A Predictor Of Their Academic Achievements In Borno State, Nigeria

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ABSTRACT

The study investigated the senior secondary school students' attitude to Chemistry practical work as a predictor of their academic achievement in Borno State, Nigeria. The study adopted ex-post facto design. Data collected were analyzed using statistical Package for Social Science (SPSS) version 22. Descriptive statistics (Mean and Standard deviation) were used to answer the two research questions and hypotheses one was tested at 0.05 level of significant using linear regression, while hypothesis two was tested using multiple regression. Stratified random sampling technique was used to select the students' sample (360) Chemistry students comprising of 221 male and 139 female students' drawn from a population of 8,210 SS III. The instrument containing 28 items of Students' Attitudinal Scale towards Chemistry Practical (SASTCP) was designed and a proforma detailing from students' records of their academic achievement in WAEC for the period of 2018/2019 session was used. The reliability coefficient of the instrument was obtained to be 0.84 using Cronbach Alpha. The findings of the study revealed that Cognitive, Affective, Behavioural components of students' attitude towards Chemistry practical work predict their academic achievement in Chemistry. Gender does not predict students' cognitive, affective, behavioral components of students' attitude towards Chemistry practical work and their academic achievement in Chemistry. $F=5.06$, $n=360$, $p<0.05$, $F=10.35$, $n=360$, $p<0.05$, $F=10.35$, $n=360$, $P=0.05$, $F=10.35$, $n=360$, $p=0.05$ and $F=10.35$, $n=360$, $p<0.05$ were obtained. To this end, it was recommended that Students' should consider Chemistry practical work as part of the Chemistry course to meet their need/requirement to study Medicine, Pharmacy, Chemical Engineering and also practical oriented Chemistry topics should be demonstrated in the laboratory using all the necessary equipment's and reagents. There should be more time allocated on the time-table for Chemistry practical laboratory work in Chemistry.

Keywords: Attitude; Affective; Behavioral; Cognitive components of Attitude; Chemistry Laboratory Practical, Proforma

INTRODUCTION

Science education is a veritable tool for scientific and technological advancement of any Nation. According to Federal Republic of Nigeria as enshrined in the National Policy on Education (FRN, 2014), states that science education should, among other things, equip students to live effectively in the modern age of science and technology. To achieve this, Chemistry laboratory facilities and

resources for science and technology teaching and learning should be adequately provided for and judiciously utilized in educational institutions to attain the desired objective.

Chemistry Education Curriculum for Secondary Schools as outlined in the 2008 curriculum document Federal Ministry of Education (FME, 2009 p. 220) is designed to prepare students to acquire: adequate laboratory and field skills in Chemistry; meaningful and relevant knowledge in Chemistry; ability to apply scientific knowledge to everyday life in matters of personal community health and agriculture; and reasonable and functional scientific attitude (FME, 2009 p. 220).

Attitude as conceived by Richler and Snowman (2008) is concerned with the cognitive, affective and behavioral aspects of an individual. The cognitive aspects represent the picture and experience the individual has about the object also is an aspects represent the belief or the amount of favorable and unfavorable feelings an individual has towards an object, while the behavioural component refers to the actual behavior of the individual towards the object or issue.

Attitude affects how students' feels, beliefs and tendency to act towards practical Chemistry work is positive or negative, mental and neural readiness towards Chemistry practical work may affect their achievement in Chemistry. Bagozzi (2009) found that negative attitude towards Chemistry practical could lead to poor performance of the subject. Attitudes are usually conceived as evaluative appraisals. This means science teaching and learning activity by the learners which involves the learners, working individually or in small groups, manipulating and/or observing real objects and materials (Science Community Representing Education (SCORE, 2008).

