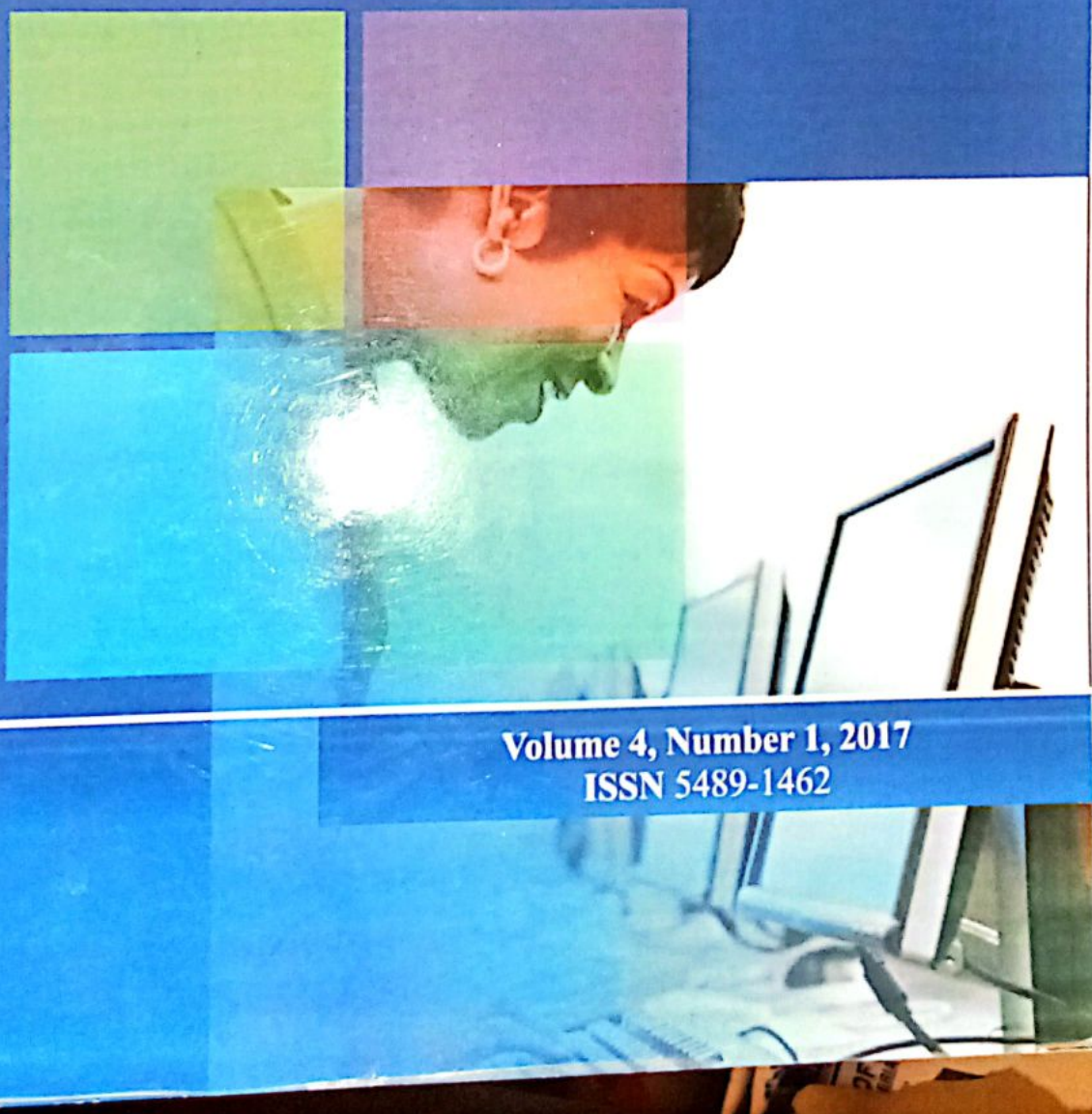


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EFFECTS OF COGNITIVE TASK ANALYSIS TECHNIQUE ON SENIOR SCHOOL STUDENTS' PERFORMANCE IN SIMPLE HARMONIC MOTION IN ILORIN

¹Abdulrasaq Oladimeji AKANBI ²Isaac Ayodele OJEDIRAN

¹Department of Science Education, University of Ilorin, Ilorin, Nigeria.

