Classroom instructional training needs of teachers and senior secondary students' attitudes towards chemistry

[1]Olufemi Abiodun Ajayi, PhD, [1]Olubukola Bright Adesuyan [2]Paul Owolabi Adelana
[1]Department of Counselling Psychology and Educational Foundations,
Tai Solarin University of Education, Ijagun, Nigeria
[2]Department of Educational Technology
Tai Solarin University of Education, Ijagun, Nigeria

Abstract

This study investigated relationship between classroom instructional needs of teachers and students' attitudes towards chemistry in senior secondary schools in Ogun East Senatorial District. The design adopted was descriptive survey. Multistage sampling technique was used to sample 30 Chemistry teachers and 450 Chemistry students. Teacher Classroom Instructional Needs Assessment Scale (TECINAS; r=0.84) and Student Chemistry Attitudes Questionnaire (SCAQ; r= 0.85) were used in data collection. Descriptive statistics (mean, standard deviation) and Pearson r were used in data analysis. Results showed that classroom instructional needs of chemistry teachers were minimal. In addition, there was no significant relationship (Pearson r = .237; P (.207) .05) between instructional delivery needs of Chemistry teachers and students' attitudes towards chemistry. Results further showed that resourcefulness and improvisation of instructional materials training needs of Chemistry teachers did not have any significant relationship (Pearson r = .059; P (.755) .05) with students' attitudes towards Chemistry. Though chemistry teachers were not adequately proficient in few core areas of classroom instruction, the students' attitudes were probably determined by some other factors excluded in the study. Among others, it was recommended that government should organize periodic training and retraining for the teachers.

Keywords: Classroom instructional needs, attitudes towards Chemistry, instructional delivery needs, training needs.

Introduction

There is no doubt that science is the bedrock of technological development and advancement of any nation. Unarguably, science contributes tremendously towards expansion of economy of the nation. On that note, it is expected that teaching and learning of chemistry at all levels of education enjoys a deservedly remarkable attention of all stakeholders. Chemistry is such a subject without which anyone could hardly pick a career in science-based disciplines. However, students' attitude towards Chemistry in Nigerian senior secondary schools is poor, and this in turn hinders their academic achievement in the subject (Ezike, 2007). Attitudes are psychological constructs theorized to be composed of emotional, cognitive and behavioural components (Newbill, 2005). New attitudes must serve the same function as the old one in order to change attitudes. Eagly and Chaiken (2013) defined attitude as a psychological tendency that is expressed by evaluating a particular entity with some degree of favour or disfavour. Attitude towards learning chemistry is a very important concept that can be described as the students' view of knowledge, assessment, laboratory activities and the roles of instructors and students (Berg, 2005). The attitude of a learner towards chemistry will invariably influence academic achievement the learner in the subject.

Obioha (2007) describing Nigeria situation, opined that schools in Nigeria have come a long way from a 'no science in schools' to 'almost compulsory science programmes at all levels' and yet younger generations do not want to study science particularly chemistry. Adesokan (2010) and Onwu (2014) asserted that despite the recognition given to chemistry among the science subjects, it is evident that students still show negative attitude towards science subjects thereby leading to poor achievement and low enrolment.

Explaining the factors that account for poor attitude of students towards chemistry, Parker, Creque, Harris, Majeski, Wool & Hogan (2013) noted the impact of demographic, school and socio-psychological variables on students' attitudes towards learning. Ivowi, (2007) states that poor students' attitude towards science, chemistry inclusive, could be attributed to poor teaching methods, unqualified and inexperienced teachers and poor learning environment. Ali, Toriman and Gasim (2014) maintained that the extent to which a student prefers a subject is proximate to the extent to which the teacher effectively delivers classroom instructions. Therefore, one could infer that a positive student's attitude towards learning may be reliant upon effective classroom instructional skills of the teacher.