Academic achievement of Students in Chemistry especially at Senior School Certificate Examinations (SSCE) level has become a source of concern to all stakeholders in education in Nigeria (Imogie, 2010) and Borno State in particular. Poor achievement of students in science especially in Chemistry has continued to be the major concerns to all and particularly those in the main stream of science education (Ariyo, 2007). One of the major reasons for this anomaly is lack of or inappropriate application of laboratory facilities in the teaching of practical Chemistry by concerned stakeholders (Orji &Ebele in Asiyai, 2012).

Gender and its manifestation in various human activities appear to be a strong predictor of human conduct. In education, many differences have been documented between achievements of males and females. Many researchers and educationalists (Fredrick, 2008) feel that gender difference is one of the factors that affect academic performance. Gender has attracted the attention of many Psychologists, Biologist, and researchers as a result of which a lot of literatures exists on different aspects of gender (Maikano, 2010). Many studies carried out in gender effects of academic Achievement (Tsai, 2012, Daso, 2013, Ibe, 2014 and Ssempala, 2015) had led to a number of conflicting conclusions. Some find gender as a relevant factor in academic Achievement; others have found that no difference exists between the sexes in academic achievement in the area of science.

However, the increasing failure rate that fluctuates from year to year in Chemistry, in school examinations becomes worrisome. Summary of West African Examination Council (WAEC) results in Chemistry in Borno State from the year 2008 – 2013 shows the high failure. Observation and investigations on students' achievement in Chemistry in the West Africa Senior School Certificate Examination (WASSCE) has shown that only a small percentage of the students' pass the examination especially when compared with other subjects (Sunday, 2012). To achieve the objectives and the aspiration of the government, and to improve students' achievement in Chemistry, efforts should be directed towards improving teaching and learning of the subject. The availability and the use of these material resources in teaching, offer students the opportunity to develop scientific skills such as observation, objectivity, creativity, communication, and critical thinking (Federal Ministry of Education, 2009).

Purpose

This is to investigate senior secondary schools students' attitude to Chemistry practical work as a predictor of their academic Achievement in Borno State, Nigeria. Specifically, the study intends to achieve the following objectives:

1. To determine whether the cognitive, affective and behavioural components of students' attitude towards Chemistry practical work predicts their academic achievement.
2. To establish whether students' gender predicts their attitude towards Chemistry practical work and their academic achievement.

Significant

The study may benefit the Chemistry students' in acquiring practical laboratory knowledge, interest and retain information about Chemistry concepts. They may also cultivate positive attitudes towards Chemistry practical work. This could lead to better academic achievement with the help of laboratory practical work. Chemistry teachers' strengths and weakness on Chemistry practical work skills could be known; to be able to use the Chemistry laboratory work for effective teaching of Chemistry likewise to encourage the Chemistry students' to develop positive attitude towards practical Chemistry.

The study could also be helpful to the educational institutions for the need to be organizing in house practical workshop, seminars etc. The study will also be helpful to the curriculum developers (planners) to re-emphasis on laboratory skills in the curriculum, especially in senior secondary schools for effective teaching and learning of Chemistry subject and the Government to provide Chemistry laboratory materials, equipment's and reagents for better teaching and learning of Chemistry subject. For the future researchers in the area of Chemistry education to widen the research in order to explore more knowledge on teaching and learning of Chemistry subject.

RESEARCH METHODS

The study adopted ex-post facto design. Data collected were analyzed using statistical Package for Social Science (SPSS) version 22. Descriptive statistics (Mean and Standard deviation) were used to answer the two research questions and hypotheses one was tested at 0.05 level of significant using linear regression, while hypothesis two was tested using multiple regression. Stratified random sampling technique was used to select the students' sample (360) Chemistry students comprising of 221 male and 139 female students' drawn from a population of 8,210 SS III. The instrument containing 28 items of Students' Attitudinal Scale towards Chemistry Practical (SASTCP) was designed and a proforma detailing from students' records of their academic achievement in WAEC for the period of 2018/2019 session was used. The reliability coefficient of the instrument was obtained to be 0.84 using Cronbach Alpha.

