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Bridging the Gap in the Current Global Initiative in Validation Process in Psychometrics: Nigerian Perspective

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Abstract

The study investigated types of differential item functioning (DIF) and effect sizes in 2014 State conducted examination in Multiple-choice Mathematics items. Ex-post facto design was adopted. The population of the study consisted of 47, 599 senior secondary two (SS2) students' responses in the three educational zones of Akwa Ibom State, Nigeria. The study sample comprised, 3,066 examinees' responses; 1,533 male and 1,533 female respectively were proportionately selected through stratified sampling procedure. A three-step model logistic regression procedure using IBM SPSS statistics version 20 was used to determine the different types of DIF. The results revealed that all the 50 items displayed uniform and nonuniform differential item functioning (DIF). Also, these items displayed negligible effect size at the uniform and/or nonuniform DIF. It was recommended that DIF analysis should incorporate types of DIF and effect sizes for making valuable psychometrics decision.

Keywords: Bridging, Gap, Validation, Process, Psychometrics, Nigeria.

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INTRODUCTION

The use of test results for major educational decision without DIF evaluation in its complete dimensions is against the global best initiatives in measurement and assessment. Evaluating DIF is one of the expected modern psychometric analyses of bias measures to ensure equality of opportunity to all examinees. The global concern of measurement evaluators and educators to ensure that items in test and examinations are not only administered to obtain the scores but fairness and equality of opportunity to all examinees irrespective of differences in race, gender and socioeconomic backgrounds is receiving great attention in education and other major areas that use test information for major decision making.

The progressive drift from traditional conceptualization of validity to the current view of validity is a welcome development in Psychometrics (McNamara & Roever, 2006). Evaluating DIF is one of the expected modern psychometric analyses of bias measures to ensure equality of opportunity to all examinees. Nigerian test developers and users in educational measurement and assessment are yet to key into this global initiative for decades.

The Educational Testing Services (ETS) in providing standard for psychometric bias analysis has evolved into an appreciable improvement in educational measurement. Test developers and evaluators are currently laying emphasis on the investigation of fairness, equality of opportunity and appropriateness of examination items with respect to different groups of examinees with similar abilities conditioned on their responses to construct of interest being measured and the identification of bias items ((Noortage & Boeck, 2005; Roever, 2005).

Differential Item Functioning as a collection of statistical procedures for detecting differences in group performances as a result of bias items among examinees with similar abilities is a global focus in educational assessment. Some of these procedures are Classical Test Theory (CTT) based, while others are Item Response Theory (IRT) based. Various detecting methods are widely used within these assessment frameworks of Classical test theory, Item response theory and Rasch Model in DIF analysis. The most popular methods within classical test theory include: Mantel Haenszel (MH) and Logistic regression (LR) and others. Within the Item response theory are: Lord's Chi-square statistics, Wald statistics, among others. Various computer programmes have been developed to make it feasible and possible. Amongst the software programmes are: BILOG. MG. 30; IRTPRO MG.30; MULTILOG; WINSTEP; RUMM and others (Perrone, 2006; Scherman & Goldstein, 2008).

McNamara and Roever (2006) opined that the contemporary discussion of validity is focused on test fairness through developing procedures that supports rationality of decision based on items not on demographic and social variables of the examinees. In addition, Zumbo (1999, as cited in Salahi, & Tayebi, 2011) and Brown (2005) stressed that the shift from the traditional view which simply relied on computing correlation with another measure, to the current view of validity as a measure to ensure, fairness and equality in testing situation is appropriate. Furthermore, Brown (2005) argued that test consideration should look away from the scores but on the interpretations for some specific purposes and inferences drawn from the test results, the decisions and actions thereafter.

Differential Item Functioning (DIF) is said to occur when a group of examinees with similar abilities, taught and examined on the same construct of interest exhibit differing probabilities of responding to items in the test (Camilli, 2006; Osterlind & Everson, 2009). Steinberg and Thissen (2006) believed that DIF examines the probability of correctly responding or endorsing an item(s) conditioned on the examinee's ability. In other word, when a particular group of examinees with respect to social, gender, race or demographic variables respond to a particular item(s) correctly than the other group, the particular item(s) is said to exhibit bias or differential functioning between the groups of examinees.

However, Differential Item Functioning (DIF) in bias analysis is expressed in two forms: Uniform and Non-uniform (DIF). Uniform DIF is believed to occur when a sub-group of examinees with ability levels, uniformly answer a particular item or subset of items than the other group. Therefore, that particular sub-group is said to be advantaged over the other group and can be considered as having a superior ability over the less favoured group. The advantaged group is termed as the “reference” group, while the less advantaged is the “focal” or the group of focus in bias analysis comparatively (Walker, 2011; Huang & Han, 2012).

Walker (2011) asserted that in uniform DIF, the item favours the advantaged group, while the other group is less favoured with respect to difficulty of the item(s) at different ability levels of the examinees. However, within the item response theory (IRT) framework, uniform DIF, occurs when item characteristic curves (ICCs) for the groups equally discriminate but exhibit differences in the difficulty parameter. Walker’s view is supported as Huang and Han (2012) opined that the difficulty level in uniform DIF is different between the groups but the discrimination is the same. To further offer clarification on the uniform DIF, Le (2006) stressed that uniform DIF occurs when there is no interaction between ability level and group membership of the examinees.

In contrast to uniform DIF, Salehi and Teyabi (2012) explained that non-uniform DIF occurs when there is an interaction between test takers’ ability level and their performance on an item contributing to change in the direction of DIF along the ability scale. Camilli and Shepard (1994, cited in Le, 2006) expressed that in non-uniform DIF, interaction is found between trait level, group assignment and item responses. In other words, the difference in the probability of responding correctly to item (s) between the groups is not the same at all levels of ability.

De Beer (2004) and Walker (2011) believed that in IRT, there is ICC intersection between the two groups at a point, indicating that a given item exhibits difficulty as well as discrimination. Huang and Han (2012) affirmed that in non-uniform DIF, the discrimination parameter is different; the difficulty may or may not be the same. In summary, the uniform DIF is about the difficulty of an item at a particular ability level or theta between the groups, while the non-uniform DIF is about the discrimination index of an item at a particular ability level between the groups of examinees. However, a given item can exhibit both uniform and non-uniform DIF or uniform or vice-versa.

Various effect size classification measures are used to examine types of DIF and effect sizes. Zumbo and Thomas, (1999 cited in Rezaee & Shabani, 2010); Jodoin & Gierl (2001) among others had proposed these measures in DIF assessment for informed decisions. However, this study used binary logistic regression as one of the mostly preferred CTT procedures for analysis of uniform and non-uniform DIF, and the effect sizes. The effect size for LR DIF is R-squared coefficient used to examine the partial correlation between the dependent (item responses) and each of the independent variable (group and total score). R^2 differences in the model fit of Chi-squared represent the effect levels of DIF. According to the effect size guideline, DIF values can be classified as: negligible (A- level = $R^2 < .035$), moderate (B- level, = $R^2 \leq R^2 .070$) and large (C – level, = $R^2 > .070$) (Alvi, Rezae & Amirian, 2011). The study used proposed classification guidelines of effect size measure by Jodoin and Gierl (2001) as predictor of Nagelkerke’s R^2 to quantify uniform and non-uniform DIF.

Statement of the problem

The use of test results for major educational decision without DIF evaluation in its complete dimensions is against the global best initiatives in measurement and assessment. Evaluating DIF is one of the expected modern psychometric analyses of bias measures to ensure equality of opportunity to all examinees. Nigerian test developers and users in educational

measurement and assessment are yet to key into this global initiative for decades. This development has plagued the educational system with respect to quality and equitable assessment and measurement. Test is one of the preferred instruments to appraise examinee's level of proficiency, ability and skill in performing a given task with respect to chosen field of study. Hence, the need to dully evaluate DIF in its dimension is in compliance with Joint Committee on Standards for Educational and Psychological Testing of the AERA, APA, and NCME (2014). Few studies revealed that State and National examination bodies are yet to show commitment to this initiative as some items in various subjects administered displayed DIF. Though, the issues of uniform and non-uniform DIF and effect sizes have not been addressed. The imperativeness of these issues should not be overlooked, if information for practical significance of DIF to interpret results is to be achieved. Based on this gap, this study decided to investigate uniform and non-uniform DIF and effect size using State administered 2014 mock multiple choice Mathematics items in Nigeria, conducted by the Akwa Ibom State Ministry of Education for senior secondary three (SS 3) students. As a major examination, the importance of making major decisions based on the results obtained has educational, professional or employment implications. Thus, the need to key into the current global initiative in validation process in psychometric is imperative for Nigerian education assessors and evaluators.

Purpose of the study

The study was carried out to investigate types of differential item functioning (DIF) and the effect size in 2014 mock multiple choice Mathematics items of Akwa Ibom State, Nigeria. Specifically, the study investigated the extent 2014 Mathematics items displayed:

1. Uniform DIF,
2. Non-uniform DIF, and
3. DIF effect sizes.

Research Questions

The following research questions were formulated to guide the study:

- To what extent do 2014 mock multiple choice Mathematics items of Akwa Ibom State, Nigeria, display uniform DIF?
- To what extent do 2014 mock multiple choice Mathematics items of Akwa Ibom State, Nigeria, display non- uniform DIF?
- To what extent do 2014 mock multiple choice Mathematics items of Akwa Ibom State, Nigeria, display different DIF effect sizes?

METHODOLOGY

The data used for the study consisted of 2014 mock multiple-choice Mathematics students' responses in Akwa Ibom State, Nigeria. Ex- post facto design was adopted. The population of the study consisted of 47, 599 Senior Secondary Two (SS2) students' responses in 2014 state mock multiple choice Mathematics in the public senior secondary schools in three educational zones of Uyo, Eket and Ikot Ekpene. Twenty three thousand, eight hundred and thirty one were male students' responses, while 23,768 were female students' responses. The sample for the study comprised, 3,066 examinees' responses from the three educational zones representing 15.52 percent, selected through stratified sampling procedure. One thousand, five hundred and thirty three (15.54 %) were male candidates' responses, while 1,533

(15.54%) were female candidates' responses. A large sample size was considered to obtain a stable estimate as a requirement in DIF analysis procedure (Broer, Lee, Rizavi & Powers, 2005). The 2014 State mock multiple-choice Mathematics is a 50 item four-optioned: A – D test. The item responses were scored in a binary format of “1” correct and “0” incorrect. The data collection was gathered by the researcher through the permission by the Director of the State Ministry of Education, Examination and Certification Unit, Akwa Ibom State, Nigeria. The reliability of the test instrument was .71 Cronbach's Alpha based on standardized items. The examinees' responses were subjected to a three-step model binary logistic regression statistical analysis proposed by Zumbo (1999, cited in Rezaee & Shabani, 2010), using IBM SPSS statistics version 20.

Step 1 (model 1): Entered the conditioning variable (total test score)

Step 11 (model 2): Entered the group variable (male and female)

Step 111 (model 3): Entered the interaction term between the conditioning variable and group variable (total test score multiply by group variable).

Chi-square test was used in addition to estimate Nagelkerke R^2 effect size as a means of examining practical significance of DIF. The logistic regression equation was analyzed thus:

1. Model 2 minus model 1 = Uniform DIF only
2. Model 3 minus model2 =Non-uniform DIF.

A 1-degree of freedom Chi-square difference between model 1 and model 2 with a p-value less than .05 significant level, indicated uniform DIF. Similarly, 1-degree of freedom Chi-square difference between model 2 and model 3 with a p-value less than .05 significant level, indicated non-uniform DIF. An item was said to be DIF significant when the group differences when the Chi-squared test of significant for a particular item was less than or equal to .05. Jodoin and Gierl (2001) classifications of “negligible”, “moderate” and “large” effects respectively were used with Nagelkerke R^2 difference between model 1 and model 2, as well model 2 and model 3. The dependent variable (item responses), while the independent variables (total score (ability) and gender) were used. The reference group (male) was coded 1, while the focal group (female) was coded 0.

RESULTS

The results of the data analysis are presented in Tables, 1, 2, and 3, according to the research questions.

Research Question 1: To what extent do 2014 mock multiple choice Mathematics items of Akwa Ibom State, Nigeria, display uniform DIF?

Table 1: Uniform Differential Item Functioning (DIF) of 2014 Mock Multiple Choice Mathematics Items of Akwa Ibom State, Nigeria.

Item	Model 2 minus Model 1 Difference			Item	Model 2 minus Model 1 Difference			Item	Model 2 minus Model 1 Difference		
	X ²	df	Sig.		X ²	df	Sig.		X ²	df	Sig.
1	.651	1	.000	21	3.925	1	.000	41	3.631	1	.000
2	2.207	1	.000	22	7.542	1	.000	42	1.276	1	.000
3	.792	1	.000	23	3.113	1	.000	43	6.446	1	.000
4	2.808	1	.000	24	2.088	1	.000	44	.006	1	.000
5	-1.62	1	.000	25	4.995	1	.000	45	2.358	1	.000
6	-.067	1	.000	26	.265	1	.000	46	8.318	1	.000

7	.832	1	.000	27	2.798	1	.000	47	4.352	1	.000
8	.04	1	.000	28	1.13	1	.000	48	7.381	1	.000
9	.134	1	.000	29	.468	1	.000	49	.993	1	.000
10	6.048	1	.000	30	.134	1	.000	50	2.232	1	.000
11	1.936	1	.000	31	1.393	1	.000				
12	.207	1	.000	32	.43	1	.000				
13	4.115	1	.000	33	.818	1	.000				
14	6.033	1	.000	34	1.287	1	.000				
15	7.864	1	.000	35	17.435	1	.000				
16	.061	1	.000	36	1.034	1	.000				
17	.065	1	.000	37	5.183	1	.000				
18	.726	1	.000	38	3.023	1	.000				
19	3.676	1	.000	39	.842	1	.000				
20	3.363	1	.000	40	.532	1	.000				

* All items display uniform DIF with 1 degree of freedom at .000 significant level

The result in Table 1 indicates that all the items exhibit uniform DIF with 1 degree Chi-square difference with significant value of .000 less than .05. Uniform DIF was assessed by subtracting model 2 (group) Chi-square from model 1 (total score) Chi-square. This indicates that the Mathematics items display uniform differential functioning

Research question 2: To what extent do 2014 mock multiple choice Mathematics items of Akwa Ibom State, Nigeria, display non- uniform DIF?