Classroom instructional skills distinguish professional teachers from non-professionals. Classroom instructional skills enable classroom teachers appreciate how the knowledge gained overtime in their subject areas can be recreated, organized and imparted to learners. Classroom instructional skills make teachers aware of the preconceptions and background knowledge that students typically bring to each subject and strategies and instructional materials that can be of assistance in addition to understanding and solving the possible difficulties likely to arise in the classroom and modify their practice accordingly (National Board for Professional Teaching Standards, 2008). Classroom instructional skills involve ability to effectively disseminate instruction in such a way that to foster students' active involvement in learning, motivate students' learning, and ultimately improve achievement. However, looking at

classroom instructional practice of teachers, two dimensions are germane: instructional delivery, resourcefulness and improvisation dexterity.

Instructional delivery for example, according to Sandt (2007), is described as knowledge or approaches to school topics, teachers' knowledge of teaching procedures such as effective strategies for planning classroom practices, behavioural management techniques, classroom organizational procedures, motivational techniques, and different ways of presenting facts.

McKenzie (2003), made an assertion that good teachers are magnificent at diagnosing and customizing instruction that enables students to succeed in learning. Instructional delivery skill is one of the major propellers that drive students' performance to the needed direction and destination in the education enterprise. Teachers that are well schooled in the art and science of teaching strives not only to improve the learning capacity of students with low ability but also combine different teaching strategies to consolidate on the gains recorded by high ability students (Oladele, 2010).

Resourcefulness and improvisation dexterity, being the other dimension of classroom instruction, is the act of construction of instructional materials from locally available materials that can adequately replace or function in place of the original material which otherwise may be very expensive or in short supply or unavailable (Eriba, 2011). Mboto, Ndem and Utibe-Abasi (2011), defined improvisation as the act of providing teaching materials from our locality when there is shortage of the standard ones. Improvisation is the ability to take existing pieces of materials from our environment and put them together in a new combination for a purpose. Asokhia (2009), defined improvisation as the use of what is available as a result of lack of what is actually needed.
In view of the foregoing, this study investigated classroom instructional training needs of teachers (instructional delivery, resourcefulness and improvisation of instructional materials) and how these relate to students' attitudes towards Chemistry.

Statement of the Problem

Human development and technological advancement attest to the relevance of chemistry. A lot of economic activities centred on the study of Chemistry and they include the management of natural resources, manufacturing, food processing and storage among others. Similarly, chemical technologies enhance quality of life in the area of health care system, materials and energy usage. However, as laudable as the significance of Chemistry, studies and personal experience have shown that students show poor attitude towards Chemistry which in turn results in poor academic achievement. Empirical evidences from literature show that poor attitude of students towards Chemistry could be attributed to numerous factors. However, studies on instructional needs of Chemistry teachers remain scanty. Thus, this study investigated classroom instructional training needs of teachers (instructional delivery, resourcefulness and improvisation of instructional materials,) and how these relate to senior secondary students' attitude towards Chemistry.

Purpose of the Study

The main purpose of the study was to investigate classroom instructional training needs of Chemistry teachers and its relationship with senior secondary students' attitude towards Chemistry in Ogun East Senatorial District of Nigeria. The specific objectives were to:

1.   determine the instructional delivery training needs of Chemistry teachers in Ogun State Senatorial District of Nigeria.
2.   examine the resourcefulness and improvisation of instructional materials training needs of Chemistry teachers in Ogun East Senatorial District of Nigeria.
3.   determine the profile of senior secondary students' attitudes towards Chemistry
4.   examine any significant relationship between Chemistry teachers' instructional delivery training needs and senior secondary students' attitude towards Chemistry.
5.   determine if any significant correlation

exists between Chemistry teachers' resourcefulness and improvisation of instructional materials training needs and senior secondary students' attitude towards Chemistry.