RESULTS

The results of this study are presented in the Tables as follows:

Table 1: Descriptive Statistics of cognitive component of students' attitude towards Chemistry practical work

	N	Mean	Std. Deviation	Remark
ITE1	360	3.84	1.21	Agree
ITE2	360	3.97	1.16	Agree
ITE3	360	3.68	1.05	Agree
ITE4	360	3.87	1.09	Agree
ITE5	360	3.50	1.02	Agree
ITE6	360	3.69	1.05	Agree
ITE7	360	3.52	0.77	Agree
ITE8	360	3.78	1.21	Agree
ITE9	360	2.83	1.11	Disagree
ITE10	360	4.14	0.88	Agree
GRAND MEAN	360	3.68	1.06	

Table 2: Descriptive Statistics of affective component of students' attitude towards Chemistry practical work

	N	Mean	Std. Deviation	Remark
ITE11	360	4.18	0.58	Agree
ITE12	360	3.52	1.13	Agree
ITE13	360	3.82	1.00	Agree
ITE14	360	3.76	1.13	Agree
ITE15	360	2.85	1.15	Disagree
ITE16	360	2.98	1.02	Disagree
ITE17	360	4.03	0.89	Agree
ITE18	360	3.28	1.06	Disagree
ITE19	360	4.45	0.69	Agree
GRAND MEAN	360	3.65	0.96	

Table 3: Descriptive statistics of behavioral component of students' attitude towards Chemistry practical work

	N	Mean	Std. Deviation	Remark
ITE20	360	3.06	1.15	Disagree
ITE21	360	4.03	0.82	Agree
ITE22	360	3.58	1.10	Agree
ITE23	360	4.25	0.82	Agree
ITE24	360	3.42	1.21	Agree
ITE25	360	3.23	1.02	Disagree
ITE26	360	3.43	1.16	Agree
ITE27	360	4.21	0.76	Agree
ITE28	360	2.97	1.23	Disagree
GRAND MEAN	360	3.58	1.03	

Table 4: Mean and standard deviation of students' attitude towards Chemistry practical work

	GENDER		Mean	Std. Dev.	Std. Error Mean	Mean Difference
	n					
STUDENTS	MALE	221	37.00	4.09	0.28	2.35
ATTITUDE	FEMALE	139	34.65	5.11	0.43	

Table 5: Mean and standard deviation of academic achievement of students in Chemistry practical work based on gender

	GENDER		Mean	Std. Dev.	Std. Error Mean	Mean Difference
	n					
ACHIEVEMENT	MALE	221	52.33	12.33	0.83	2.01
	FEMALE	139	50.32	15.91	1.35	

Table 6a: Model Summary Table of Cognitive component of students' attitude towards Chemistry practical work and their achievement

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.12 ^a	0.01	0.01	13.74

a. Predictors: (Constant), Cognitive Component of Students Attitude

Table 6b: ANOVA Summary Table of Cognitive component of students' attitude towards Chemistry practical work and their achievement

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	954.98	1	954.98	5.06	0.03 ^b
	Residual	67596.21	358	188.82		
	Total	68551.19	359			

a. Dependent Variable: Achievement

b. Predictors: (Constant), Cognitive Component of Students Attitude

Table 6c: Coefficients Summary Table of Cognitive component of students' attitude towards Chemistry practical work and students' achievement

Model		Unstandardized Coefficients		Standardized Coefficient	t	Sig.	95.0 & Confidence Interval for B	
		B	Std. Error				Lower Bound	Upper Bound
1	(constant)	38.86	5.69		6.83	0.00	27.68	50.05
	Cognitive Component of Students Attitude	0.35	0.16	0.12	2.25	0.03	0.04	0.66

a. Dependent Variable: Achievement

Table 7a: Model Summary Table of Affective component of students' attitude towards Chemistry practical work and students' achievement