Table 2: Non-uniform Differential Item Functioning (DIF) of 2014 Mock Multiple- Choice Mathematics Items of Akwa Ibom State, Nigeria

Item	Model3 minus Model 2 Difference	X ²	df	Sig.	Item	Model 3 minus Model 2 Difference	X ²	df	Sig.	Item	Model 3 minus Model 2 Difference	X ²	df	Sig.
1	2.527	1	.000		21	1.358	1	.000		41	.044	1	.000	
2	4.7	1	.000		22	.163	1	.000		42	.021	1	.000	
3	.081	1	.000		23	.943	1	.000		43	.18	1	.000	
4	2.108	1	.000		24	5.211	1	.000		44	.314	1	.000	
5	.143	1	.000		25	.128	1	.000		45	1.527	1	.000	
6	.067	1	.000		26	.327	1	.000		46	.606	1	.000	
7	.004	1	.000		27	.379	1	.000		47	.472	1	.000	
8	.004	1	.000		28	.484	1	.000		48	5.334	1	.000	
9	2.676	1	.000		29	6.671	1	.000		49	2.224	1	.000	
10	1.612	1	.000		30	.848	1	.000		50	12.167	1	.000	
11	1.329	1	.000		31	.724	1	.000						
12	2.263	1	.000		32	.295	1	.000						
13	.939	1	.000		33	.827	1	.000						
14	.149	1	.000		34	.779	1	.000						
15	.834	1	.000		35	2.235	1	.000						
16	.523	1	.000		36	.874	1	.000						
17	.556	1	.000		37	.082	1	.000						
18	.081	1	.000		38	.082	1	.000						
19	.833	1	.000		39	.001	1	.000						
20	1.262	1	.000		40	.278	1	.000						

Note: All items display Non-uniform DIF with 1 degree of freedom at .000 significant level.

The result reveals that the entire all the 50 items display non-uniform differential item functioning (DIF) with 1 degrees of freedom at .000 significant less than .05. Therefore, the 2014 mock multiple- choice Mathematics items of Akwa Ibom State, Nigeria, display non-uniform DI. This result indicates that non- differential item functioning occurs as a result of the interaction between the group membership and total score.

Research question 3: To what extent do 2014 mock multiple choice Mathematics items of Akwa Ibom State, Nigeria, display different DIF effect sizes?

Table 3: Differential Item Functioning (DIF) Effect Size Analysis

Uniform DIF [Model 2 (R ²) – Model 1(R ²)]						Non-uniform DIF [Model 3 (R ²) – Model 2(R ²)]					
Item	Sig.	Remark	Item	Sig.	Remark	Item	Sig.	Remarks	Item	Sig.	Remark
1	.000	Negligible	26	.000	Negligible	1	.002	Negligible	26	.000	Negligible
2	.002	Negligible	27	.002	Negligible	2	.002	Negligible	27	.000	Negligible
3	.000	Negligible	28	.001	Negligible	3	.000	Negligible	28	.000	Negligible
4	.003	Negligible	29	.000	Negligible	4	.001	Negligible	29	.003	Negligible
5	-.002	Negligible	30	.000	Negligible	5	.000	Negligible	30	.000	Negligible
6	.000	Negligible	31	.000	Negligible	6	.000	Negligible	31	.000	Negligible
7	.04	Negligible	32	.000	Negligible	7	.000	Negligible	32	.000	Negligible
8	.000	Negligible	33	.001	Negligible	8	.000	Negligible	33	.000	Negligible
9	.002	Negligible	34	.001	Negligible	9	.002	Negligible	34	.000	Negligible
10	.003	Negligible	35	.008	Negligible	10	.000	Negligible	35	.001	Negligible
11	.001	Negligible	36	.001	Negligible	11	.000	Negligible	36	.000	Negligible
12	.000	Negligible	37	.002	Negligible	12	.001	Negligible	37	.000	Negligible
13	.002	Negligible	38	.001	Negligible	13	.000	Negligible	38	.000	Negligible
14	.003	Negligible	39	.000	Negligible	14	.000	Negligible	39	.000	Negligible
15	.004	Negligible	40	.000	Negligible	15	.000	Negligible	40	.000	Negligible
16	.000	Negligible	41	.002	Negligible	16	.000	Negligible	41	.000	Negligible
17	.000	Negligible	42	.001	Negligible	17	.001	Negligible	42	.000	Negligible
18	.001	Negligible	43	.003	Negligible	18	.000	Negligible	43	.000	Negligible
19	.001	Negligible	44	.000	Negligible	19	.001	Negligible	44	.000	Negligible
20	.002	Negligible	45	.001	Negligible	20	.003	Negligible	45	.001	Negligible
21	.001	Negligible	46	.004	Negligible	21	.001	Negligible	46	.000	Negligible
22	.003	Negligible	47	.002	Negligible	22	.001	Negligible	47	.000	Negligible
23	.001	Negligible	48	.004	Negligible	23	.001	Negligible	48	.002	Negligible
24	.000	Negligible	49	.000	Negligible	24	.003	Negligible	49	.001	Negligible
25	.000	Negligible	50	.001	Negligible	25	.002	Negligible	50	.007	Negligible

A (negligible) DIF: $R^2 < .035$; B (moderate) DIF: $R^2 \leq R^2 \leq .070$; C (large) DIF: $R^2 > .070$; Items display negligible effect size DIF at Uniform and Non- uniform DIF

The result reveals that by 2014 mock multiple choice Mathematics items of Akwa Ibom State, Nigeria, display uniform and non-uniform DIF with negligible effect size at Nagelkerke $R^2 < .035$. The negligible DIF effect size is considered small. The result indicates that the items did not display the other two types (moderate: $R^2 \leq R^2 \leq .070$ and large: $R^2 > .070$) of the effect size classifications.

DISCUSSION OF FINDINGS

The result of research question one revealed that all the 50 items of 2014 mock multiple choice Mathematics items of Akwa Ibom State, Nigeria, displayed uniform DIF. The finding of this study is in consonant with various studies that identified uniform DIF in items of different examinations using logistic regression procedure. For instance, Abedalaziz (2010) found in a study using logistic regression that 10 of the 30 items of the tenth grade students' Mathematics in Jordan at the end of the First semester, school year 2009 – 2010, displayed uniform DIF that favoured the male group. Similarly, Rezaee and Shabani (2010) discovered uniform DIF in 11 out of the 39 items in a partial requirement admission examination for Ph.D. programme of the University of Tehran English Proficiency test. Six of the items favoured males, while five items favoured females. Besides, Alavi, Rezaee and Amirian

(2011) in the study of the University of Tehran English proficiency test for master's degree holders in humanities, science and engineering revealed that logistic regression flayed 14 items as exhibiting uniform DIF. However, Alavi, Rezaee and Amiriam attributed the source of the uniform DIF to group variable not the interaction effect. Furthermore, Cormier (2012) discovered the influence of uniform differential item functioning (DIF) for race and gender on STAR Mathematics in all items with logistic regression procedure. The consistency in the use of logistic regression analysis to examine uniform DIF has all been supported in the cited researches. It is imperative that type of DIF be examined in addition to DIF with respect to race, gender among others.

The result on research question two revealed that all the 50 items of 2014 mock multiple choice Mathematics items of Akwa Ibom State, Nigeria, displayed non-uniform DIF. The result supports other previous researches such as the study by Cormier (2012) that revealed non-uniform differential item functioning (DIF) for race and gender on STAR Mathematics in all items using logistic regression procedure amongst male and female; White; Black and Hispanic students. Similarly, Alavi, Rezaee and Amirian (2011) discovered only 5 items that exhibited non-uniformed DIF in the University of Tehran English proficiency test in master's degree humanities, science and engineering. In contrast to the findings of this study, Abedalaziz (2010) discovered that 8 of the 30 items administered to tenth grade students' in Mathematics in Jordan at the end of the First semester school year of 2009 – 2010 displayed non-uniform DIF in a study using logistic regression. Therefore, the study of Non-uniform DIF is a considerable issue in DIF evaluation in educational assessment which is a global concern to ensure fair assessment.

The result that provided answer to research question three revealed that all the 50 items 2014 mock multiple choice Mathematics of Akwalbom State, Nigeria, displayed negligible DIF effect size. The negligible DIF effect size is considered small. The result indicated that the items did not display the other two types of the effect size classifications of moderate and large DIF effect sizes. This finding is in agreement with some previous studies on classifications of DIF effect sizes when logistic regression analysis was used. Similarly, Salehi and Tayebi (2012) found that 35 items of the University of Tehran English proficiency test (UTEPT) using 3,398 male and female test takers in the partial requirement Ph.D. entrance examination revealed negligible effect size when Jodion and Gierl (2001) Nagelkerekere² was used. It was concluded that the items did not favour any particular group of examinees regarding gender. Therefore, those items were considered fair to all. Furthermore, Park (2006) found DIF across language and gender groups in Michigan English Language Assessment Battery (MELAB) that exhibited effect size that was far too small to have an important group effect. However, Parked concluded that with the effect size being too small, the group differences could be attributable to item impact rather than group difference. However, Alavi, Rezaee and Amirian (2011) found that out of the 100 items of University of Tehran English proficiency test, only item 47 displayed moderate or type B effect size when using Jodoin and Gierl (2001) Nagelkerekere² classification guidelines, but the other items displayed negligible effect size. Also, Fidalgo, Alavi and Amirian (2014) found 4 items that displayed negligible effect size at non-uniform DIF, while 13 items played moderate effect size at uniform DIF level when Jodoin and Gierl, (2001) classification guidelines was used. But when other method of classifying effect size such as Wald test was used, there was increase in the number of moderate DIF. Also, Cormier (2012) found negligible effect sizes in 554 STAR Mathematics items at uniform and non-uniform DIF when Jodoin and Gierl (2001) classification was used. Cormier concluded that since the effects size was negligible in value, the result demonstrated that the items analyzed did not exhibit bias towards a particular gender or race.

The plausible explanations as to why such results were arrived at in this present study may be attributable to some possible external influences at some centres that must have assisted the students in solving the mathematics problems. Secondly, some correct answers must have been provided that influenced the results.

CONCLUSION

The study revealed that all the 50 items of the 2014 mock multiple choice Mathematics items of Akwa Ibom State, Nigeria, exhibited uniform as well as non-uniform DIF when three step comparative logistic regression models were used. Jodoin and Gierl (2001) classification guidelines of effect size revealed negligible DIF, with no item displayed moderate or large effect size. It was concluded that on the account of the effect size result the items were considered to be fair to all groups since the manifested DIF of the items had negligible value. However, the implication of this result to valid, fair and equality of opportunity in testing is the information that the findings provided should engender further studies that offer some insight into the use of uniform and/ or non-uniform DIF in bias assessment for practical significance.

Recommendations

Based on the findings, the following recommendations were made:

- That a comparative analysis of 2014 mock multiple choice Mathematics items of Akwa Ibom State, Nigeria, be made using other DIF detection procedures.
- That other DIF effect size classification guidelines should be used in conjunction with DIF evaluation;
- Other papers than Mathematics at the Junior Secondary School Three (JSS3) and national examinations should be used for comprehensive view of the testing situation in Nigeria.

REFERENCES

- Abedalaziz, N. (2010). A gender-related differential item functioning of mathematics test items. *The International Journal of Educational and Psychological Assessment*, 5(2), 101-116.
- Acar, T., & Kelecioğlu, H. (2010). Comparison of differential item functioning determination techniques: HGLM, LR and IRT-LR. *Educational Sciences Theory & Practice*, 10(2), 639-649.
- Alavi, S. M., Rezaee, A. A., & Amirian, S. M. (2011). Academic discipline DIF in an English Language proficiency test. *Journal of English Language teaching and Learning*, 7, 39-65.
- Brown, J. D. (2005). *Testing in language programs: A comprehensive guide to English Language assessment*. New York: McGraw-Hill.
- Camilli, G. (2006). *Test fairness*. Westport, CT: American Council on Education.
- Cormier, D. C. (2012). Evaluating the influence of differential item functioning for race and gender on STAR Mathematics items. Retrieved from www.renlearn.com
- De-Beer, M. (2004). Use of differential item functioning analysis for bias analysis in test construction. *Journal of Industrial Psychology*, 30(4), 52-58.
- Fidalgo, A. M., Alavi, S. M., & Amirian, S. M. R. (2014). Strategies for testing statistical and practical significance in detecting DIF with logistic regression models. *Language Testing*, 31(4), 433-451.