Research Questions

1.   What are the instructional delivery training needs of Chemistry teachers in Ogun East Senatorial District of Nigeria?
2.   What are the resourcefulness and improvisation of instructional materials training needs of Chemistry teachers in Ogun East Senatorial District of Nigeria?
3.   What is the profile of senior secondary students' attitude towards Chemistry?

Hypotheses

Ho_1:   There is no significant correlation between Chemistry teachers' instructional delivery needs and senior secondary students' attitude towards Chemistry.

Ho_2:   There is no significant correlation between Chemistry teachers' resourcefulness and improvisation of instructional materials needs and senior secondary students' attitude towards Chemistry.

Methodology

The design of this study was cross sectional descriptive survey. The design primarily involves the researcher administering questionnaire and and interview schedule to a sampled group of individuals for the purpose of describing the entire population regarding the subject of investigation. The population for this study comprised all Chemistry teachers and Senior Secondary II students in Public Senior Secondary schools in Ogun East Senatorial District of Ogun State, Nigeria.

The sample for the study consisted of 450 students and 30 teachers of Chemistry giving a total of 480 respondents. Multi-stage sampling technique was adopted to select the sample in order to cater for adequate representation of the Senatorial District under study. At first level,

three local government areas (LGA$_s$) were selected from the senatorial district using simple random sampling technique. From each LGA, 10 schools were selected giving a total of 30. At the school level 15 students and 1 teacher of Chemistry were selected. Selection at both levels of LGA and school was done using simple random sampling technique. For this study, two research instruments employed were:

1. Teachers Classroom Instructional Needs Assessment Scale (TECINAS).
2. Student Chemistry Attitude Questionnaire (SCAQ)

TECINAS isa structured instrument developed by the researcher to capture Chemistry teachers' classroom instructional training needs. It comprises sections A, B and C. Section A captures demographic information of the teachers. Section B is sub-titled Teachers Instructional Delivery Needs Assessment Scale (TIDNAS) and it captures teacher instructional delivery training needs. Section C is a sub-scale tilted Teachers Resourcefulness and Improvisation Needs Assessment Scale (TRAINAS), and it captures resourcefulness and improvisation training needs. The response options given were NAA - Not At All (1), TAE - To An Extent (2), TALE - To A Large Extent (3), TAVLE - To A Very Large Extent (4).

SCAQ was developed by the researchers to collect information from the students as regard their attitudes towards Chemistry. The items were structured using simple sentences in such a way that the students will be able to provide appropriate responses. The questionnaire has sections A and B. Section A measures demographic information of respondents such as the sex of respondent, while Section B comprises 15 items, structured in declarative statement format. For example, "Under no

circumstances should I be absent in chemistry class". SCAQ was developed using 4-point modified Likert scale consisting of Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD).

To achieve content validity of the instruments, educational evaluation experts were consulted who reviewed the items in content, structure and language. The two (2) instruments were trial tested using samples of Chemistry students and teachers that were parallel to the sample selected for the main study. Cronbach alpha coefficients for TIDNAS and TRAINAS were 0.70 and 0.82 respectively. Both clusters were components of TECINAS with composite alpha coefficient 0.84. SCAQ on the other hand yielded 0.85 Cronbach alpha coefficient.

Permission to include the selected schools in the study were sought and obtained from the principals. As a follow up to this, the instruments were administered by the researchers to the respondents with the support of two research assistants. The researchers together with the assistants ensured that respondents were adequately briefed on the content and procedure required to respond to the instruments. They also ensured prompt retrieval of the copies of the instruments administered in order to ensure high rate of return. The whole exercise was performed within four (4) weeks. Data were analysed using descriptive statistics of mean andstandard deviation to answer the research questions while correlation method was used to test hypotheses 1 and 2 at 0.05 alpha level of significance.

Results
Research Question 1: What are the instructional delivery training needs of Chemistry teachers in Ogun State Senatorial District of Nigeria?

Table 1: Instructional delivery training needs of Chemistry teachers (N=30).