physiscakanbi@yahoo.com

²Department of Science and Technology Education, Faculty of Education,

Obafemi Awolowo University, Ile-Ife, Osun State.

ojediranyag27@gmail.com

Abstract

The study investigated the effect of cognitive task analysis technique on senior secondary school students' performance in Physics in secondary schools in Ilorin. It determine the effects of cognitive task analysis technique on senior school students' performance in Physics; It investigated the influence of gender on students performance in Physics when taught using cognitive task analysis technique; and also investigated the influence of gender and students' scoring level abilities on students' performance in Physics. An intact class of two coeducational senior secondary school two (SSII) in Ilorin, Kwara State constituted the sample of the study. The research was a quasi-experimental and employed the use of two major instruments. Simple Harmonic Motion Task Analysis was used as a guide to teach the experimental group and 20-item multiple choice and 5 short answer questions tagged Simple Harmonic motion performance test (SHMPT) which was adapted from West African Senior Secondary Certificate Examination (WASSCE) past questions. Three research hypotheses were formulated and tested. Findings revealed that there was a significant difference existed in favour of the group that was exposed to cognitive task analysis technique when compared to their counterparts who were not exposed to cognitive task analysis technique. Female students taught Physics using cognitive task analysis technique performed better than their male counterparts who were also taught using same technique. The findings also showed that high scoring level students benefited more followed by medium scoring level students and the low scoring level students respectively. It was recommended among others that Physics teachers should make the teaching and learning of Physics an interactive and learning by doing. Teacher should try to encourage students to create their own knowledge in order to improve their critical thinking.

Key words: Cognitive Task Analysis Technique, Performance, Physics, Gender, Scoring level.

Introduction

Physics is one of the pure science subject/course offered at tertiary institution and taught at senior/high schools all over the globe. Physics is often regarded as the bedrock and backbone of the scientific innovations and technology know-how. Omosewo (1998) defined Physics as the science that deals with energy and matter and their interactions. It is

sometimes refers to as the science of measurement whose knowledge has contributed greatly to the production of instruments and devices with tremendous benefit to human race. Physics is one of the core science subjects taught at the senior secondary school level of the Nigerian educational system. The importance of Physics cannot be over emphasized because of its benefit forms the

basis for technological advancement of any nation. The knowledge of Physics is usually required to pursue courses like Astronomy, Geology, Chemistry, Biology, Engineering amongst others (Omosewo, 2009 and Ojediran, 2015). Hence, every living soul requires certain amount of competence in basic topics in Physics for the purposes of handling latest gadgets, equipment's and tools as well as critical thinking.

Despite all the benefit of Physics to human race, the subject is still seen as a difficult. it is widely recognized that the teaching and learning of Physics has been fraught with challenges such as low enrolment both in secondary schools and tertiary institutions in Nigeria (Daramola, 1982; and Ojediran, 2015). Notable among the causes for low enrolment of students offering Physics in schools include: lack of conceptual understanding, poor equipped laboratory, insufficient number of teachers, student disposition to problem solving and student

poor cognitive task analysis which has generated phobic among the learners and teachers during teaching-learning processes (NERDC,2009; Jegede and Adedayo, 2013; Ojediran, 2017). Endless benefit of this subject to national development has prompted the interest of some researchers, educators, government and other concern stakeholders in the field of education in rectifying the students' low enrolment and poor academic performance. These factors have equally added to decline in performance of students who enrolled for Physics at the Senior Secondary School Certificate Examinations (SSCE). This decline in performance of student in secondary school Physics has brought great concern among researcher, scholars and examination bodies (Omosewo,2009; Jegede and Adedayo, 2013; Ojediran, 2017). This is evident in the West African Examination Council (WAEC) results between 2010 and 2015 as presented in Table 1.

Table 1: Trends in Students' Performance in Physics in the May/June West African Senior Secondary Certificate Examination (WASSCE) (2002-2011)

Year	Subject	Total No. Candidates	No. of Credit Pass	% Pass	No. of Fail	% Fail
2010	Physics	487,963	159,264	32.64	328,699	67.36
2011	Physics	587,772	157,543	26.80	430,229	73.20
2012	Physics	324,998	126,131	38.81	198,866	61.19
2013	Physics	298,971	86,612	29.17	212,359	70.83
2014	Physics	241,161	72,522	29.27	168,639	70.73
2015	Physics	529,425	165,604	31.28	363,820	68.72

Source: West African Examination Council, Research and Statistics Unit 2015

In 2010 out of 487,963 students that enrolled for this subject, only 32.64% of the students had a minimum of credit leaving 67.36% scoring below credit. In 2011, 587,772 students enrolled while only 26.08% had a minimum of credit leaving 73.20% failing the examination. These as being like that till 2015 results. It also implies that only a few students would eventually be able to pursue Physics related careers in higher institutions. This will

consequently have great implication on manpower development in Engineering and

other related professional fields. The report attributed the cause to three major factors which include negative interest of the students to the subject, inappropriate teaching/learning methodology employed by the teachers and students and lack of teaching and instructional materials among others.