- Huang, J., & Han, T. (2012). Revisiting differential item functioning: Implications for fairness investigation. *International Journal of Education*, 4(2), 195- 250.
- Jodoin, G. M., & Gierl, M. J. (2001). Evaluating type I error and power rates using an effect size measure with the logistic regression procedure for DIF detection. *Applied Measurement in Education*, 14(4), 329-349.
- Joint Committee on Standard for Education and Psychological Testing of AERA, APA, NCME (2014). Retrieved from: <http://www.teststandards.org/files/standards>.
- Le, J. (2006). Analysis of differential item functioning. Paper prepared for annual meetings of the American Educational Research Association in San Francisco.
- McNamara, T., & Roever, C. (2006). *Language testing: The social dimension*. New York: Blackwell publishing.
- Monaham, P. O., McHorney, C. A., Stump, T. E., & Perkins, A. J. (2007). Odds ratio, Delta ETS classification, and standardization measures of DIF magnitude for binary logistic regression. *Journal of Educational and Behavioural Statistic*, 32, 92-109.
- Noortgate, W. V. D., & Boeck, P. D. (2005). Assessing and examining differential item functioning using logistic mixed models. *Journal of Educational and Behavioral Statistics*, 30(40), 443-464.
- Osterlind, S. J., & Everson, H. T. (2009). *Differential item functioning*. Thousand Oaks, CA: Sage Publishing.
- Park, T. (2006). Detecting DIF across Different Language and Gender Groups in the MELAB Essay Test using the Logistic Regression Method. Spain: *Working Papers in Second Foreign Language Assessment*, 4, 81-96.
- Perrone, M. (2006). Differential item functioning and item bias: Critical considerations in test fairness. *Columbia University Working Papers in TESOL & Applied Linguistics*, 6(2), 1-3.
- Rezaee, A. A., & Shabani, E. (2010). Gender differential item functioning analysis of the university of Tehran English proficiency test. *Pazhuhesh-e ZaaabanhayeKhareji. Special Issue* 56, 89-108.
- Roever, C. (2005). That's not fair! Fairness, bias, and differential item functioning in language testing. Retrieved from <http://www2.hawaii.edu/~roever/brownbag.pdf>.
- Salehi, M., & Tayebi, A. (2012). Differential item functioning (DIF) in terms of gender in the reading comprehension subtest of a high stakes test. *Iranian Journal of Applied Language Studies*, 14(1), 135-168.
- Scherman, C. A., & Goldstein, H. W. (2008). Examining the relationship between race-based differential item functioning and item difficulty. *Educational and Psychological Measurement*, 68, 537-553.
- Steinberg, L., & Thissen, D. (2006). Using effect sizes for research reporting: Examples using item response theory to analyze differential item functioning. *Psychological Methods*, 11, 402-415.
- Walker, C. (2011). What's the DIF? Why differential item functioning analyses are an important part of instrument development and validation. *Journal of Psychoeducational Assessment*, 29, 364-376.
- Wiberg, M. (2007). Measuring and detecting differential item functioning in criterion-referenced licensing test: A theoretical comparison of methods. Retrieved from http://www.edusci.um.se/digitalAsserts/59/59534_em_no-60pdf.

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Influence of Free Primary Education on Performance in KCPE in Chemundu Zone, Kapsabet Division in Nandi County, Kenya

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Abstract

This article investigated the influence of free primary education (FPE) on performance in KCPE in Chemundu Zone, Kapsabet Division in Nandi County, Kenya. The study was a cross sectional survey in which both quantitative and qualitative data was collected. The dependent and independent variables were FPE and performance respectively in KCPE. Purposive sampling technique was used to pick 30% of the total population (teachers and pupils) of the schools in the zone for the study. However, all schools in the zone participated. The data collection instruments were questionnaires, interview schedules and documentary analysis. The data were analyzed using descriptive and inferential statistical techniques. The study revealed that FPE has attracted many students hence stretching teaching and learning resources, thus, compromising the quality and performance. The study recommended adequate and timely funding if the programme has to succeed. Further, it also recommended that infrastructure should be expanded to meet pupils rising enrolment.

Keywords: Pupils, Free Primary, Education, Performance, KCPE, Funding, Infrastructure, Nandi County, Kenya.

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INTRODUCTION

On January 6th 2003 the Kenya children started the day with new vigor and hopes. Primary education was free and all that was required was for every child regardless of age to walk to school next to where they live. Though the abolition of school levies increased the number of student attending primary school with it comes many challenges that the government continues to face. The issue of quality of education has been of great concern as the number of pupils to teacher ratio has increased. Some parents have since then remove their children from private school so as to benefit from this free education while others have left the public sector due to the poor quality of education and overcrowded classes. The challenge that faces educators in 21st century is shifting education from mere learning to effective and efficient management of learners by teachers (Unesco, 1995).

Taylor, (1970) said that as much as learning activities and resources has been integrated in the curriculum, most of them remain loosely coordinated within the curriculum. Hence the teacher retains a major role in the selection and organization of learning activities.

This study came almost five years after the implementation of FPE when the country is ready go to the polls again, it's reasonable time after ample time has been given to incorporate the lessons learnt so as to get a comparative report with the government end term report. Though the Kenyan government pledged to provide funds for purchasing of all the teaching and learning materials, reports of delayed or inadequate funding are common among most institution. As in many African nations that have implemented FPE, the question of sustaining it is still a big debate in Kenya. And what people can positively achieve is influenced by the economic opportunities political liberation social powers and the enabling conditions of good health basic education and the encouragement and cultivation of initiative persistence of poverty and other unfulfilled basic needs are factors that constrains the social, political and the economic opportunities available to Kenyans (SEN, A1999 p. 5).

Kenyan parents place a high premium on quality education as this is seen as the only opportunity to break away from poverty. This has further been reinforced by the governments adoption of the free primary education policy aimed at the provision of education and training for all Kenyan children as fundamental to the success of the government overall development strategy. While a lot has been written by the government on the success of the FPE in Kenya, implementation problems continue to be experienced at the grassroots level.

As Kenya went to the poll yet again on March 4th 2013 it is important to examine the FPE impact as the government is already pledging to fully sponsored free primary and secondary education. A shift in government may affect the current funding of FPE which is partly reliant on external donors. This research aimed to codify the impact of the FPE policy with the hope that the challenges and lessons learnt can be addressed so as to retain the focus on "Education for All" as a development strategy for the nation.

Statement of the Problem

Despite the introduction of free primary education to offer knowledge, skills and attitudes to all children, there are increasing concerns regarding the quality of education offered. The ratio of teacher to pupil and pupil, to textbooks as well as classrooms is strained (Chunk, 2009). There are many learners against few textbooks, teachers and classrooms. The above situation makes

teachers offer inferior quality education and hence dismal performance in KCPE (Daily Nation, 2012). In 2002, the Narc government introduced the above system of cost sharing. The idea was well thought of as it enable many less fortunate pupils to get the opportunity and access the corridors of classrooms. The Kenyan government alone cannot be able to sponsor the FPE program and as such, she has been soliciting support from donor countries and many western countries stepped in to support the program. Nevertheless, the monies factored in have been characterized by delays beside the fact that the amount is not enough. Cases of teachers threatening to go on strike because of money delay was a major factor (Chunk, 2009).

The above challenges have worsened due to the fact that the monies are not enough to meet all the demands of the system. Teachers are government employees who equally have to work to justify their salaries. This scenario makes the teachers to compromise the quality of education offered (Daily Nation, 2012). In 2011, , the candidates in Chemundu zone had a mean grade of 270/500 marks, with most public primary schools scoring less than 250 marks. It was against this background that the researcher felt the need to investigate the effect of FPE and its performance in KCPE in Chemundu Zone of Nandi County of Kenya.

Purpose of the Study

Education is the bedrock of development. The knowledge, skills and attitudes acquired will enable the young people spur education and the realization of Kenya's vision 2030. Education is paramount; there is no system or country that develops without education. The primary schools are the foundation upon which knowledge is conceived. The knowledge conceived will sets the basis upon which further understanding depends. As such, there is need to offer firm foundation to our children. To this end, this study attempted to fulfill the following objectives:

- To establish the relationship between student population in class and performance in KCPE;
- To establish the extent to which amount disbursed to schools influence performance in KCPE;
- To determine the influence of availability of instructional materials on performance in KCPE;
- To establish the influence of infrastructural status on performance in KCPE;
- To suggest appropriate strategies that would improve teaching and learning in primary schools to enhance performance in KCPE

Research Questions

The study attempted to answer the following questions:

- What is the relationship between student population in class and performance in KCPE?
- To what extent does the amount dispersed influenced performance in KCPE?
- What is the influence of availability instructional materials on performance in KCPE?
- How infrastructural status does influenced performance in KCPE?

- What are the appropriate strategies that would improve teaching and learning in primary schools and hence performance?

LITERATURE REVIEW

Theoretical Framework and Conceptual Framework

This study will subscribe to the (Gerlack & Ely, 1978) theory of systematic approach to instruction. The theory states that before teaching takes place the teacher should specify the objective, content, entry behaviors allocation of space selection of resources determination of strategy and evaluation. The theory point out that if the resources in form of personnel, textbooks and space are not there learning will not take place well. The theory was deemed appropriate because the researcher felt that lack of the resources and space is a hurdle to teaching and learning in free primary education. The study subscribes to Abraham Maslow's hierarchy of needs.

The hierarchy of needs concept applied to classroom has it that for the teacher to teach well, basic needs should be provided as for humans they need food shelter and clothing to do the work. Basic classroom needs are:

- Space
- Instructional materials
- Teaching resources
- Learners
- Conducive environment

Space in this case refers to the classroom, buildings providing a place for learning. Instructional materials are books, teaching resources are the teachers and teacher support materials. Learners are students while conducive environment is the place which can facilitate learning. According to this concept, learning can take place well if all the above variables are provided. However, questions are emerging as to whether the above are provided under free primary education

Historical Development

A few countries in Africa have implemented the free education policy before Kenya with mixed cases of success, problems and challenges. Some countries have challenged the policy, with Nigerians labelling UPE in the 1980 as the Unfulfilled Promise Education (Csapo, 1983). Understanding the factors that lead them to adopt this policy will be an important aspect of this study. To review the impact of the policy in Kenya, it will be vital to look at the history of the education system, the government motivation towards the policy changes, the effects on funding, access to education and the quality of education.

It will be necessary also to review experiences of countries already operating the new policy. The initial adjustment and revitalization of education in Kenya in early 1980s was due to internal and external forces. The World Bank and the international community wanted the government to cut expenditure and adhere to structural adjustments programs while the social

sector oriented professionals (including teachers) wanted allocation of more resources to make education more effective (IPAR, 1999). The world conference on EFA held in Jomtien, Thailand and the Dakar Conference, in Senegal (2000) have sparked a paradigm shift in the education sector. Education quality and gender disparity have been barriers to accessing education (Boyle et al., 2002). For every 100 boys out of school, there are 115 girls in the same situation (State of Worlds Children, 2006, p. 4).

UNICEF (2000) noted sadly that one out of every five girls in school is unable to complete primary education; moreover, countries charging fees tend to have the largest number of girls out of schools (Save the Children, 2005). The government argues that compulsory FPE is the first solution to ensuring an equal chance to boys and girls to attend schools.

UPE has, since 2000, been a goal for most countries worldwide. World Bank (2004) notes that when fees were abolished in Malawi (1994), enrolments went up by 51% and in Uganda they went up in by 70% in 1996. Cameroon (1999) saw an increase from 88% to 105% while in Tanzania (2001); rates soared from 57% to 85%. In Kenya, the rates went up by 90% after the new policy was introduced in 2003 (MOEST, 2005). Though the government continues to quote these success figures, dropouts' rates in public primary schools have increased due to unfriendly learning environments, poverty levels, child labour and impact of HIV/AIDS (Ayieko, 2005). Other factors affecting enrolment include limited number of schools within easy walking distance, absence of female teachers and failure to provide separate toilet for female students (World Bank, 2004). Limited numbers of schools offering the full cycle of primary education and perceived low returns for schooling in labour markets are other factors. The current FPE system suffers from high rates of wastage through dropouts and repetitions (GoK, 2005 p. 3). Lessons from massive expansions of primary schools in the 1980s and 1990s show that expanding rapidly can compromise quality, reflected in high enrolments but low achievements (WDR, 2007).

After the introduction of FPE in Kenya, an additional 1.5 million students were able to attend schools for the first time (MOEST, 2005). The World Bank emphasizes on improving the balance between expanding primary education enrolment and ensuring a minimum standard. While citing the cases of Morocco and Namibia, it stated that many of the large number of adolescents completing primary education do not know enough to be literate and numerate members of the society (WDR, 2007 p. 11). Congestion in classes, unbalanced PTR and poor infrastructure has affected the quality of education with some parents moving children to private schools. Some Kenyans believe that teachers who did not receive fees from parents did not feel as accountable for working hard (Tooley, 2004).

While the government continues to receive credit on the increase in enrolment and availability of textbooks in schools, with pupil to textbook ratio at 2:1 in some schools (MOEST, 2005), the EFA global monitor reports that the quality of education remains poor in most in sub-Saharan countries including Kenya. Nigeria has implemented FPE on and off since the 1950s and by 2003, literacy level was still at 55% (Ajetomobi & Anyanwale, 2005).

Many African countries including Kenya are heavily indebted, forcing them to devote huge portions of the tax receipts to payment of debts. This undermines their ability to finance vital investments in human capital and infrastructure. While the Kenyan government has increased the education budget since FPE to 36%, around 90% of the cost is spent on salaries and benefits, leaving very little for other essential inputs. On average, governments in low-income countries spent 34 times more on students in tertiary education than in primary education

(Glewwe& Kremer, 2005). In Kenya, there are complaints that FPE is getting more attention than universities where enrolment exceeds resources and in postgraduate centres where students do not receive research grants. As table 1 show, the government is already having financing gaps and will rely on donor funding for the next three years.