S/N	Item	NAA	TAE	TALE	TAVLE	$\overline{X}$	S.D
1	Writing effective lesson plan.	12(40)	4(13.3)	8(26.7)	6(20)	2.27	1.20
2	Awareness and use of different teaching methodologies as appropriate.	3(10)	12(40)	8(26.7)	7(23.3)	2.63	.95
3	Fostering effective classroom interaction.	10(33.3)	6(20)	10(33.3)	4(13.3)	2.27	1.08
4	Effective use of instructional material.	9(30)	4 (13.3)	6 (20)	11(36.7)	2.63	1.27
5	Use of ICT in instructional delivery.	6 (20)	9 (30)	11(36.7)	4 (13.3)	2.43	.97
6	Fostering effective classroom management.	13(43.3)	2 (6.7)	6 (20)	9 (30)	2.37	1.33
7	Effective use of instructional time.	12 (40)	6 (20)	7 (23.3)	5 (16.7)	2.17	1.15

Ground Rule: A mean score of 2.5 and above is an expression of training need while, a mean score of less than 2.5 indicates that training need least existed.

Table 1 revealed that, the teachers expressed need for training only in two areas. The areas were awareness and appropriate use of different teaching methods ($\overline{X}$= 2.63) with 50% indication of teachers' expression and effective use of instructional materials ($\overline{X}$ = 2.63) with 56.7% of the teachers' level of expression. The teachers claimed to be adequate in the five remaining areas of instructional delivery.

Research Question 2: What are the resourcefulness and improvisation of instructional materials training needs of Chemistry teachers in Ogun East Senatorial District of Nigeria?

S/N	Item	NAA	TAE	TALE	TAVLE	$\overline{X}$	S.D
1	Developing ingenuity and creativity.	4 (13.3)	17(56.7)	4 (13.3)	5 (16.7)	2.33	.92
2	Developing keen observation of the environment.	4 (13.3)	16(53.3)	5 (16.7)	5 (16.7)	2.37	.93
3	Construction and development of improvised materials to specification.	4 (13.3)	13(43.3)	8 (26.7)	5 (16.7)	2.47	.94
4	Creation and management of mini educational resource centres in the school.	2 (6.7)	6 (20)	15 (50)	7 (23.3)	2.90	.85
5	Modeling of instructional aid.	2 (6.7)	12 (40)	7 (23.3)	9 (30)	2.77	.97

Ground Rule: A mean score of 2.5 and above is an expression of training need while, a mean score of less than 2.5 indicates that training need least existeds.

Table 2 showed that the teacherswere not adequate only in two out of five areas measured on resourcefulness and improvisation of instructional materials and so, required retraining. These two areas are establishment and management of mini-educational resource centres in schools (X=2.90) with 73.3% level of expression of the teachers and modelling of instructional aids (X = 2.77) with 53.3% of the teachers making the expression.

Research Question Three
What is the profile of senior secondary students' attitudes towards Chemistry?

Table 3: Mean and standard deviation indicating students' attitudes towards Chemistry (N=450)

S/N	Item	Mean	S.D	Decision
1	I am of the opinion that under no circumstance should I come late to chemistry class	2.81	1.29	Positive
2	I am of the opinion that under no circumstance should I be absent in chemistry class	2.67	1.25	Positive
3	I am of the opinion that chemistry cannot be effectively learnt without textbooks	3.05	0.89	Positive
4	I am of the opinion that I cannot be a good student of chemistry without being ready to study hard	3.52	0.76	Positive
5	I am of the opinion that I cannot be a good student of chemistry without basic stationery e.g. graph, pencil, notebooks, pen, ruler, calculator etc.	3.08	0.99	Positive
6	I am of the opinion that assignment given should be promptly done and return for marking	3.45	0.69	Positive
7	I am of the opinion that class exercises must be done and submitted within time limits	3.40	0.86	Positive
8	I am of the opinion that extra classes organised for chemistry must be taken very seriously	3.44	0.74	Positive
9	I am of the opinion that for me to do well in chemistry, I must have interest in my teacher	3.30	0.85	Positive
10	I am of the opinion that I must be willing to seek the attention of my chemistry teacher even at times outside chemistry period	3.31	0.82	Positive
11	I am of the opinion that I should be bold to ask questions in chemistry class and refuse to hide my ignorance	3.52	0.69	Positive
12	I am of the opinion that I should move with friends who always read their books in other to do well in chemistry	3.49	0.76	Positive
13	I am of the opinion that I must study hard at home if I want to do well in chemistry	3.52	0.59	Positive
14	I am of the opinion that I must participate in chemistry practical classes effectively if I want to do well in chemistry	3.62	0.65	Positive
15	I am of the opinion that I should not be ashamed to learn more and better in chemistry from my classmates	3.55	0.68	Positive