In the same vein, Erinoshio (2013) affirmed that there are reasonable numbers of topics in

Physics that students perceived as difficult ones which include simple harmonic motion. The scholar further attributed the problem to students' attitude towards the subject and teacher-related factors which include methodology employed by the teacher to teach. Teachers teaching in the 21st century needs to adopt the use of innovative methods of teaching that can aid students understanding, build student self efficacy, Meta cognition and ease students learning difficulty level, such methods include task analysis techniques. Daniel and Debra (2011) carried out a study on effects of task analysis and self-monitoring for children with autism in multiple social settings and the study found out that task analysis and self-monitoring intervention increases the number of steps that each students was able to perform independently.

Task analysis technique can be described as the studies of what a user is require doing in terms of actions and or cognitive processes to achieve an objective. Szidon and Franzone (2009) defines task analysis as the process of breaking a skill down into smaller, more manageable component. McGrew (1997) opined that task analysis is of two major type's namely cognitive task analysis (CTA) and hierarchical/traditional task analysis technique (HTA). Richard, David, Jeroen, Van, Kenneth and Sean (2006) asserted that cognitive task analysis technique is an extension of hierarchical/ traditional task analysis technique to yield information about knowledge, thought processes and goal structures that underline observable task performance. Cognitive task analysis refer to disintegration of a complex or compound tasks into sub tasks and more manageable steps in order to teach and learn the task. As learners become master of a sub task, the learners get increasingly independent in his or her ability to perform the next and larger subtasks. Chipman, Schraagen and Shalin (2000), Coffey & Hoffman (2003), Clark (2006) postulated five common steps in most of the dominant cognitive task

analysis method are performed in the following sequence:

1. Collect preliminary knowledge
2. Identify knowledge representations
3. Apply focused knowledge elicitation methods
4. Analyze and verify data required
5. Format results for the intended application (p.3).

Raymond and Ogbuanya (2015) investigated study on comparative effects of cognitive task analysis and traditional task analysis-based instructional guide students' skill achievement in electronics work. The study found out that cognitive and traditional task analysis techniques are more effective than traditional (conventional) method. Single gender and Co-educational post basic schools are two types of schools setting operating in Nigeria. Each of these school settings were established to bridge the gap of gender bias or in equality. Gradual School of Arts and Sciences Teaching Centre Columbia University observed that male students are more advantageous than the female counterpart in the classroom activities. Academic attainment is achieved by it students test achievement scores and male teachers, tutors and educators believe that their achievement scores or test scores of the students is an index of their teaching effectiveness and students understanding. Mastery of the contents and concepts are determined through the level of scores by the scorers and learners.

Lamidi, Oyelekan and Olorundare (2017) carried out a study on effects of mastery learning instructional strategy on senior school students achievement in mole concept. The study revealed a significant difference in the achievement of low scores, medium scorers and high scorers. In the same vain, Salman, Ayin Adeniyi, Ogundele and Ameen (2017) conducted a study on effects of problem solving instructional strategy on senior secondary

school students attitude toward mathematics.. The study found out that there exist significant differences between the three levels of scorer. The study also revealed that high scorer benefited more followed by the medium scorers and low scorers in that order. This study therefore tends to investigate the effects of cognitive task analysis technique on senior school students' performance in simple harmonic motion in Ilorin metropoly of Kwara State, Nigeria.

Statement of the Problem

It has been observed that the students' performance in Physics is not encouraging over the years despite the importance of the subject to science and technology and nation building. Scholars have attributed the lackluster performance of Physics students to many factors such as inappropriate instructional method employed by the teacher to teach, poor usage of instructional resources, in conducive learning environment without cognizance note on the students cognitive task analysis technique in some concepts in Physics. However, effects of cognitive task analysis technique on Physics student performance in Physics has not been investigated in Ilorin secondary schools Physics classrooms. Hence, the study.