Table 1: Indicative Financing Gap (* KSH Million)

Net * GoK Recurrent	2005/06	2006/7	2007/8	2008/9	2009/10
Funding	86,792.0	91,131.6	95,688.2	99,515.7	103,496.4
GoK Development					
Funding (Net)	842.0	842.0	842.0	842.0	842.0
Total GoK Funding	87,634.0	91,973.6	96,530.2	100,357.7	104,338.4
Funding Available	94,613.1	985,20.1	101087.9	102,707.7	106,046.7
Total Proposed	96,544.9	105,338.0	112,628.5	113,343.0	100,102
Financing Gap	1,931.9	6,817.9	11,540.5	10,635.3	9,510.5

Source: Government of Kenya: MOEST, KSSP

Without additional investments, quality education is difficult to achieve and dropout rates and illiteracy are likely to increase (GoK., 2005, p. 2). In 2005, the majority of voters in Kenya rejected a draft constitution, which could have entrenched human rights GoK: Government of Kenya KSH: Kenya Shilling. At the time of the study, 1 US Dollar(\$) = 65 KSH guarantees including education.

While the previous government of Moi was targeted by aid cut offs and often because of corruption (State of the Right of Education Worldwide, 2006), it is impossible to tell whether this government will continue to receive external funding with its record. Previous school levies included, registration fees, textbooks, activity fee, caution money, payments for teachers /support staff hired by school committees, development funds, school trips, teachers tours and internal exam fees.

The new policy only covers textbooks and tuition fees. While it has discouraged schools from charging other expenses, school committees are having problems supplementing these other costs. Parents have refused to pay levies due to this notion of free education. The current education is not totally free. Kattan (2006) noted that fees continue to be collected (sometimes illegally) in a third of the countries with an official policy against fees. “Because public funding was/and is insufficient to cover for direct and indirect costs of schools [in Uganda, Tanzania, Zambia and Mauritania], the definition of free education was reduced to fee free” education (Tomasevski, 2006, p. 35). Kenya abolished school levies since 2003 and has seen an upsurge in GER as in the case of its neighbours; Uganda, Tanzania, Ethiopia and Rwanda. User fees negatively affect attendance rates in Kenyan schools with 31% of student’s absenteeism attributed to school fee related issues (Mukudi, 2004b).

The World Bank urges that abolishing fees should be part of a broader government commitment to attaining FPE.As a United Nations (UN) cluster lead agency in children’s affairs, UNICEF has engaged in all means of partnership to raise awareness and fundraise for education projects. These collaborative advocacy campaigns have led to the emergence of philanthropists including, soccer players like Didier Drogba (UNICEF Goodwill ambassadors), and actor Angelina Jollie (UNHCR goodwill ambassador) and renowned talk show host Oprah Winfrey. Though they contribute to the education sector, partnerships with governments would have

boosted the FPE kitty and had more impact on the new policy. Governments need complementary measures to cover costs of teachers' remunerations and recruitment, monitoring, policy training and supply of instructional materials. UNICEF Kenya earmarked 1.5 million USD in 2007 for education related expenses as part of the 2004- 2008 country framework cooperation (Humanitarian Report, 2007, pp. 71-73).

These reinforce the importance of education and take the challenge to the doorsteps of governments who are obligated to developing this important education sector. The Shanghai conference of 2004 on Primary Education for Poverty Reduction concurred that most government policies on FPE were political initiatives implemented hurriedly with little time for detailed planning.

Kenya, Malawi and Lesotho were cited as emergent multiparty democracies where FPE was a key election issue that propelled new governments into power. The Malawi president pushed for FPE despite opposition and suggestions that to implement it in phases. He claimed FPE would provide immediate political capital, regime legitimacy and was the surest route for the new government, which had inherited a bankrupt state to secure rapid extensive state-directed international support (Kendall, 2007). In Tanzania, zone workshops for elaboration of the poverty reduction strategy plans allowed Tanzanians a channel to express the importance of education and helped government make it a priority.

Tanzanians in earlier FPE trials in 1970s had labelled the UPE policy "Ualimu Pasipo Elimu" which means Teaching without Education (Wedgwood, 2007 pg 386)". This more recent participatory nature of decision-making in Tanzania has made parents more supportive of the system and reduced misconceptions. The Kenya government formed a stakeholder's forum, which later formed a task force that discussed/reviewed the FPE policy and reported to the government (Tomasevksi, 2006). UPE in Kenya was a political expediency rather than a planned education reform, as such; problems related to adequate funding allocations are being accommodated in an ad hoc manner (Mukudi, 2004a, p. 239). The Kenya FPE raises questions of sustainability due to its lack of appropriate planning, slowness to deliver, poor quality of education and the failure to incorporate the lessons learned in the past five years. Conflict has been a major obstacle to accessing education for children. Children caught in conflicts are killed, forcibly recruited or orphaned by the death of their parents forcing them to flee. They end up in separated families, camp situations and /or traumatized situation.

The first Global Consultation on Education in Emergencies was held in 2004 and was meant to provide guidelines to countries and agencies in conflict or post conflict. On 20 November 2007, UNICEF appointed Mr Ishmael Beah (a former child soldier) as the first advocate for children affected with war. His mission is to further strengthen the voice advocating for their rights.

Conflict in the Arid and Semi-Arid lands (ASAL) of North Eastern Kenya is widespread and often overlaps with extreme food insecurity. It is mainly triggered by competition for resources. There is clear evidence that despite government intentions, most pastoralists' children are not benefiting from FPE (CEMIRIDE, 2007). The government estimates 71,000 were out of schools in Turkana district, 25,000 in Samburu and 3,800 in Laikipia (IRIN, 2007). While some people view peace negotiations as priority over education to avoid wasting resources, there are questions as to "whether a standardized education system is beneficial to pastoralists and whether it would be necessary to provide pastoralists with education that suites their pastoral and

nomadic livelihood system (CEMIRIDE, 2007, p. 5)". Children affected by conflict "not only need ordinary schooling but the entire process of re- education.

They tend to be ignored by ministries of education and taken up by NGOs (UNESCO, 2006: p6). The World Bank has supported education for all by joining programmes accredited to enhancing equality and access to education including the Food For Education (FFE) programmes whose initial success were recorded between 1993 and 2000 (UNICEF, 2006). Through the FFE program, schools receive wheat grains, which are used in school feeding. FFE has increased GER, promoted attendance and retention in primary schools. Evidence suggests that retention in schools reduces early marriages. Borrowing from these successes, the Kenya government runs feeding programmes within the FPE in schools in ASAL and implements the Extended Feeding Program (EFP) to any region experiencing droughts, famine or needing assistance. Some critics argue that the government should focus on food security projects rather than school feeding programmes. They argue that feeding children in schools only creates a dependency and most of these children eventually dropout of schools when the feeding programmes are withdrawn.

Student Population in Class and Performance in KCPE

According to chuck, A. (2009) on disparities in the FPE system, the increase in enrolment as a result of FPE had huge consequences for schools. From 2003 to 2008, the population of students attending primary school expanded an additional 2.3 million pupils a national increase of 39%. This has put huge strains on the quality of education that schools are able to provide. First the influx of students created a massive teacher shortage. While the number of students increased, the number of teachers did not. The government reports that there are simply no more teachers to provision. As a result, teachers are overwhelmed and overworked. Classes were manageable at 40 to 50 students, but some classes have expanded to over 100 students. Especially in the case of rural areas, class size has tripled due to the number of older students that their education in 2003 who had missed the opportunity before. At rural schools, teachers have even resorted to multi-shifting structure because there are many students to handle. Some students come in the morning and a different group comes in for afternoon ones. Teachers are less able to address the needs of individual students; discipline children create opportunities for interactive learning. Teachers are also conducting classes in a lecture format, which does not hold the attention of young primary students. Less homework is being assigned due to the inability of teachers to mark over 100 papers every night. Quality of education suffered as teachers became overburdened and stopped being able to provide students with the attention they need and hence dismal results in KCPE.

Unless effective instructional and assessment conditions are identified and employed to implement instructional objectives, learner achievement will not increase (Romiszowski, 1988). According to Simiyu, (1997), the role of the teacher is dynamic as the society in which he/she lives. He said that for the teacher to be effective, he she should have conducive environment endowed with resources. Research conducted by (Baker & Schutz, 1967) provides background and experience support for the utility of the overall quality teaching. Education quality has recently received a lot of attention in Kenya. The government's main document in this effort, the Kenya Education Sector Support Programme for 2005–2010, established the National Assessment Centre (NAC) to monitor learning achievement. In 2010, the NAC released the results of its first assessment.

In 2009, in collaboration with the NAC, Uwezo Kenya conducted an assessment of the basic literacy and numeracy skills of children ages 6–16. The Annual Learning Assessment (ALA) reached villages in 70 out of 158 districts in Kenya and assessed nearly 70,000 children in their homes. The ALA was set at a Standard 2 level, which is the level where students are supposed to achieve basic competency in reading English and Kiswahili and complete simple arithmetic problems. The chart below shows the percent of children who could not read a Standard 2 level paragraph or solve Standard 2 level subtraction problem.

Table 2: Percent of Children who could not Read

Level of Children Assessed	Cannot Read English Paragraph	Cannot Read Swahili Paragraph	Cannot Do Subtraction
Standard 2	85%	81%	79%
Standard 5	27%	23%	30%
Standard 8	4%	4%	10%

Key findings about education in Kenya based on the results of the Uwezo 2009 assessment

Literacy levels are low, and are substantially lower in certain regions. Girls tend to perform better in reading English and Kiswahili, while boys tend to perform better in math. Literacy levels are lower in public schools than private schools.

Most children can solve real world, “ethno-mathematics” problems, while fewer can solve similar math problems in an abstract, pencil and paper format. 5% of children are not enrolled in school, but the problem is far worse in particular regions. About half of children are enrolled in pre-school. Many children are older than expected for their class level, including 40% of children in class 2, and 60% of children in class 7. North Eastern Province and arid districts in Rift Valley and Eastern Provinces have particularly low performance; and many older children, especially girls, are not attending school. Many families pay for extra tuition, which focuses heavily on drilling and exam preparation. Schools struggle to plan their budgets because they receive funds at unpredictable times. Children, whose mothers are educated, particularly beyond primary school, tend to have much higher rates of literacy and numeracy. About 15% of students are absent on a given day, with much higher absenteeism in certain districts. There is a severe shortage of teachers, estimated at 4 teachers per school.

Amount Dispersed to Schools and Child Right to Education

The Kenyan government spends about 30% of its income on education. Beside that Kenya receives donation from various countries which is channeled to FPE. 47.5 billion Kenya shillings has been dispersed to 18, 346 primary schools to date (Chunk, 2009). The government has provided Kenya shillings 1020 to each child to gather for tuition. Despite this, the programme faces many challenges.

The amount dispersed sometimes delays and is not enough to gather for all the learner needs. Head teachers also lack knowledge on financial management (Daily Nation, 2012). Kenya has policies for all the children to school. “... A child means every human being below the age of eighteen years unless under the law applicable to the child, majority is attained earlier” (Article

1: CRC, 1990). Kenya recognizes a child as anyone less than eighteen years of age (Children Act, 2001).

The UN General Assembly proclaims the Universal Declaration of Human Rights (UDHR) as a common standard of achievements for all peoples and all nations, to the end that each individual or nation shall keep the declaration constantly in mind and strive to promote respect for these rights and freedoms and to secure their effective recognition and observance (UDHR, 1948). The Kenya law relating to education and children compliments the basic principles of the UDHR.

According to the Office of the High Commissioner for Human Rights (OHCHR), Kenya is signatory to the following legal instruments relating to the rights of the child; the Convention on the Rights of the Child (CRC), ratified in July 1990 International Covenant on Economic, Social, and Cultural Rights (ICESCR), ratified in 1972 and the International Covenant on Civil and Political Rights (ICCPR), ratified 1972.

The Committee of the CRC report on Kenya (June 2007) acknowledges Kenya is also a signatory to the International Convention on the Elimination of All forms of Racial Discrimination (ICEAD), in 2001; the ILO Convention NO.182 Concerning the Prohibition and Immediate Action for the Elimination of the Worst Forms of Child Labour, in 2001; Optional Protocol on the Involvement of Children in Armed Conflict, 2002 and the Protocol to Prevent, Suppress and Punish Trafficking,

Especially Women and Children, supplementing the United Nations Convention against Transitional organized Crime, in 2005. The common understanding within all the covenants and basic guideline while working with children is the basic principle that “in all actions concerning children, the best interest of the child shall be a primary consideration (CRC, Article 3)”. While all major conventions have sections regarding the rights and obligations to children, the CRC is entirely dedicated to children rights. In most societies, children are considered as the most important members of the family.

The family is considered as the basic/natural fundamental group unit of society and governments are obliged to offer support, protection and assistance (ICESCR, article 10; ICCPR article 23 and 24). Education is the key to preparing the child to an individual life, mental and social development. Per the CRC, children have a right to free and compulsory primary education (article 13) including the mentally or physically disabled (article 23). The CRC is the most ratified covenant with only two countries left to sign it. It covers issues such as the definitions of who is a child, parent’s responsibilities, right to nationality, names, education, health, legal protection and social development to protection against exploitation, and forced military enlistment/ recruitments. It emphasizes on the dissemination of information and cooperation among agencies working with children.

In the region, Kenya was a signatory to the African Charter on the Rights and Welfare of the Child, in July 2000. It established the National Council of Children Services in 2000, the Sexual Offences Act and the Refugee Act in 2006. The Committee on the Convention on the Rights of Children (CRC) commended these actions in its forty-fourth session as major steps towards protection of children’s rights.

To achieve the rights of the children, UN member countries are currently committed (from targets set in 1990) to reducing poverty, promoting education, gender equality, child mortality, maternal health and reduce AIDS and other diseases through the MDG. The second goal of the MDG is to ensure that all boys and girls complete a full course of primary education.