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.19 ^a	0.04	0.03	13.59

a. Predictors: (Constant), Affective Component of students Attitude

Table 7b: ANOVA Summary Table of Affective component of students' attitude towards Chemistry practical work and students' achievement

Model		Sum of Square	df	Mean Square	F	Sig.
1	Regression	2477.70	1	2477.70	13.43	0.00 ^b
	Residual	66073.50	358	184.56		
	Total	68551.12	359			

a. Dependent Variable: Achievement

b. Predictors: (Constant), Affective Component of students Attitude

Table 7c: Coefficients Summary Table of Affective component of students' attitude towards Chemistry practical work and students' achievement

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0 & Confidence Interval for B	
		B	Std. Error				Lower Bound	Upper Bound
1	(constant)	35.35	4.48		7.89	0.00	26.54	44.16
	Cognitive Component of students Attitude	0.48	0.13	0.19	3.66	0.00	0.22	0.73

a. Dependent Variable: Achievement

Table 8a: Model Summary Table of Behavioral component of students' attitude towards Chemistry practical work and students' achievement

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.17 ^a	0.03	0.03	13.64

a. predictors: (constant), Behavioral Component of Students Attitude

Table 8b: ANOVA Summary Table of Behavioral component of students' attitude towards Chemistry practical work and students' achievement

Model		Sum of Square	df	Mean Square	F	Sig.
1	Regression	1925.43	1	1925.43	10.35	0.00 ^b
	Residual	66625.77	358	186.11		
	Total	68551.12	359			

a. Dependent Variable: Achievement

b. Predictors: (Constant), Behavioral component of students Attitude

Table 8c: Coefficients Summary Table of Behavioural component of students' attitude towards Chemistry practical work and students' achievement

Model		Unstandardized Coefficients		Standardized Coefficients			95.0 % Confidence Interval for B	
		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound
1	(constant)	40.48	3.52		11.51	0.00	33.56	47.39
	Cognitive Component of students Attitude	0.34	0.11	0.17	3.22	0.00	0.13	0.55

a. Dependent Variable: Achievement

Table 9a: Model Summary Table of Combination of cognitive, affective and behavioral components of students' attitude towards Chemistry practical work and students' achievement based on gender.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.07 ^a	0.01	0.03	13.82

a. Predictors: (Constant), Gender

Table 9b: ANOVA Summary Table of Combination of cognitive, affective and behavioral components of students' attitude towards Chemistry practical work and students' achievement based on gender

Model		Sum of Square	df	Mean Square	F	Sig.
1	Regression	343.48	1	343.48	1.80	0.18 ^b
	Residual	68201.21	357	191.04		
	Total	68544.69	358			

a. Dependent Variable: Achievement

b. Predictors: (Constant), Gender

Table 9c: Coefficients Summary Table of Combination of cognitive, affective and behavioral components of students' attitude towards Chemistry practical work and students' achievement based on gender.

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(constant)	54.34	2.20		24.68	0.00
	Gender	-2.01	1.50	-.07	-1.34	0.18

a. Dependent Variable: Achievement

Table 10a: Model Summary Table of Combination of cognitive, affective and behavioral components of students' attitude towards Chemistry practical work and students' achievement

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.22 ^a	0.05	0.04	13.54

a. Predictors: (Constant), Affective Component of Students Attitude, Cognitive Component of Students Attitude, Behavioral Component of Students Attitude

Table 10b: ANOVA Summary Table of Combination of cognitive, affective and behavioral components of students' attitude towards Chemistry practical work and students' achievement

Model		Sum of Square	df	Mean Square	F	Sig.
1	Regression	3296.97	3	1098.99	5.99	0.00 ^b
	Residual	65254.23	356	183.30		
	Total	68551.12	359			

a. Dependent Variable: Achievement

b. Predictors: (Constant), Affective Component of Students Attitude, Cognitive Component of Students Attitude, Behavioral Component of Students Attitude