Purpose of the Study

The main purpose of this study was to:

1. determine the effects of cognitive task analysis technique on senior school students' performance in Physics
2. Investigate the influence of gender on students performance in Physics when taught using cognitive task analysis technique; and
3. investigate the influence of gender and students' scoring level abilities on students' performance in Physics.

Research Hypotheses

The following null hypotheses were tested in this study:

1. There is no significant difference in performance of students taught Physics using cognitive task analysis technique and those taught using conventional method;
2. : There is no significant difference in the performance of male and female students in Physics when taught using cognitive task analysis technique;
3. : There is no significant difference in the performance of students on the basis of scoring levels when taught Physics using cognitive task analysis technique;

Research Methodology

This study adopted quasi-experimental research designed to determine the effects of cognitive task analysis technique as determinant of students' performance in Physics. 2 x2x3 pretest and posttest intact class, non-equivalent control group design was considered appropriate for this study. The independent variables are teaching-learning techniques at 2 levels (cognitive and non-cognitive task analysis techniques), student gender at 2 levels (male and female) and student scoring ability at 3 levels (low, medium and high).

Population Sample and Sampling Technique

The population of the study comprised of all the senior secondary school II (SSII), Physics students in Ilorin metropolis. The study sample consisted of intact classes of two purposively selected public coeducational senior secondary school two (SSII) in Ilorin offering Physics participated in the study. The two intact classes were subjected to treatment and control. The experimental schools were labeled as school A and control school as school B.

Research Instrument

One instrument tagged Simple Harmonic Motion Task Analysis Test (SHMTAT) was used for data collection. The first instrument were 20-items multiple choice questions adapted from WASSCE past questions. SHMTAT manual was validated by two science education lecturer (Physics) and two experienced senior school teachers for both face and content validation.

Procedure for Data Collection

The experimental group was taught using cognitive task analysis technique which gives rooms for interaction among the

teacher, students and instructional materials. The control group was taught using manual cognitive task analysis technique (expository method). The study lasted for four weeks; administration of pretest was carried out in first week, teaching the two groups in second and third week and administration of posttest in fourth week. Two periods of forty minutes was specified each week throughout with the groups for two weeks. In cognitive task analysis technique group, students were asked to concentrate on sub tasks I & II for first period, sub tasks III and IV for second period and subtask V for third period.

Data Analysis and Results

Hypothesis 1 (HO₁) : There is no significant difference in performance of

students taught Physics using cognitive task analysis technique and those taught using conventional method;

Table 2: *t*-test analysis of the pretest and posttest mean score of students taught Physics using cognitive task analysis technique and those taught without cognitive task analysis technique

Group	N	Pretest mean	Posttest mean	Mean gain score	SD	df	t-value	p-value
Expt. grp	25	6.95	15.45	8.50	5.266			
					6.35	4.431	.00	
Control grp	20	7.50	9.10	1.60	3.1661			

P<0.05, Not Significant

Table 2 shows that $t = 4.431$, $p = 0.00$. Since the p -value was less than 0.05 level of significance, hypothesis one which states that there is no statistically significant difference in performance of students taught Physics using cognitive task analysis

and those taught using conventional method was rejected

Hypothesis 2 (HO₂): There is no significant difference in the performance of male and female students in Physics when taught using cognitive task analysis technique;

Table 3: *t*-test analysis of the pretest and posttest mean score of students taught Physics using cognitive task analysis technique based on gender

Gender	N	Pretest mean	Posttest mean	Mean gain score	SD	df	t-value	p-value
Female	10	8.38	15.0	6.62	6.408			
					2.271	.297	.017	
Male	15	8.50	14.3	5.80	4.137			

P<0.05 not significant

To test for the significant difference in the performance of students taught Physics using cognitive task analysis technique based on gender. The result on table 3 revealed that there was significant difference in the performance of male and female students taught Physics using cognitive task analysis. $t = 2.297, p = .017$. Since the p -value was less than 0.05 level of significance, hypothesis two which

states There was no statistically significant difference in the performance of male and female students in Physics when taught using cognitive task analysis was rejected.