The MDGs are commitments (through global partnership) that reinforce the stipulations in the regional and international conventions. While poor countries have promised to govern better, the rich have promised to support them through aid, debt relief and fair trade. The UN Secretary General believes that the goals are achievable through working together. The Dakar Framework for Action, conceptualized in Senegal in 2000, sets regional goals for countries including EFA by 2005 and UPE by 2015.

Through regional dialogue, countries having similar problems are able to come up with solutions and strategies in their own context to enhance their commitment to preserving children's rights and promoting their development. The Education Act Cap 211 of 1968 (Revised in 1970/1980) is the main legal document in Kenya governing education. It covers administration issues, management and curriculum development. The Teachers Service Commission (TSC) Act Cap 212 of 1967 not only covers remuneration and other admin issues but stresses on professional conduct. This act protects children from all forms of exploitation including sexual harassment. The KNEC Act Cap 225a of 1980 stipulates the conduct during public examinations, certification of schools and offers instructions on how to file complains.

Related to review examinations adjudications among other students' rights after attaining independence in 1963, the prioritization of the education policies in Kenya was driven by the manpower needs of the nation. The government identified ignorance and illiteracy as major problems and education was meant to tackle this area. This meant access to primary education.

Individuals who had completed secondary education secured many government positions and were considered to be among the Kenyan elite (Oketch & Rollestone, 2007). The immediate emphasis on developing secondary and tertiary level institutions to meet the manpower needs led to the need for more primary schools. Access to primary schools was limited by the colonial government and completion further hampered by the policies and compulsory national examinations as early as grade four. To gain legitimacy and as a political move to reassure the people of its authority, primary education was open to all by the new government and the grade four examinations abolished. Since then, policies have been pursued to facilitate rapid access for those who had been excluded. Independence was the first catalyst which triggered a commitment towards UPE in Kenya (Oketch & Rollestone, 2007 p. 14).

The overall goal of FPE is to build the human capital capacity through investing in children at an early age. Basic skills not only help individuals but also have an impact on the income, growth potential, population and public sector performance. In Nigeria in the 1970s, FPE was driven by the need to produce skilled manpower (Kelly, 1983). The government realizes that education and training will contribute to national development.

Economic difficulties have denied many Kenyan children education. The poor economic performance in Kenya has led to rising poverty levels which impact negatively on education performance indicators. By offering FPE the government is making a link between education and economic development. Everyone has a right to education. Education shall be free, at least in the elementary and fundamental stages. Elementary education shall be compulsory (UDHR, 1948: Article 26)

The MOEST gives guidelines on FPE policies, which are channeled down to the School Management Committees (SMC). MOEST also advises on teachers, parents and students roles. The District Education Officer (DEO) is in charge of education matters in the district and is assisted by the Area Education Officers (AEO) in the various divisions in the district. The Teacher Advisory Committee (TAC) has been set up to play an advisory role to the teachers and

the SMC. Under FPE policy, the teachers' role is curriculum implementation as per the approved syllabus. Teachers also support school management through membership in the SMC. Parents are regarded as stakeholders in the new policy. Parents are to assist in school management through PTA meetings and the board membership; they are to assist in providing physical infrastructure, which is not offered by government under FPE. Parents are also called upon to help in counseling and instilling discipline to the pupils. The SMC is responsible for managing funds, settling disputes in the school or making recommendations to the DEO, conducting tendering interviews/approvals for supplies and receiving school supplies.

The MOEST gives guidelines on recommended textbooks under the approved syllabus. The DEO receives monthly enrolment figures from schools, which are then used to determine funding. Under FPE, each school receives Kenya shillings (KSH) 1,020 (USD 15.7 at current exchange) per child enrolled, per school year. The funds are distributed in two deposits per year, usually, six months apart. Under MOEST instructions, the area education offices have helped schools open two accounts.

Account I: Instructional Materials Account. Funds in the account cater for textbooks, pens, exercise books, charts and writing chalk among other supplies.

Account II: General Purpose Account, which caters for the wages for supporting staff, repairs and maintenance, phone bills, electricity bills, garbage collection, postage and general expenses.

Account I receives 650 KSH per pupil enrolled (63.7%) and

Account II receives 370 KSH (36.3%) per pupil. The SMC are responsible with the management of FPE funds. SMC is composed of:

- Head Teacher- Chair person
- Deputy Head Teacher – Secretary
- The Chairperson of the PTA
- Two parents (non-members of PTA) elected by parents
- One teacher to represent each school grade class.

The drive to achieve UPE is a positive indicator of the nation's commitment to human rights in conformity with the adopted conventions. The current education curriculum in Kenya has been formulated to enhance national unity, social, economic and cultural aspirations of Kenyans (MOEST, 2005). Parents and citizens have in the past blamed the government for lack of control on the education system, which was getting very expensive, with schools charging fees as they pleased.

FPE is aimed at easing the burden from the parents by abolishing school levies and ensuring equity and accessibility to schools. Through FPE, government has strategically placed itself as an important stakeholder in the education sector and hope that this will create a better relation between government representatives, SMC and parents. While launching the Kenya FPE policy (January, 2003), the Minister of Education stated that: Both the government and the parents have financial obligations to meet. The government is charged with mobilization of resources, recruitment of teachers and training, paying tuition fees, development of the school curriculum and provision of the infrastructure and instructional materials. Parents on the other hand provide basic needs for the children, school uniforms and other scholastic materials FPE was introduced in recognition of its importance as a basic right of all Kenyan children as

articulated in the Children's Act (2001). Through FPE, Kenya aims to attain UPE by the year 2015. One of the greatest challenges of the government will be to help the parents and communities understand the FPE policies and what it entails. The perceptions of the FPE have differed in many communities.

The policy having been initiated as a campaign pledge meant that it was not well introduced to Kenyans. FPE is interpreted by many people to mean; total exemption or a free pass to all education expenses (Nyamute, 2006). The right to education is one of the basic human rights stipulated in the Universal Declaration of Human Rights, 1948. In Kenya, this right has recently been lived through the launch of the Free Primary Education program (hence FPE) by the newly elected NARC government. The FPE program is faced with major challenges that range from lack of facilities, few teachers, over-age children, street children, no books, lack of finances and socio-cultural impediments such as HIV-AIDs. The FPE has been received with mixed feelings from different sections of the society. While some have expressed feelings of discontentment, failure, betrayal among others, many low income members of the population view it as a God sent opportunity. While a lot of concern has been raised, little has been advanced concerning the propagation of the actual learning itself.

Availability of Resources and Instructional Materials and Performance in KCPE

The ministry of education receives meager amount that is not enough to buy enough textbooks, teacher guides, dusters, pieces of chalks etc. Therefore the number of textbooks per student still stands high at 4:1, compared to international standards of 2 to 1. Most of the materials bought tend to get lost within a short period hence making the learners not to use it. The teachers are also few with on average 50:1 compared with the international standards of 40:1 (Chunk, 2009). Apart from finding the money to pay for extra teachers, the government also has to persuade them to take posts in "less desirable" areas. There has been a lot of resistance from teachers and head teachers to change. Moreover, many poor schools are understaffed because teachers are reluctant to go to areas where parents cannot afford to pay for private tuition after normal school hours.

In the affluent areas, the same teachers could expect to earn an extra kshs.10,000 (US \$130) per month on top of their salary of kshs.10,000. Teachers often refuse to work in slum areas, citing security concerns. One school in the Mukuru slum area of Nairobi has just been assigned three new teachers since the introduction of free education, two of whom have refused to accept the post. Poor areas have been used as dumping grounds for 'bad' teachers - it was seen as a demotion. Poor schools were inclined to get less good staff. While 232,000 teachers in Kenya are currently employed, many more need to be recruited to ease the burden. The government is currently gathering statistics on how many trained teachers are unemployed and how many are needed nationwide. Then it has to entice them to move to unfavorable areas. The government has to think of incentives for teachers in order to spread them out evenly.

As Kenya's economy has crumbled over the last few years, many families, forced to live on incomes of about kshs. 3,000 per month, simply cannot manage the costs. In Nairobi this resulted in 48 percent of children between the ages of 6 and 13 years not attending school. Only 47 percent of those who were attending completed their primary education, while the remaining 53 percent dropped out. Since the mid-1980s there was no regulation of private schools. The situation got out of hand. Teachers were even refusing to teach children during normal school

hours, whose parents could not pay for private tuition after school. Over-age and Street Children The tens of thousands of "over-age" children - including street children, or those who dropped out of school to work and who now wish to return to finish their primary education need to be catered for urgently. While statistics on their numbers are not yet available, preliminary figures show them to be enormous. In the Mukuru slum area of Nairobi, only about 500 of the 5,000 new pupils who enrolled in schools since the beginning of the year were of "normal" school-going age. It becomes tricky to handle them and so they had to be segregated from the younger children. Street children, who number about 250,000 in Kenya, also pose a problem. Placing children with patchy educational backgrounds, short attention spans, dysfunctional backgrounds and glue-sniffing addictions, in a classroom of 50 or 60 "normal" children, will arguably lower standards for everyone. They need smaller classes, interesting and interactive programs, and teachers who can cope with them. On top of this, many have serious linguistic difficulties as they speak "sheng" - a blend of local languages, Kiswahili, and English.

Meanwhile, many other marginalized children are not even making it near a classroom. Some do not even get past the school gate as they are chased away by the guards. While some schools are genuinely full, others simply do not want to accept children who do not have the correct uniform, look untidy, or have the 'wrong' background. Lack of facilities is a further headache. While some rural areas have adequate school buildings, there are many others, particularly in urban areas with large slum populations, with none at all. Many rural schools also lack even the most basic amenities such as toilets and running water.

Status of Infrastructure and Performance in KCPE

Chunk (2009) said that enrolment under FPE has overloaded school facilities. When the programme was started student population increased but the number of classrooms has not increased corresponding to the increased in students. Classrooms that were built for 30 students to sit comfortably are now packed with three times the number of students. The shortage of desks forces two or sometimes three students to squeeze onto a small bench.

The learning environment has become uncomfortable, encouraging students to become distracted. In some cases, the number of classrooms is not enough, so classes need to be held on the field while teachers conduct them with megaphones. Offices and other schoolrooms have been converted to classrooms for the children. Facilities have been much more difficult to maintain and have led to deterioration. The status of the classrooms is poorly structured with the government proposing to build a model primary school in every district. The paintings are peeling off and buildings are too old with majority not having windows. The above make the learners have very difficult time during rainy season and can't do morning preps well. A survey at the buildings of most schools revealed that they were built along time ago using donations from haram bees or church sponsorship. The government does not provide for the buildings because it will be too costly to the tax payer. As such the government gathers for the payment of the teachers' salaries. The number of the learners per classroom is supposed to be 40; however we have classes of even 100 learners. The overcrowding in class make most learners not to concentrate hence the scores on charts in KCPE is wanting.

Further, the government issued notice for all children to go back to school. This means that admission is not restricted. The unrestricted admission means that every child can enroll; hence the classes swell which eventually affect performance in KCPE

Appropriate Remedies Under FPE

FPE has increased enrolment, but many students' learning remains inadequate. A recent nationwide survey comprising over a 100,000 students aged between 3 and 16 in over 2,000 schools, found that only 33% of children in class 2 can read a paragraph at their level. The survey further found that a third cannot read a word and 25% of class 5 students cannot read a class 2 paragraph (Uwezo, 2010).

These poor performance and learning indicators may be driven by the following: *Increased pressure on available inputs*—With the advent of FPE, enrolment increased in the classes in the lower grades were often are very large, and the children arrived with wide-ranging levels of preparedness. These large and heterogeneous classes can challenge pedagogy. For example, at the beginning of 2005, the average first-grade class in some areas in Western Province was 83 students, and in 28 percent of the classes it was more than 100.

Reduced learning, as indicated lower test scores—Large and heterogeneous classes, possibly driven by the influx of poorly prepared first-generation learners, has led to a slight decline in test scores (Lucas & Mbiti, 2010).

The low levels of reading proficiency found in the Uwezo survey suggest that learning has been compromised in primary schools.

Increased stratification—Students from richer households increasingly enroll in private school. This stratification becomes all the more important given the continued (perceived) dominance of private schools in the KCPE. Data from the KNEC shows that between 2003 and 2007, private schools have consistently outperformed public schools in the KCPE by about 50 points on average. This has raised concerns about the rising disparity in quality and achievement between private and public schools.

Potential solutions: *Tailoring Teaching to Meet the Needs of Students*—A study of a program that provided textbooks in Western Province found that, while the average child did not benefit from textbooks, students who were already proficient did benefit. A possible explanation for this, the authors conclude, could be that many students had fallen behind the level of the textbook (and possibly the curriculum). Support for children who have fallen behind, including remedial education, could provide children who have fallen behind the basic skills that they need to learn effectively (Glewwe et al., 2008).

One possibility is to reorganize the classroom to allow teachers to tailor their lessons to pupils' level of preparation. A study in Western Province suggests that this can allow students to benefit from being taught in more homogenous peer groups. Such groups have greater homogeneity which can allow teachers to tailor their teaching to what the students do not know. The study finds that the group of students who were less prepared seemed to gain the most in the easier competencies and to gain the least in the hardest competencies (Duflo et al., 2009). Other possibilities include changing the teaching methods. More research is needed however to determine the most effective teaching methods given the large and heterogeneous classes that are common in most developing countries. Another possibility is increasing the flexibility in the way classes are structured. Given the heterogeneous achievement level in the classes, should the grade structures be more flexible so that some children can take different subjects with different peer groups, taking math with one group and reading with another? Some school systems group students into different classrooms for certain subjects depending on their achievement in that subject. Research by Duflo et al. (2009) suggests that these approaches can boost performance,

although more research is needed to examine the effectiveness of subject specific grouping as described above.