Table 10c: Coefficients Summary Table of Combination of cognitive, affective and behavioral components of students' attitude towards Chemistry practical work and students' achievement

Model	Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B	
	B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound
1 (constant)	29.07	6.34		4.58	0.00	16.60	41.55
Cognitive Component of students Attitude	0.10	0.17	0.03	0.58	0.57	-.24	0.44
Behavioral Component of students Attitude	0.20	0.12	0.10	1.67	0.10	-.04	0.44
Affective Component of students Attitude	0.36	0.14	0.14	2.56	0.01	0.08	0.64

a. Dependent Variable: Achievement

Concept of Attitude

A positive attitude may be congruent with higher achievement at secondary school (Osborne, Simon, & Collins, 2008); however, there is a paucity of data pertaining to the importance of attitude in secondary school majoring in Chemistry (Bauer, 2008; Xu and Lewis, 2011). Developing a positive attitude towards a subject may be an important component of the secondary school experience, and as educators, we may encourage students to have a positive attitude, yet the concept of an attitude towards the study of Chemistry is somewhat vague. According to Walker (2009), students have higher achievement with subject matter when they are in a good mood, enjoy what they are doing, and have a positive attitude.

Although there is a complex relation between attitude and achievement (Freedman, 2009; Steiner and Sullivan, 2004), the limited previous work on Chemistry majoring students has suggested that associations between both the cognitive and affective components of attitude, and academic

performance were weak (Bauer, 2008). Xu and Lewis, (2011) reported correlations between achievement and both cognitive and affective components of attitude as 0.30 and 0.34, respectively.

Concept of Academic Achievement

Academic achievement of a student is the ability of the student to study and remember facts and being able to communicate his knowledge orally or in written form even under examination conditions. Secondary education plays a crucial role in laying the foundation for the further education of students. If a good foundation is laid at the secondary school level, students can better cope with the challenges of life and profession with great ease (Kpolovie, Joe, & Okoto, 2014). Academic success is one of the most widely used constructs in educational research and assessment and it's often wrongly confused with the term academic achievement. Based on the analysis and findings of York, Stephen, Sue, Bibhya, Lara, Mani, Shaneel, Romila, and Veena (2015), the academic success is inclusive of academic achievement, attainment of learning objectives, acquisition of desired skills and competencies, satisfaction, persistence, and career success. According to Sejcova (2009) an important factor contributing to good results of students in individual subjects is their attitude towards them. Pavelkova and Prochadzko (in Sejcova 2009) indicate that an attitude towards a subject reflects a measure of popularity that, in turn, reflects a tendency to undertake actions required by the subject and the satisfaction gained from these actions.

Concept of Chemistry Laboratory

Laboratories are of utmost importance in the teaching and learning of science subjects particularly Chemistry. A Chemistry Laboratory offers the environment and resources for teaching practical Chemistry skills which help students handle examination and other academic affairs. Chemistry has always had its practical side. It had to be so, because it is an experimental science. Laboratory is an essential facility for meaningful science teaching and learning. Facility is any material or object a teacher can use to facilitate his/her teaching and materials are very vital to science teaching and learning. Students should observe and experience science for learning to be meaningful, useful and permanent (Ango, 2008). Oduyuyi (2015) determined the effects of laboratory learning environment on students' learning outcomes in senior secondary school Chemistry. Results also indicated that student cohesiveness dimension of laboratory learning environment has the most significant effect on the learners' attitude, closely followed by rule clarity.

Akinbobola (2007) suggested that the same space (building) is used for both lectures and practical work. A good science classroom welcomes all students and strives to enable all motivated students to be successful (Akinbobola, 2007). According to Akinbobola and Afolabi (2012), a productive laboratory environment is a student-centered classroom, which is interactive, comfortable, and collaborative learning is encouraged. The most appropriate enabling environment for effective teaching and learning of science is the science laboratory.