Hypothesis 3 (H_{O3}): There was no significant difference in the performance of students on the basis of scoring levels when taught Physics using cognitive task analysis techniques;

Table 4: *ANCOVA computation based on score levels of students taught Physics using cognitive task analysis technique*

Source	Type III Sum of Squares	Df	Mean square	F	Sig.	Partial Eta squared
Corrected model	67.233	3	22.411	.801	.514	.146
Intercept	14.243	1	14.243	.509	.487	.035
PRETEST SCORING LEVEL	4.316	1	4.316	.154	.700	.011
Error	17.377	2	8.689	.311	.738	.042
Total	391.711	14				
	5099.000	18				
Corrected Total	458.944	17				

To test for the significant difference in the performance of high, medium and low scoring level students taught Physics using cognitive task analysis, Analysis of Covariance was used and the result is presented in table 4. The result indicated that there was no significant difference in the performance of high, medium and low

scorers taught Physics using cognitive task analysis. $F = .311, p = 0.738$. Since the p -value was greater than 0.05 level of significance, hypothesis three which states that there was no significant difference between the performance of high, medium and low scorers in Physics when taught using cognitive task analysis was retained.

Summary of Findings

The major findings of this study are as follows;

1. There was statistically significant difference in the performance of students taught Physics using cognitive task analysis technique and those taught using conventional method;
2. There was no statistically significant difference in the performance of female and male students taught Physics using cognitive task analysis technique;
3. Significant difference does not exist in the performance of high, medium and low scoring level students taught Physics using cognitive task analysis

Discussion of Findings

One of the findings in this study was that the students taught Physics using cognitive task analysis technique had higher mean score than those students taught Physics using conventional method. The findings show that students' performance was enhanced as a result of students' exposure to cognitive task analysis technique. The finding was in agreement with David, Briana, Kirk and Richard (2010); Julia, Leslie, Kenneth, Richard, Kenji, Donald, David, Lydia, Andrew, Ramon and Maura (2011); Liza (2014); Raymond and Ogbuanya (2015), who found that students

taught using cognitive task analysis technique perform significant better their counterparts taught using other techniques.

Another finding of this research shows that gender has no influence on the performance of students taught Physics using cognitive task analysis technique. This finding was aligned with Okoh (2010) and Craig (2011); who also affirmed that gender of students has no influence on their performance. Furthermore, the study revealed that there was no statistically significant difference in the performance of high, medium and low score levels of students who were exposed to cognitive task analysis technique. This finding was in line with Salman, Ayinla, Adeniyi, Ogundele and Ameen (2012); Lamidi, Oyelekan and Olorundare (2015) who found that students scoring level ability had no influence on students' performance.

Conclusion

Based on the findings of this study, it was concluded that the use of cognitive task analysis technique enhanced positive students' performance in Physics than the conventional method of teaching. Gender did not influence students' academic performance in Physics as both sexes are capable of competing and collaborating in classroom activities and ability to create their own knowledge. It was further deduced from the study that cognitive task analysis technique might be adequate to bridge the gap that existed in the academic performance of low, medium and high score level students.

Recommendations

Based on the findings of this study, it is recommended that cognitive task analysis technique should be adopted as a method of instruction by the teacher and method of learning by students to boost the

performance in skills acquisition, problem solving approach, decision making, development of cognitive ability making students' self-efficacy among others. Male and female students should be given equal opportunity in Physics and other subjects in classroom lessons to compete and collaborate. Teacher should try as much as possible to expose students to different instructions that can help and boost students self-learning and increase their cognitive ability.

REFERENCES

- Chipman, S. F., Schraagen, J. M. & Shalin, V. L. (2000). Introduction to Cognitive Task Analysis. In J. M. Schraagen, S. F. Chipman & V. J. Shute (Eds.), *Cognitive task analysis*. Mahwah, N. J: Lawrence Erlbaum Associates. 3-23
- Clark, R. E. (2006). Design document for a guided experiential learning on contract. Institute for creative technology and the Rossier school of education.
- Coffey, J. W. & Hoffman, R. R. (2003). Knowledge modeling for the preservation of institutional memory. *Journal of Knowledge Management*, 7, 38-52
- Craig, E. O. (2011). A Comparison of student performance in single-sex and coeducational settings in urban middle schools. *Electronic Theses and Dissertations*, Georgia Southern University.
- Daniel, P. & Debra, K. (2011). Effects of task analysis and self-monitoring for children with autism in multiple social settings. retrieved from <https://www.researchgate.net/publication/245925312>.
- Daramola, S.O. (1982). Factor Influence Enrolments in Physics in the upper forms Secondary Schools in Kwara