Reforming the Teaching Workforce—The largest share of the national education budget already goes to teacher compensation. There is scope for reforming the teacher workforce to increase learning. Possibilities include: *Teacher Unemployment*—The shortage of teachers that leads to overcrowding is not because there are not enough teachers but that there is not enough money to employ teachers graduating from the national system of teacher-training colleges. A possible way to circumvent this is to hire teachers in two steps. Teachers graduating from the teaching colleges get a probationary contract, possibly locally managed, contract.

These teachers would be paid less than the civil service teachers. This would put more teachers into schools at a lower cost. These teachers are likely to work hard as these contracts are probationary and will only lead to a TSC contract, if they perform well. See Duflo et al. (2009). Evidence suggests that such a program would be even more effective if these probationary short-term teachers were managed by local school committees. However, this necessitates sufficient training for members of the school committee and community.

Teacher Incentives—On paper the teachers already have all the incentives they need. A great number of teachers are indeed professional. They come to work and they teach when they are at work and they are dedicated to the success of their students, even if they sometimes endure very difficult working conditions such as large classrooms. But there is still unacceptably high chronic absence, especially in remote areas. A possible way to address this is to introduce performance/attendance-based pay. A study by Glewwe, Ilias and Kremer (2008) in Western Province found that a program that gave teachers prizes based on student performance increased exam scores while the program was in place. A study by Muralidharan and Sundararaman(2009) found that linking student test performance to teacher pay significantly improves learning outcomes for students in government schools in Andhra Pradesh, India. Other studies in Israel by (2002, 2009) have also shown that student performance-based pay can increase test scores. A study by Duflo, Hanna and Ryan (2010) shows that linking teacher pay to attendance increased both attendance and test scores.

But there are some potential issues. In linking teacher salaries to student test scores, one worry is that teachers may focus on activities which improve exam scores but may not improve learning in the long run or the underlying competencies targeted by the curriculum. Another worry, given the varying level of preparedness among students, is that the pay-for-performance scheme may penalize teachers whose pupils are less prepared at the start. For example, pupils from poorer socioeconomic backgrounds tend to be less prepared than richer students, perhaps because their parents are not educated or because they did not go to preschool or benefit from other early education programs. Teachers assigned to schools with proportionally more of these students, for example teachers in rural areas, may be penalized compared to their counterparts in schools with more advantaged children. For attendance-based pay, the worry is the cost of measuring attendance, which requires adequate monitoring.

Some headmasters may feel pressure from teachers that makes monitoring teachers difficult. . The difficulty of monitoring teachers was the reason that the program linking pay to attendance in India that was studied by Duflo, Hanna, and Ryan (2010) used cameras to record teacher presence. Another approach would be incentivizing headmasters.

Engaging parents—Recent work in France examined a program that encouraged parents to participate more in their child's school and found very positive results (Avvisati et al., 2010).

The program emphasized the importance of parents' involvement in their children's education. It also provided parents with better information on the school system, including information on the roles and responsibilities of various personnel and school offices. While the results were very encouraging, this approach has not been tested in a context where the average education of parents is lower.

Merit Scholarships—Incentives for students such as cash prizes and bursaries can be effective at increasing performance. Research has shown that merit scholarships can induce more effort from students trying to earn the award. A merit scholarship program for girls in Western Kenya provided Standard 6 girls who scored in the top 15 percent in their district exam a two-year scholarship that covered school fees and school supplies for the remaining two years of primary school. The scholarship program resulted in increases in test scores, not just among the top students who had hope for the scholarship, but even the lower students and the boys. A possible explanation is that the students demanded more time from the teachers and the teachers increased time for all students (Kremer, Miguel & Thornton, 2008).

METHODOLOGY

Research Design

The study adopted an exploratory approach using descriptive survey design to investigate the influence of free primary education on performance in the Kenya certificate of primary education (KCPE). Nandi County comprises of five districts namely, Nandi central, Nandi East, Tinderet, Nandi North and Nandi South. Descriptive survey designs are used in preliminary and exploration studies to allow researcher to gather information, summarizes, present and interpret for the purpose of clarification (Orodho, 2002)

Target Population

Nandi County (Chemundu Zone) has about 20 primary schools. Purposive sampling technique was used to pick 30% of the teachers and learners. This is because some schools are doing well; others were average while some are doing poorly. Those targeted were informed and their permission sought prior to the collection of data. Once were selected, their head teachers were given formal letters.

Sample and Sampling Procedure

All the schools in the zone were picked for the study since the schools were few in the zone. 30% of the teachers and pupils in every school were picked for the study. The schools that participated were informed through formal letter. Their identities were kept confidential. Teachers from upper, middle and lower classes filled the questionnaires. The above criteria were equally applied to learners.

Data Collection Instruments

The researcher collected data using questionnaires, interviews schedules and documentary analysis. Both open and closed ended questionnaires were prepared. Then respondents filled answers in written forms. The interview and observation schedule was filled by the researcher; the instruments were distributed by the researcher and research assistants. The instruments were administered and collected within a period of one week.

Validity and Reliability

Data will be made reliable by ensuring that the degree to which indicators or measures of theoretical concept are stable or consistent across two or more attempts to measure the theoretical concept, particular measuring procedure gives similar results over a number of repeated trials. Thus test- retest will be carried out with reliability co-efficient of 80% taken. Lecturers within the proximity of the researcher and other valuable persons were asked to carry out audit of the document and make recommendations for improvement. Later the content validity was ascertained by consulting supervisor.

Piloting

The researcher carried out the testing of the research instrument in Kericho County. This is because it would not make the respondents to change their responds because of knowing what is needed. A co- efficient of 80% was accepted as reliable.

Data Analysis

An analysis of data was being done using statistical packages for social science (SPSS).Data was analyzed through coding, tabulation and then drawing statistical inference. Large amount of field data was eventually condensed into few managed groups and tables for analysis. Both descriptive and inferential statistics were used. Under descriptive analysis measures of central tendencies such as mean, mode and median was calculated. The researcher grouped data from closed ended questionnaire items, open ended interviews schedules and document analysis under broad themes and convert them into frequency counts. All data were analyzed at level of significance of 95% < or 0.05

Ethical Issues

The researcher got authority from the MOE concern to conduct the research thereafter all those who participated were informed and they were requested to participate at their own convenient time. The identities of participant we're not disclosed. All information given by respondent was kept confidential.

RESULTS

Preliminary: Presentation of the findings based on gender, schools which was studied and teacher participants

There were about 336 pupils who sat KCPE in 2011. Male were 170 and female 166.

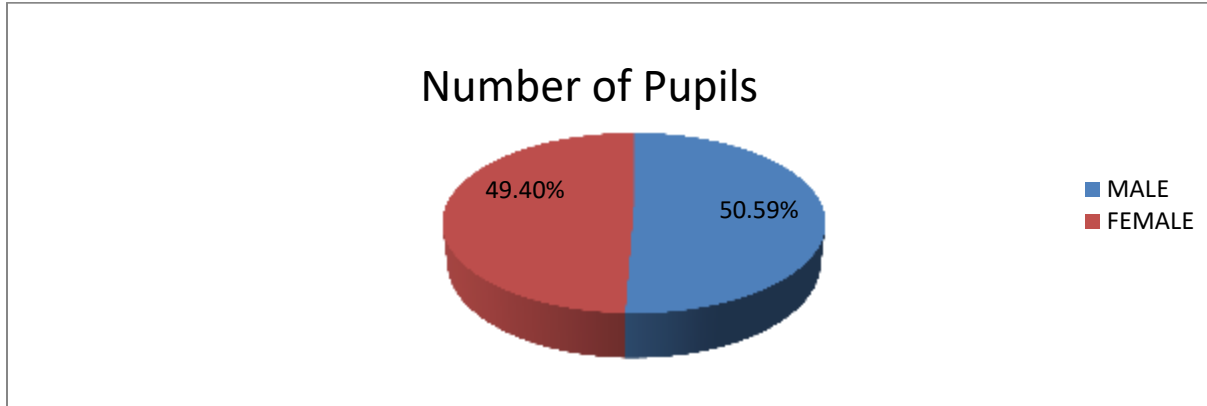


Figure1: Pie chart showing the mean mark of the pupils in 2011 in Chemundu zone.

Table 2: Summary of Teachers who participated in the study

Code	Number	Highest Qualification	Teaching Experience	Post
1	29	Pi	Over 5 Years	Teacher
2	13	Ats4	Over 5 Years	Teacher
3	8	Ats3	Over 5 Years	Head teachers
4	5	Ats2	Over 5 Years	Head teachers

Table 3: The Schools under Study

Code	Name of the Primary School	Mean Mark in KCPE 2011
1	Samoo	252
2.	Kapkechui	248
3.	Berur Academy	334
4.	Baraton	250
5.	Tilalwo	242
6.	Mogoon	235
7.	Kapkobis	241
8.	Baraton Academy	322
9.	Sumbeiywo Academy	325
10.	Baraton Aic	280
11.	Kaptiltil	245
12.	Nandi Flame Academy	324
13.	Fr. Boyle	330
14.	Masaba Chepsokor	229
15.	Chepkober	221
16.	Kapyagan	225

Presentation of Result Based on the First Objective

The first objective was to establish the relationship between free primary education and performance in KCPE. The objective was gauged by analyzing the number of teachers and the pupils per primary school and performance in KCPE in the zone. The finding shows that in all the schools, there was a shortfall of about one teacher.

Table 4: A table showing required number of teachers and available number of teachers

Number of teachers require in the zone	128	Percentage (shortfall)
Number of teachers available	112	12.5

It was noted that the above shortfall impacted on the performance as the mean mark was down. The schools that performed better were those who are academies, otherwise, public schools performed extremely poorly as demonstrated by the mean marks on preliminary presentations. This concurs with educationists have been calling for all along. Educationists have said that the monies are too little and should be increased to enable the learners get all they need. The information above was represented using a pie chart.

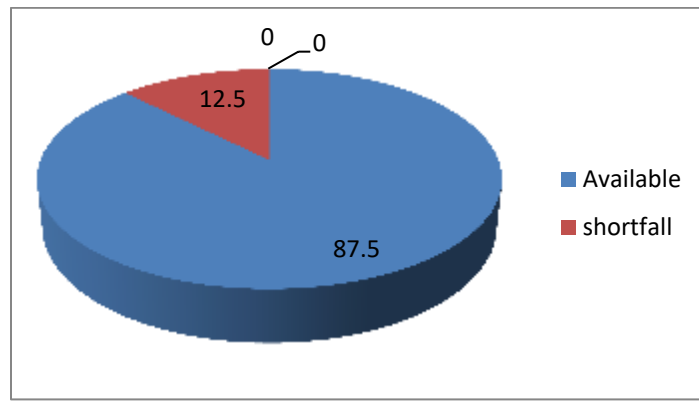


Figure 2: Showing the number of teachers required against number of teachers available

Results of the Second Objective

The second objective sought to find out to what extent the amount disbursed influenced performance. From the findings, it was noted that there has not been any improvement on performance based on the amount disbursed. However, the new books in the school were highlighted as the major achievement. The books are not enough for the learners although they have been purchased. There were new buildings in some schools erected from constituency development funds. The money for free primary education could not be dressed in terms of new infrastructure in the schools. The performance index in KCPE in most public primary schools could be seen to have gone down as witnessed by the scores in 2011 exams. Teachers therefore call upon the government to increase the funding of FPE. About whether the programme was

good, most of them said that it was a good idea except that it needs adequate funding. Head teachers were for the point that the parents should not be completely detached from the schools. They equally need to make contributions tailored towards bettering the performance of the child education in primary schools.

Analysis of Instructional Materials and Status of Infrastructure

The third and fourth objective sought to find out the position of the instructional materials. The objective was ascertained by looking at the classrooms and the number of the learners in each of the classrooms. The findings were as follows:

Table 5: Table showing average number of learners per classroom against recommended number

	N.	%
Average number of the learners per classroom	46	15
Recommended number	40	

Table 5 shows the average number of learners per classroom against the recommended number. The researcher also looked at the infrastructure physically and it was observed that there were on average shortfall of two classrooms per school (table 6).

Table 6: Classrooms Available and Required

	N.	%
Classrooms available per school	10	16.66
Classrooms required per school	12	

The ratio of text books to the pupils was analyzed and it revealed the information presented in table 7

Table 7: A table showing textbooks and the number of pupils

	%	Recommended	Recommended percentage
Textbooks 4	25%	1	50
Pupils 1	75%	2	100

Table 8: Ratio between number of pupils and teachers recommended

Number of pupils	40
Teachers	1

The researcher went further to analyze infrastructural materials like desks; learners' writing materials and textbooks used by teachers. The finding shows that about 3 pupils were sharing desks fit for one learner. The above information was presented as follows

Table 9: A table showing the recommended number of pupils per teacher

Number of desks	Three pupils sharing a desk
Number of exercise books	Enough
Teachers teaching materials (resources)	Available but not adequate
Learners feeding program	Not available
Availability of learner resource centre / resource room.	Not available

Recommendations

The following strategies were suggested by teachers to improve teaching and learning with regards to objective number 4.