Ground Rule: A mean score of 2.5 and below indicates negative attitude towards Chemistry, while a mean score above 2.5 is an indication of positive attitude.

Table 3 revealed that the students demonstrated positive attitudes towards Chemistry. Item by item analysis indicates that the students were positively disposed to punctuality (Mean= 2.81), regularity (Mean= 2.67), procurement of relevant textbooks in Chemistry (Mean= 3.05), willingness to study hard (Mean= 3.52) and possession of basic stationery items such as graph book, calculator, pencil ruler, pen and notebook (Mean= 3.08). The results indicated further positive disposition of students as follows: willingness to return assignment promptly for marking (Mean= 3.45), willingness to attend to class exercises within time limits (Mean= 3.40), readiness to take extra classes organised in Chemistry seriously (Mean= 3.44), readiness to be friendly with the Chemistry teacher (Mean= 3.30) and readiness to seek attention of the teacher at times beyond Chemistry class (Mean= 3.31). The other items where the students demonstrated positive disposition include being courageous to ask questions for clarification during classroom instruction (Mean= 3.52), being friendly with classmates that are brilliant (Mean= 3.49), studying hard at home for improved performance (Mean= 3.62), effectively participating in practical classes (Mean= 3.62) and not being ashamed to learn from classmates (Mean= 3.55).

Testing Ho₁: There is no significant relationship between Chemistry teachers' instructional delivery training needs and senior secondary students' attitude towards Chemistry.

Table 4: The Relationship between Chemistry teachers' instructional delivery training needs and students' attitude towards Chemistry

Variables	N	$\bar{X}$	S.D	Pearson r	Sig.	Decision
Teachers' instructional delivery needs	30	16.77	6.84	.237	.207	Not
	450	49.93	3.43			Significant
Students' attitude towards Chemistry						

Table 4 shows that a low positive relationship existed between teachers' instructional delivery training needs and students' attitude towards chemistry (Pearson r = .237; P (.207) .05)., The proposition that there is no significant correlation between Chemistry teachers' instructional delivery training needs and students' attitude towards Chemistry is therefore not rejected. The results imply that students' attitude towards chemistry is not dependent on Chemistry teachers' instructional delivery training needs.

Testing Ho$_2$: There is no significant correlation between Chemistry teachers' resourcefulness and improvisation of instructional materials training needs and senior secondary students' attitude towards Chemistry.

Table 5: Correlation between Chemistry teachers' resourcefulness and improvisation of instructional materials training needs and students' attitude towards Chemistry.

Variables	N	$\bar{X}$	S.D	Pearson r	Sig.	Decision
Teachers' resourcefulness and improvisation training needs	30	12.83	3.83	.059	.755	Not
	450	49.93	3.43			Significant
Students' attitude towards Chemistry						

Table 5 reveals a very low positive relationship between teachers' resourcefulness and improvisation of instructional materials training needs and students' attitude towards Chemistry(Pearson r = .059; P(.755) .05).The null hypothesis is therefore not rejected. The implication is that students' attitude towards Chemistry is not a function of teachers' resourcefulness and improvisation of instructional materials training needs.