- State. Ann Arbor, *University Micro films international*, 2(3). 22-26.
- David, F. F., Briana, C. T., Kirk, A. S. & Richard, S.(2010). Translating expertise into effective instruction: the impacts of cognitive task analysis (CTA) on lab report quality and student retention in the biological science, *Journal of Research in Science Teaching*, 47(10), 2-21.
- Erinosh, Y. S. (2013). How do student perceived the difficulty of Physics in secondary school: An exploratory study in Nigeria. *International Journal of Cross-disciplinary Subjects in Education(IJCOSE)*, 3(3) 1510-1515.
- Jegede, S.A. & Adedayo, J.O. (2013): Enriching Physics Education in Nigeria towards Enhancing a Sustainable Technologies Development. *Greener Journal of Educational Research*. 3(2) 80-84.
- Julia, C., Leslie, T., Kenneth, Y., Richard, C., Kenji, I., Donald, G., David, P., Lydia, L., Andrew, T., Ramon, C. & Maura, S. (2011).The effectiveness of a cognitive task analysis informed curriculum to increase self-efficacy and improve performance for an open cricothyrotomy. *Journal of Surgical Education*, 68(5), 403-407.
- Lamidi, B. T., Oyelekan, O. S., & Olorundare, A. S. (2015): Effects of mastery-learning instructional strategy on senior school students achievement in mole concept. *Electronic Journal of Science Education*, 19 (5). *retrieved from* <http://ejse.southwestern.edu>
- Liza, C. (2014). Task analysis and implementation activities as vehicles for middle school math teacher growth. *Delta Journal of Education*, 4(2), 11-23.
- McGrew, J. F. (1997). A comparison of three methods of task analysis: cognitive analysis, graph matrix analysis and self-organizing networks. *International Journal of Human-computer Interaction*, 9(1), 41-57.
- Nigerian Educational Research Development Council (NERDC) (2009) Secondary School Physics Curriculum. NERDC Press, Lagos, Nigeria.
- Ojediran, I. A. (2015). A Study of the Philosophy, Structure and Implementation Strategies of Physics Teacher Education Curricula in Southwestern Nigerian Universities. Unpublished Ph.D. Thesis (Curriculum Studies). Department of Science and Technology Education, Obafemi Awolowo University, Ile-Ife.
- Ojediran, I. A. (2016). The Philosophical Relevance of Physics Teacher Education Curricula in Southwestern Nigerian Universities to Senior Secondary School Physics Curriculum. *Journal of Education & Social Policy*: 3(2). USA.
- Okoh, E. E. (2010). Influence of age, financial status and gender on academic performance among undergraduates. *Journal of Psychology*, 1(2), 99-103.
- Omosewo, E. O. (1998). A proposal on an Improved training programme for prospective Physics teacher in Nigeria secondary schools. Retrieved from www.unilorin.edu.ng/unilorin/publications/omosewo/factor%20.
- Omosewo, E.O. (2009). Views of Physics Teachers on the Need to Train and Retrain Physics Teachers in Nigeria. *An International Multi-Disciplinary Journal of African Research*.
- Raymond, E. & Ogbuanya, T. C. (2015). Comparative effects of cognitive and traditional task analysis-based instructional guide on students' skill achievement in electronics work. *International Journal of Scientific and Engineering Research*, 6(1), 122-130
- Richard, E. C., David, F. F., Jeroen, J. G., VAN, M., Kenneth, Y. & Sean, E. (2006). cognitive task analysis
- Salman, M.F., Ayinla, J.O., Adeniyi, C.O., Ogundele, L.O., & Ameen, S. K. (2012):

- Effects of problem solving instructional strategy on senior secondary school students attitude towards mathematics in Ondo, Nigeria, *International Journal of Asian Social Science*. 2 (7) , 1056-1066.
- Szidon, K, & Franzone, E. (2009). Task analysis: Madison, WI: Steps for implementation. Development center on autism spectrum disorders, waismann center, university of Wisconsin. (1-6)
- West Africa Senior Secondary School Certificate Examination Chief Examiner's Report, WASSCE (2009).
- Retrieved from www.waeconline.org.ng/science/papers
- West Africa Senior Secondary School Certificate Examination Chief Examiner's Report, WASSCE (2012). Retrieved from www.waeconline.org.ng/science/papers
- West Africa Senior Secondary School Certificate Examination Chief Examiner's Report, WASSCE (2014). Retrieved from www.waeconline.org.ng/science/papers.