Table 10: A table showing suggestion and recommendations made by teachers

	Recommended by teachers
Number of teachers	Should be increased so that teacher , student ratio be 40:1
Textbooks	Ratio should be increased to 2:1
Classrooms	New classrooms be constructed so as to have 40:1
Feeding program	Feeding be started especially for the candidates
Learning resource centres (resource rooms)	Resource rooms be strengthen (libraries) in primary schools.
In service training for teachers	Teachers be given time to review their learning by taking in service courses.
Teaching	Remedial teaching be made compulsory for slow learners
Amount disbursed	The teachers said the amount be increased so as to enable schools to buy tuition infrastructure
Admission	Admission to public primary schools be based on availability of vacancies.
Cost sharing	The teachers recommended cost sharing to enable schools meet some of the requirements
Boarding facilities for upper classes	Class seven and eight should board for teachers to give them remedial teaching

DISCUSSION OF THE FINDINGS

This chapter discusses the findings of the research. The findings were discussed based on the research objectives. The first objective was to establish the relationship between free primary education and performance in K.C.P.E. There were about 336 pupils who sat KCPE in 2011. Male were 170 representing 54.673% while the female were 166 representing 45.326%. The information shows that the number of male candidates in primary schools sitting for Kenya Certificate of Primary Education are more compared to their female counterparts. The above information concurs with what Education Minister Prof. Sam Ongeri said when he was releasing exams results KCPE 2011. He called upon the society of Kenya to still ensure that the girl child is supported so that she may access education. The researcher noted that there were many factors which impede the way for the girl child. The factors range from early child marriage to lack of sanitary towels hence missing school during some days of the month.

In the zone the researcher felt also from observation that the society values education of the boy child at the expense of the girl child. About performance the pupils had an average of 270 representing 54.0%. Male had an average of 274 representing 54.8% while female had an average of 266% representing 53.2%. From the above information, there is still need to improve on the performance of the pupils in the zone. The zone had only two pupils scoring more than 400 marks representing 0.54%. The above findings above findings were used to compare with the instructional materials and resources. The researcher realized that there were 112 teachers in the zone as compared with 128 required. The shortfall represents 12.5%. This means that the teachers need an extra 16 teachers to do its work effectively. This kind of situation equally affects the performance of the teachers as they are carrying an extra load which makes them tired and being unable to give individual attention to the weak slow and average learners. For the learners to do well, the teachers called for an increase in the number of the teachers in the primary schools. Further the above information shows that the teachers available represent 87.5%.

The second objective was to establish the extent to which the amount disbursed influence free primary education performance in KCPE. It was noted from the findings the amount disbursed was too small to make learners make remarkable improvement in terms of performance in KCPE. There were no new buildings constructed from free primary education funds. From the above findings, it shows that the classes are swollen and supersedes the required number. The ration of the pupils to the classroom was observed and it was found that free education have increased the enrollment of the learners. A research carried out by (Chuch, 2009) on disparities in FPE in Kenya concurs with this.

The third and fourth objective was to determine the position of instructional materials, resources and infrastructure. The findings show that there were 46 pupils on average per one teacher, instead of 40. The above represents 15%. About textbooks 4 pupils were sharing a textbook instead of the recommended 2:1. The above represents 20%. FPE has provided textbooks for all core subjects: Kiswahili, English, Math, Science, Social Studies and Religious studies. The policy provision of textbooks is widely regarded as one of the policy's major achievement. The program has aimed at achieving 1:1 textbook ratios with every student, but loss of books has prevented this from happening at certain schools. For schools whose parents would afford to buy textbooks prior to FPE, this program has little effect. Academy schools like Berur, Baraton, Kapkobis could afford the books.

The teachers called upon the Ministry of Education to increase the funding to enable schools have the capacity to increase the number of textbooks per pupils in the schools. The resource teacher also need to be increased to enable the recommended ratio 40:1 be attained. All schools studied reported an increase in learning materials at their schools as a result of FPE (things like maps, charts, posters).

Suggestions and Recommendations

The fifth objective aimed at suggesting appropriate strategies that would improve teaching and learning in primary schools. The following were suggested in order to improve teaching and learning:

- The performance in K.C.P.E can be enhanced if funding for the resources are enhanced in FPE;
- The number of teachers should be increased to the recommended ratio 40:1;
- The instructional materials such as textbooks, number of classrooms, desks, and chairs should be increased;
- Remedial teaching should be offered to weak and slow learners;
- E –learning can be used in order to address teacher shortage;
- Teaching and learning should be learner centered;
- Textbooks should be made affordable to the learners so that many learners may buy;
- The number of lessons taught by a teacher should be reduced to reasonable number to enable teachers not to strain;
- The parents and guardians should be asked to partly pay for tuition of the learners;
- The government should ask for external support in order to support the free primary education.

Other Findings

Theoretical Mechanisms at Work under FPE

Three channels linking FPE to student performance:

1. Increased funding (perhaps)

- Increased government funding;
- Ambiguous net effect on infrastructure and learning resources which will enhance results in KCPE.

2. Changes in the pool of students

- Fees are abolished so more children can access education;
- Of course, these children may be different from existing students in terms of socio-economic background, age, ability, etc.

3. Increased centralization = loss of local accountability

- Community no longer raises funds for the school, thus their governance power is undermined;
- Parents no longer pay for the school, so may lose sense of ownership;
- Authority over hiring and firing, etc. is held by Ministry, with little information on school management.

CONCLUSIONS

Theoretical Mechanisms at Work under FPE

Three channels linking FPE to student performance:

1. Increased funding (perhaps)
 - Increased government funding
 - Improvement in KCPE result.
2. Changes in the pool of students
 - Fees are abolished so more children can access education.
 - Of course, these children may be different from existing students in terms of socio-economic background, age, ability, etc.
3. Increased centralization = loss of local accountability
 - SMCs no longer raise funds for the school, thus their governance power is undermined;
 - Parents no longer pay for the school, so may lose sense of ownership;
 - Authority over hiring and firing, etc. is held by Ministry, with little Information on school management.

Areas for further Research

Further to having researched on the above area, the researcher felt that there is need in future to research in Nandi, Kenya on:

- The effect of infrastructure and free primary education on learning;
- Challenges faced by teachers in free primary education;
- Quality and free primary education;
- Sustaining free primary education.

REFERENCES

- Adelabu, M., & Rose, P. (2004). 'Non-State Provision of Basic Education in Nigeria.
- Albarran, P., & Attanasio, O.P. (2002) 'Do Public Transfers Crowd Out Private Transfers?'. Evidence from a Randomized Experiment in Mexico, Discussion Paper No. 2002/6, United Nations University.
- Ayot, H. O., & Patel, M. M (1992). Instructional methods. Nairobi: ERAP.
- Balyage, Y. (1990). Evaluation of curriculum. Unpublished reading report, Philippine Union College.
- Baurer, A., Brust, F., & Hybbert, J. (2002). Entrepreneurship: A Case Study in African Enterprise Growth. Chazen Web Journal of International Business, Fall, Columbia Business School.
- Brown, G. (2006). Our Final Goal must be to Offer a Global New Deal', The Guardian 11th January: 12.
- Daily Nation July 10th (2008). Exam body concerned over poor results
- Day, K. M., & Devlin, R. A. (2004). Do Government Expenditures Crowd out Corporate Contributions? *Public Finance Review*, 32(4), 404–25.
- East African Standard (2003) 'Free Education Forgets Community Schools', 9 August.
- Edwards, Twiselton, & Ogden. (1997). Pedagogy: the missing ingredient in initial teacher. European associates.

- Lauglo, J. (2004). Basic Education in Areas Targeted for EFA: ASAL Districts and Urban Informal Settlements in Kenya. AFTH1. Washington DC: World Bank.
- Mbiti, D. M (1978). Alternative to traditional systems and process of teachers education. Teacher education for basic education. Report of a conference held in Tanzania, 1978.
- MOEST (2003) National Action Plan for Education for All. Nairobi: Ministry of Education, Science and Technology.
- Mwiria, K., & Wamahiu, S. (1995). *Issues in educational research in Africa*. Nairobi: East African Educational Publishers.
- Namach, S. K. (1990). A study of factors which affect the implementation of 8-4-4 syllabus. Unpublished thesis, Kenyatta University.
- Oxfam, G. B. (2003). Assessment of the Education Status in Kibera in the Light of Free Primary Education (FPE). Policy in October 2003, Mimeo. Nairobi: Oxfam (GB).
- Oxfam International (2005). *Paying the Price: Why Rich Countries Must Invest Now in a War on Poverty*. Oxford: Oxfam International.
- Republic of Kenya. Ministry of Education Science and Technology (2002). *Primary education syllabus 1*. Nairobi: Kenya Institute of education.
- Rose, P. (2002). Is the Non-State Education Sector Serving the needs of the Poor?: Evidence from east and Southern Africa. Paper prepared for DFID seminar in preparation for 2004 World Development Report.
- Save the Children UK (2002). Private Sector Involvement in Education, Submission to “The private sector as service provider and its role in implementing child rights. Office of the High Commissioner for Human Rights, Geneva, 20 September.
- Save the Children UK (2004). Submission to the World Development Report 2004: ‘Making Services Work for Poor People’. London: Save the Children UK.
- Shiundu, J., & Mohammed, A. (2001). Issues in social studies teacher education in Africa. *African symposium: an Online Education Research Journal*, 4(1), 1-12.
- Shulman, L. (1987). Knowledge and teaching: founding of new reform. Harvard Educational Review. Harvard.
- Skinner, B. F. (1954). *The science of learning and the art of teaching*. Harvard: Harvard Educational Press.
- Tan, J. (1970). Teacher training in developing countries. In T. P Gorman (Ed.), Language in Education in East Africa. Nairobi: Oxford University Press.
- Tight, M. (1996). Key Concepts in Adult Education and Training. London: Routledge.
- Tooley, J. (2004). Private Education and Education for all. *Economic Affairs* 24(4), 4–7.
- Tooley, J. (2005). Private Schools for the Poor. *Education Next: A Journal of Opinion and Research*, 4, 22–33.
- Tooley, J., & Dixon, P. (2005) Private Education is Good for the Poor: A Study of Private Schools Serving the Poor in Low-Income Countries. Washington DC: Cato Institute.
- Tyler, R. W. (1949). *Basic Principles of Curriculum and Instruction*. Chicago: The University Of Chicago Press.
- United Nations General Assembly (2001) Resolution A/56/326, 6 September.
- United Nations Development Programme (2003). Human Development Report 2003: Millennium Development Goals—A Compact among Nations to End Human Poverty. New York: United Nations.

- United Nations Development Programme (2005). *Investing in Development: A Practical Plan to Achieve the Millennium Development Goals*. Washington, DC: Grundy & Northedge.
- UNESCO (2000). *Preparation of National Plans of Action, Education for all, Country Guidelines*.
Available at: <http://www.unesdoc.unesco.org/images/0012/001219/121911e.pdf>.
- Walkin, L. (1987). *Instructional Techniques and Practice*. Great Britain: The Bath Press.
- Watkins, K. (2000). *The Oxfam Education Report*. Oxford: Oxfam in Great Britain.
- Watkins, K. (2004). Private Education and “Education for All”—or how not to Construct an Evidence-based Argument. *Economic Affairs*, 24(4), 8–11.
- West, E. G. (1975). Educational Slowdown and Public Intervention in 19th century. *Educational Management Administration & Leadership*, 36(4), 30-45.

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The Media and Corruption in Nigeria

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Abstract

The Media represents a collective channel of communication in the society. In a democratic polity, its role cannot be overemphasized because of its indispensability. With the primary function of education, entertainment and information, it not only keeps the populace abreast of daily events, but serves as a medium through which the social pulse of the people weighed and elicits their contributions. This is extremely important because with the revolution in the communication industry, citizen journalism has emerged within the prism that the media is often referred to as whistle blowers and watchdog. This paper seeks to examine the role of the Media in the fight against Corruption in Nigeria. To carry out this onerous responsibility, our data collection was based on two sources. The Primary sources included interviews and personal discussions, while the Secondary sources involved review of existing literature, Newspapers, Magazines, Official bulletins and Gazettes. It was discovered that no government can objectively sanitize society without a profound involvement of the Media. We, therefore, suggest that as whistleblowers, the fight against corruption in Nigeria cannot be successfully won without the active participation of the Media. This is because of their ability and capacity to unravel those things which are beyond the purview of the people. Most important is their watchdog role which subject public officials to democratic norms.

Keywords: Media, Corruption, Whistleblowers, Watchdog, Democracy, Revolution, Globalization.

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INTRODUCTION

The Media represent an essential and integral part of democratic process in any political community. Their statutory functions of enlightenment, education and entertainment have placed them on a pedestal of alertness and vigilance such that they have become an indispensable part of social governance. As whistle blowers, they inform the populace, set agenda for social discourse and hold public opinion through their editorial comments, public opinion corner and opinion articles.

Through their watch dog oversight, they bring to the public space shoddy deals of government which in most cases violate the basic freedoms of the people. It is through these checks that the principles of good governance are respected. This lays the essence of the libertarian theory of the Media. It proposes that it is the duty of journalists to protect the rights of the citizens against the excesses of government officials, not for the Media to protect the government against public criticism (Oboh, 2014, p. 40). This at variance with the Authoritarian media theory which harps on the absolute protection of the State and its paraphenelia by the media at all time. Indeed, it is the libertarian theory that empowers the media to be on the side of the people, bring government officials to scrutiny for accountability and ensure the efflorescence of a democratic etiquette. This paper derives its inspiration from the above theory.

The salient thing we have to understand about the media is that, it is the windows that enable us to see beyond our immediate surroundings, interpreters that help us make sense of experience, platforms or carries that convey information interactive communication that includes audience feedback, signposts that provide us with instructions (Oboh & Onu, 2008, p. 122).