Discussions
The result on the instructional delivery training needs of chemistry teachers in Ogun State Senatorial District of Ogun State shows that the Chemistry teachers need training on awareness and appropriate use of different teaching methods and effective use of instructional materials. The result implies that teachers are pedagogically deficient in those two areas and therefore require make-up training. This finding supports the assertion of Gbadebo (2013),that most teachers in secondary schools lack classroom instructional skills particularly in the area of instructional delivery. These two areas are critical components of classroom instruction to which learning outcomes among students are sensitive. For a teacher to realise high academic achievement among students,, he must be versatile in deployment of different teaching methods depending on subject matter content, varying abilities of the students and the prevailing environmental conditions. In addition, effective use of instructional materials cannot be over emphasized. Effective use of instructional materials certainly aids understanding, promotes retention and recovery of materials learned.

Looking at training needs of Chemistry teachers on resourcefulness and improvisation of instructional materials, it was observed that they needed training on how to establish and manage mini-educational resource centres in schools as well as how to model relevant and significant instructional materials. These results compare

favourably with the position of Umar and Adedokun (2006), who noted that science teachers need to update their professional capacity development, commitment, creativity, mechanical skills, resourcefulness and initiative for planning of science instruction. No teacher can claim to be effective without being versed and skillful in resourcefulness, improvisation and effective use of instructional materials. A teacher that desires to make a positive impact in students' learning cannot but be creative with high sense of ingenuity. Resourcefulness and improvisation of instructional material is key to effective classroom instruction, and for Chemistry teachers to lack in that area goes a long way in dictating what the learning outcomes will be.

The proposition that there is no significant correlation between chemistry teachers' instructional delivery needs and students' attitude towards Chemistry was found to be true. In essence, the ability of chemistry teachers to effectively deliver classroom instruction surprisingly does not in any way influence students' attitude towards chemistry. This result refutes the findings of Olowojaiye (2010), Ahtee and Salome (2015), where it was reported that apart from having to be a master in their subjects, the classroom teachers must also have command over a wide repertoire of different teaching methods and strategies and understanding of the learning processes of students. The explanation for this shocking result probably could be on account of the current public opinion and awareness that parents must be willing to put in place alternative arrangements to supplement and complement what is being offered in school to students. By these arrangements, students might have developed a mindset not to be moved by whatever happens in the school. Moral talks and discipline tone in the school might have also contributed a bit.

The results on confirmed the proposition that there is no significant correlation between teachers' resourcefulness and improvisation of instructional materials training needs and students' attitude towards Chemistry. The finding suggests that students' attitude towards chemistry is not related to Chemistry teachers' resourcefulness and improvisation of instructional materials training needs. The finding contradicts the report of Standslause, Maito and Ochiel (2013), which states that students' positive attitude towards science could be enhanced by teacher factors which include teachers' resourcefulness.

Conclusion

The findings of this study revealed that the Chemistry teachers require training in few core areas of their classroom instructional practice. However, it was striking to observe that the classroom instructional needs of the teachers were not significantly related to students' attitude towards Chemistry. Perhaps, the factors that explain students' attitude towards Chemistry are outside those included in hypothesized model of this study.

Recommendations

In line with the findings of this study, the following are recommended:
1. Government should organize periodic training and retraining for Chemistry teachers in order to update their knowledge, skills and competence required to function effectively in the discharge of their classroom instructional practice.
2. There is a need for curriculum developers to give special attention to students' attitudes whenever the curriculum is being reviewed.

References

Adesokan, C. O. (2010). *Students attitude and gender as determinants of performance in JSS integrated science.Unpublished B.Ed. project,* University of Ado – Ekiti, Nigeria.

Ahtee, P. O. & Salome, W. C. (2015). *Performance determinants of Kenya certificate of secondary education* (KCSE) in mathematics of secondary schools in Nyamaiya division, *Kenya Asian Social Science,* 7(2): 107 – 112.