The full benefits of the laboratory method are not always realized in Nigeria either because the teachers do not employ the strategy or because material resources are not available for practical work (Nwona & Akogun, 2015).

Cognitive Component of Attitude and Students' Academic Achievement

Cognitive reflects an individual's beliefs and knowledge about the stimulus (Xu, Southam, & Lewis, 2012). Cognitive responses generate knowledge, awareness, thought, opinion, perception and beliefs in a consumer's mind. Germman (2008) reveals that science process skills, cognitive development, attitudes towards science, parental level of education and gender has positive correlation with science achievement, but gender has little or even no relationship with attitudes towards science.

Hassan and Harold (2009) reported that the cognitive characteristics of learners are extremely important to their overall wellbeing and are likely to have significant effects on their achievement in schools. The authors added that about seven factors have influence on individuals' achievement which is: Attitudes, Interest, Intelligence, Environment and Study habits.

Affective Component of Attitude and Students' Academic Achievement

Affective reflects emotional responses through individual preferences to the stimulus, whereas the cognitive reflects an individual's beliefs and knowledge about the stimulus (Xu, Southam, and Lewis,

2012). Affective aspects of consumer behaviour according to (Aaker, 2008; Batra & Ray, 2006; Burk & Edell 2005), "affective" includes mental status exclusively characterized by experienced feelings, emotions and moods such as happiness, anger, depression, gladness and fear. Affective response is based on feelings towards a special stimulus related to cognitive effort (Anand, Morris & Stephens, 2007; Westbrook 2009) and the result of an affective judgment is typically a crucial determinant for daily consumption experiences (Anand et al. 2007), which brings consumers to use it to form a priority consumption experience on which they base their future purchasing decisions (Cowley, 2007). According to Colin (2010), the component of the attitude, affective and operational aspects, constitute a balanced system which helps to understand the stable nature of attitudes which may be favorable. Cognitive evaluation also refers to brand image (Keller 2007; Malhotra 2009). The cognitive brand attributes seem to have the most important influences on brand preferences (De Chernatony, 2007).

Behavioral Component of Attitude and Students' Academic Achievement

This component of attitude deals with the students' individual action about the Chemistry practical work. Students by nature are curious; they need to be actively involved in the learning process in which they are continuously experimenting, testing, speculating and building their own personal construct and knowledge. It is only by personalizing such knowledge that it becomes valid, meaningful and useful to them. In Chemistry, students need to actively construct their own personal awareness and meaning (Usman, 2010). Usman (2016) remarked that the brain is not a passive consumer of information and to learn with understanding, a learner must actively construct the meaning of what to be learned. Chemistry is abstract in nature; its abstract nature brings about learning difficulty most especially in the mathematical aspect of Chemistry.

Glasson (2008) reveals that hands-on and teacher laboratory demonstrative methods did not have any significant differential effect on achievement. In other words, physical manipulation of laboratory equipment was not a factor in improving achievement, but student prior knowledge predicted about their performance significantly. Naiz and Robinson (2009) reveal that logical presentation of problems to learners by teachers and the intellectual capacity of students have the greatest influence on performance in science not more attitudes towards science.

Toh and Woolnough (2009) reveals that students provided with practical knowledge through instruction performed significantly better in overall achievement because the practical knowledge complements the instruction by providing necessary reinforcement. If students are not specially taught the practical skills they do not have the necessary skills to perform well.

Gender and Students' Academic Achievement in Chemistry Practical Work

Gender has remained a burning issue and has also remained relevant in education because it has been linked to achievement and participation in certain professions (Sotonade, 2008). Certain cultures restrict particular gender to certain professions like: farming, engineering and trading (Erinsho, 1997; Olatoye & Afuwape, 2007). Therefore; using gender as moderating variables in an experimental study can yield useful practical information. However, there have been conflicting findings on how gender influences academic achievement. It seems the influence of gender varies according to school subjects (Olatoye & Afuwape, 2007). The author lamented that no significant difference between male and female achievement in science.