Ali, A.R., Toriman, M. E. & Gasim, M. B. (2014): Academic achievement in biology with suggested solutions in

selected secondary schools in Kano State, Nigeria *International Journal of Education and Research*. 2 (11), 215-224.

Asokhia, M. O. (2009). Improvisation/teaching aids: Aids to effective teaching of English language. *International Journal of Education Science*, 1(2), 79-85.

Berg, C. (2005). Factors related to observed attitude change toward learning chemistry among university students, *Chemistry Education Research and Practice,* 69 (1), 1-18

Eagly, A. H.,& Chaiken, S. (2013). *The psychology of attitude*. Fort Worth, TX: Harcourt Brace Jovanovich College Publishers.

Eriba, J. O. (2011) Laboratory and the art of improvisation. Makurdi: Use of improvisation and Learning Resources in Schools. *Journal of Educational Innovators*, 4 (1), 45-46

Ezike, B.U. (2007) Effect of english language proficiency on students' academic achievement in and attitude towards chemistry. Retrieve on May 10 from www.globalacademicgroup.com.

Gbadebo, A.O. (2013). Trend in physics education in secondary school in Kwara State. *Lafiagi Journal of Science Education*, 5 (1&2): 69-75.

Ivowi, U. M. O. (2007). Redesigning school curricula in Nigeria. *British Journal of Education,* 3(8), 20-27.

Mboto, F. A., Ndem, N. U. & Utibe-Abasi. (2011). Effects of improvised materials of students' achievement and retention of the concept of radioactivity. *African Research Journal*, 5 (1)342-353.

Mckenzie, J. (2003). Pedagogy does matter. *The Educational Technology Journal, 13(1): 1-10.*

National Board for Professional Teaching Standards (2008). Pedagogy –definition – summary. *Retrieved from http//www.intime.uni.edu/,*

Newbill, P. L. (2005). *Instructional strategies to improve women's attitudes towards science.* Unpublished PhD

Dissertation, Virginia polytechnic institute and State University. Retrieved 23 May, 2018 from http://vtechwork.lib.vt.edu/handle/1091 9/27000.

Obioha, N. E. (2007). Decline in students' choice of science and technology. *Annual conference Proceedings of Science Teachers' Association of Nigeria*, 28: 16-23.

Oladele, O. T. (2010). *Teacher quality and students' academic performance in C. R. S. in secondary schools, Ilorin –South L. G. A., Nigeria. Unpublished B. A. (Ed) Project,* University of Ilorin, Ilorin.

Olowojaiye, F. B. (2010). *A comparative analysis of students' interest in and perception of teaching learning of mathematics at senior secondary schools' levels.* A paper presented at MAN conference "EKO 2010". p56

Onwu, G. O. M. (2014). Learning difficulties in chemistry: Capacity limitation or strategy deficit. *African Journal of Educational Research*, 4 (1&2), 161-177.

Parker, D., Creque, T., Harris, W., Majeski, W. S.,& Hogan, A. (2013). Ways to make your teaching more effective. Centre for teaching and learning, University of California, California. Retrieved 6 from https:www.researchgate.net/publication /223077353_Academic_in_high_schoo l_Does_emotional_intelligence_matter

Sandt, S. (2007). Effects of maternal employment and non-maternal infant care on development at two and four years. *Early Development and Parenting,* 3(2), 113 - 123.

Standslause, O. E. A., Maito, T. L.,& Ochiel, J. K. O. (2013). Teachers and students' attitude towards mathematics in secondary schools in Siaya County, Kenya. *Asian Journal of Management Sciences and Education,* 2(3), 116-123.

Umar, A. A.,& Adedokun T. (2006). Effects of biology practical activities on students' process skills acquisition in Minna, Niger State Nigeria. *JOSTMED*, 7(2), 118-126.