In Nigeria, Adeyemo (2010) showed that there is a significant sex difference in academic Achievement in science with male achieving higher than female. It seems therefore that the results in Nigeria favour male students. Thus, studies outside Nigeria supported the males' superiority in academic Achievement over female. However, Adeyemo (2010) was not in complete agreement with the males' trend in sex differences with regards to Achieving in science. The study also showed that the performance of students' in co-educational schools were better than those in single schools. He also found that female in single schools had better scores in Chemistry than male in single schools.

Laboratory Facilities and Students Academic Achievement in Chemistry Practical Work

According to Akpan, (2015), Chemistry is a natural science which studies composition, structure, property and change of matter. Matter, from the chemical point of view, consists of the substances encountered in daily life in whatever phase such as solid, liquids, gaseous and plasma, as well as the

atoms and molecules of which these substances are composed. Since much of Chemistry deals with atomic and molecular phenomena that cannot be observed in the secondary school classroom, analogies and models are only used for delivery of instruction. Within the context of science education, Chemistry has been identified as an important science subject and its importance in the scientific and technological development of any nation has been widely reported. Chemistry is a key subject in most careers in the education system. These include but not limited to; Medicine, Veterinary Medicine, Nursing, Engineering and Biotechnology among others; but Chemistry is also a key subject for the development of Science and Technology in any country.

Despite the prime position Chemistry occupies in our educational system and the efforts made by researchers to enhance students' performance in sciences and Chemistry in particular, are still low (Adesoji & Olatunbosun, 2008). Chemistry is a science subject and has been stipulated to be taught using activity (Ifeakor, 2008) in schools which teachers do not comply accordingly. Bandele (2013) noted that the importance of physical facilities cannot be relegated. Facilities like modern laboratories, libraries and classrooms are to be put in place in all our schools. As recommended by Alimi (2007). Akinfolarin (2008) identified facilities as a major factor contributing to academic performance in the schools system. These include classroom furniture, recreational equipment among others. Different studies conducted by Ayodele (2010) and Vandiver (2011) showed that a positive relationship exists between availability of facilities and students' academic performances.

Findings of the study

Means that; cognitive, affective and behavioral components of students' attitude towards Chemistry practical work predicts their academic achievement in Chemistry. Also agrees with Omiko (2015), Igwe (2007) and Eze (2006) they asserted that "we get involved in science teaching for three important aspects of human development. These are creative thinking, reflective thinking and critical thinking which is a behavioral component / aspect of attitude.

CONCLUSION

Based on the finding of this study, it was concluded that: That there is significant positive relationship exists between the Chemistry laboratory materials and student's academic achievement in the subject. Chemistry laboratory practical work enhances and also improves student's performance in Chemistry subject and the laboratory materials were not available in most of the senior secondary schools in Borno State. The few Chemistry laboratory practical materials were not used in most of the senior secondary schools in Borno state. That there is significantly positive relationship exists between students' attitude towards Chemistry practical laboratory work and their academic achievement in Chemistry. That there is no significant relationship exists between genders on students' academic achievement in Chemistry. This means that attitude to Chemistry practical work is gender vies.

RECOMMENDATIONS

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

1. Students' should consider Chemistry practical work as part of the course or subject to meet their needs/requirement to study Medicine, pharmacy, Chemical Engineering and the practical oriented Chemistry topics should be demonstrated in the laboratory using all the necessary equipment's and reagents, also; more time allocated on the time-table for Chemistry practical laboratory work.
2. Chemistry Laboratories in every Senior Secondary Schools should be equipped with modern equipment and other necessary teaching aids or instructional materials in Borno State and qualified Chemistry teachers (B. Sc. Chemistry Education) should be employed to teach Chemistry subject, they are qualified Chemistry teacher.

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