Through a mosaic of media propaganda and threats, colonialism penetrated pre-colonial African political economy, and integrated it into the global capitalist economy only visible in its subservience. In fact, in 1851, the Nigerian Broadcasting Service, the month piece of the colonial state used the radio to stress the need for the public to participate in the implementation of the government's policies and programmes for development and facelift (Oboh, 2014, p. 28).

Conversely, the media became a veritable tool of anti-colonial struggles in Africa. In Nigeria, right from 1859 when Iwe Irohin was established to the 1960s, an avalanche of newspapers emerged such as the popular West African Pilot in 1937 by Nnamdi Azikiwe, Nigeria Tribune in 1949 by Obafemi Awolowo, Lagos Weekly Record in 1890 by John Pagne Jackson, and the African Messenger in 1914 by Ernest Ikoli. These newspapers were unrelenting in highlighting and condemning the exploitative tendencies and fallacies of colonial rule. Today, with the advent of globalization and its concomitant social media, such platforms such as the internet, YouTube, and GSM information is made easy and almost placed at the doorstep of people. These phenomena have shattered the opacity in governance and subjected everything to microscopic scrutiny. This is not strange because the internet is trumpeted as the newest and best for increased democratic involvement and participation, and emboldens 'citizens journalism or participatory journalism (Tsaaio & Agina, 2011, p. 110).

Looking at the vital role of the Media, to gag it becomes an exercise in social destruction. Therefore, as an instrument to strengthen and reposition society, this paper seeks to examine the extent of Media participation in the fight against corruption in Nigeria.

CONCEPTUALIZING THE MEDIA AND CORRUPTION

It would be apposite to define the two major concepts in this paper for easy comprehension. These are media and corruption. Simply put, the media is the fourth estate of the realm

(Gambo & Edward, 2014, p. 168), that intermediate between the people and the state. It is a collective noun used to refer to various channels of communication such as newspapers, television, and radio. The media represent the social institutions concerned with generating and transmitting standardized messages to large, wide dispersed and heterogeneous audiences, of who are not necessarily known to the source (Oboh & Onu, 2008, p. 61). Primarily, it represents the communicating channels through which news and other forms of information are disseminated to the vast majority of the people. The reference to a vast majority of people in the business of information has given rise to the mass media. The media focuses on the mass of the people because it is the collective communication outlet or tools that are used to strive and deliver information or data. It is either associated with communication media, or the specialized mass media communication business such as print media, and the press, photography, advertising, cinema and broadcasting (Radio and television) and publishing (Wahl-Jorgensen & Hanitzsch, 2009).

From the above, we can deduce that the Media represent many ways through which information about the state, society and environment is presented to the general public. It is these information that builds the peoples literacy and fortify them to challenge arbitrary rulership and demand a humane governance. They can be classified into three broad categories- print (Newspapers, magazines) electronic (radio, cinema, and television) and the social media (internet, You Tube, Facebook and Twitter). The social media which is the latest arrival refers to social instruments of communication which are different from the conventional interaction often among heterogeneous people (Adibe, Odemelam & Chibue, 2014, pp. :299-300). The traditional function of the media to educate, inform and entertain has inexorably made it a trigger of human development. This is because the basic goal of (the media) is to serve society by informing the public, scrutinizing the way power is exercised stimulating democratic debates, and in these ways aiding political, economic social and cultural development (Oboh & Onu, 2008, p. 3).

The importance of the media to political education has led to some legal enactments to safeguard it from capricious censorship. Section 162 of the Republic of Ghana 1992 constitution as amended states that ‘freedom and independence of the media are hereby guaranteed’. Section 162(2) further stated that ‘subject to this constitution and any other law inconsistent with this constitution, there shall be no censorship in Ghana’. In the same vein, section 22 of the 1999 Nigerian constitution as amended stated that ‘the press, television and other agencies of the mass media shall at all times be free to uphold the fundamental objective contained in this chapter and uphold the responsibility and accountability of the government to the people’. Other legal affirmations concerning the necessity for media freedom include the first amendment of United States of America (USA) constitution and the Universal Declaration of Human Rights (UDHR). The first amendment which is part of the 1791 Bill of Rights stated that congress shall make no law respecting an establishment of religion, or prohibiting from exercise thereof, or abiding the freedom of speech, or of the press, or the right of the people peaceably to assemble, and to petition government for redress of grievances (Tom, 2006, p. 5).

Interestingly, article 19 of the UDHR provides for the ‘right to freedom of opinion and expressions, this right includes freedom to hold opinion without interference and to seek, receive and impart information and ideas through any media and regardless of frontiers’. According to article 9 of the African Charter of Human and Peoples’ Right ‘every individual shall have right to receive information, every individual shall have the right to express and disseminate his opinion within the law’. It is against this prism that the Thomas Jefferson 3rd President of USA averred that the basis of our government being the opinion of the people, the very first objective should be to keep that right and where it left to me to decide whether we should have a government without newspaper or newspapers without a government, I

should not hesitate a moment to prefer the latter. But I should mean that every man should receive those papers and be capable of reading them.

CORRUPTION

Corruption has become a global virus threatening the stability of the international political economy. Its unwholesome effect on human development has precipitated organized efforts to curb its expansion. Therefore, it becomes imperative to define it for proper comprehension. Corruption is a dubious act that takes place when people try to get what they do not deserve by using money, tribal connections, religion, family name, threats, harassment and other negative means (ICPC, 2002, p. 28). It is out rightly the conscious perversion of an approved process for the sole purpose of gaining an advantage which in most cases is selfish and personal (Akani, 2001, p. 31). It is hinged on ferocious individualism, operates in an environment saturated with moral laxity, and necessarily operates in the sender-receiver context.

In a society where the pressure for survival is high with a corresponding knack for a consumer consciousness and possessive individualism, corruption will be imminent because a condition of a sender and receiver is established. In other words, corruption is a process that is consummated by two or more people for personal satisfaction. As a process, each part is expected to play its assigned role to achieve the overall goal. Hence, it is often defined as a polygonized process whereby sides are involved and each of these sides must contribute or perform its task affectively in order to make it function effectively (Omojola, 2010:25). As militant materialism and moral miasma engulf the entire society, with a weak institution of governance, fantastic fraud becomes the norm, just as public position, become conquered territory for unbridled self-environment. The epoch of globalization which facilitated the triumph of capitalism, movement of ideas, persons, goals and services beyond national barriers have unwittingly created some values which have emboldened the incidence of corruption. Even countries and regions perceived to be immune from corrupt tendencies have joined the international grid of corruption. It is against this prism that many African scholars believe that graft was part of the imperialist importation in Africa. Babalola averred that:

African society was a perfect typology of transparent and honest human conduct. It was a society thickly shrouded in an ambiance of impeccable values, ethnic and moral rectitude. Corruption was therefore virtually nonexistent in the 'pure', 'original' African Society (Babalola, 2007, p. 5).

As capitalist values and ethics anchored on profit maximization at all cost influenced the whole gamut of colonial administration. By the time of political independence, this un-African ethical orientation had become an essential part of officialdom. They were legitimized through a series of obnoxious enactments and primordial sensibilities. Perhaps, this was why Ekekwe (1956, p. 113) declared that corruption necessarily exist in and is encouraged by every capitalist economy, since in such an economic system the drive and competition for private profit and accumulations are the motor. Since the public sector is the fulcrum that swings in most developing countries, corruption seem to be endemic there. This is because the struggle to participate in sharing the state patrimony is high. The phenomenal rise of corruption defying national boundaries and engulfing the private and public sectors has provoked global condemnation and a plan of action. In the Foreword to the United Nations Convention by Against Corruption through the United Nations Assembly Resolution 58/4 of October 31,2003 Kofi Annan, former United Nations Secretary-General Stated that 'corruption is an insidious plaque that has a wide range of corrosive effect on societies. It

undermines democracy and the rule of law, leads to violation of human rights'. The Preamble of the convention noted that concerned about the seriousness of problems and threats posed by corruption to the stability and security of societies, undermining the institutions of democracy, ethical values and justice and jeopardizing sustainable development and the rule of law.

Article 8 stipulates that 'in order to fight corruption each state party shall promote inter alia, integrity, honesty and responsibility among its public officials, in accordance with the fundamental principles of its legal system'. Article 8 (2) also stated that each state party shall endeavor to apply within its own institutional legal system, codes or standards of conduct for the correct, honourable and proper performance of public institution. In May 2016, the Prime Minister of Britain, David Cameron organized an Anti-corruption summit in London. Nigeria's presence was noticeably encouraging. It demonstrated the country's unstinting determination to reduce corruption which has almost imposed grinding impotence, rising disillusionment and gnawing frustration in the society. According to the London 2016 communiqué: corruption is at the heart so many of the world's problems. It erodes public trust in government, undermines rule of law, and give rise to political and economic grievances that may, in conjunction with other factors, fuel violent extremism. Tackling corruption is vital for sustaining economic stability and growth, maintaining security of societies, protecting human rights, reducing poverty, protecting the environment for future generations and addressing serious and organized crime.

In the next section, we shall examine the role played by the media in the anti-corruption campaigns.

THE MEDIA AND THE FIGHT AGAINST CORRUPTION

Nigerian media is noted for their vibrancy, vitality and fearlessness in combating social injustice. This was prominently demonstrated in the June 12 campaign. They were inveterately opposed to prolonged military absolutism, and consistently clamoured for a democratic order where rule of law and good governance would prevail. Indeed, if we are talking about June 12, 1993 today, we are celebrating the mass media because of the roles they played in the struggles towards actualizing what June 12 stands for (Tella, 2012). With Decree 38 of 1992 which liberalized the media, many channels of communication were opened, these led to a harvest of information, heightened popular curiosity, awareness and excited peoples consciousness on social activities. With more than thirty-five radio stations, televisions, and numerous newspapers both provincial and national, communication and popular participation became easy. One must state here that the media did not go scot-free for their bravado and social activism. Many Newspapers and magazines were arbitrarily shot down through draconian laws, and some journalists were arrested and unjustly detained and some like Dele Giwa Editor-in-chief of Newswatch magazine bombed to death. Such Decrees like the (Proscription and Prohibition from circulation) Decree of No 6 of 1994, Decree No 7 of 1994, Decree No 8 of 1994 which proscribed from circulation, The Concord Newspapers, African Weekly magazine, The Guardian Newspapers, African weekly magazines, and The Punch Newspapers. More menacing and outrageous was the death of Mr. Giwa through a letter bomb marked, 'message from the President' in October 19, 1986. He was alleged to have investigated the circumstances surrounding the 'death' of Gloria Okon, a drug peddler. The death of Giwa described as 'the outspoken crusader whose weekly column had become a must read for thousands (Basorun, 2013, p. 188) outraged many Nigerians. It was alleged that President Ibrahim Babangida had a hand in his death. In what may be regarded as a confirmation of the allegation (Basorun, 2013, p. 238). The military press secretary to President Babangida revealed that his real mission to New York was to work in concert with

‘American citizens’ aimed at neutralizing the stigma which the assassination of Dele Giwa had inflicted on the President, the nature of the package, at that moment indicated that there was no longer a doubt about my belated suspicion over the murder which had become a malignant tumour for our administration.

Apart from the above, it was the media that exposed the corrupt process that exalted Ibrahim Sanusi to the position of Speaker House of Representatives in 1999. Evan Ewerem lost his palatial position of Senate President when the Media revealed that he had a double identity. These revelations ultimately galvanized efforts for the resignation and subsequent trial of Sanusi in court. Ewerem lost the Senate President position. This is interesting because:

The media has a dual role to play. It not only raises public awareness about corruption, its causes, consequences and possible remedies but also investigates and reports incidences of corruption, aiding other oversight bodies. They serve as an impediment to corruption (Res, 2010).

Pursuant to article 8 of the United Nations Convention Against corruption Nigeria promulgated some legislation, which underscored its avowed commitment to fight corruption. These include:

- The Freedom of Information Act of 2011
- The Economic and Financial Crimes Commission (Establishment) Act of 2004 (EFCC)
- The Nigeria Extractive Industry Transparency Initiative (*NEITI Act 2007*)
- The Corrupt Practices and other Related Offences Act of 2000 (ICPC)

Part 11, section 6(b) of the EFCC Act gives the Commission the power of investigating all financial crimes including advance fee fraud, laundering, counterfeiting, illegal charge transfers, futures market fraud, fraudulent encashment of negotiable instruments, computer credit card fraud contract scam etc. Section 6(b) of the ICPC Act is ‘to examine the practices, systems, and procedures of public bodies and where in the opinion of the commission, such practices, systems or procedures aid or facilitate fraud or corruption, to direct and supervise a review of them. Section 6(f) to enlist and foster public support in combating corruption. The primary objective of NEITII is stated in section 2(a-c). Specifically subsection C is ‘to eliminate all forms of corrupt practices in the determination, payments, receipts and posting of revenue accruing to the Federal Government from the extractive industry companies.

These legislations obviously led to the persecution and conviction of those who corruptly enriched themselves. In 2013, the EFCC recorded 117 convictions ranging from one year imprisonment to 91 years, and a refund of huge sum money. This increased to 126 in 2014 (EFCC Records, 2013/2014 conviction). Between December 2014 to February 2015, the ICPC handled a total of 54 cases bordering on corrupt practices (ICPC News, January, 2015). On the other hand, the media exposed the profundity of grinding corruption, propelled by squander mania consciousness that has placed the Nigerian economy on a dizzying financial plane. The aftermath is that as corruption has bound Nigeria to the granite rock of greed and self-aggrandizement with the manacles of financial instability (Okara, 1997, p.2), the country has been reduced to a boiling point. In this era of premeditated graft, human development becomes a mirage. Ake (1996, p. 18) pointed out that a society of beggars, parasites and bandits cannot develop, it cannot know peace or stability, and it cannot be democratic. It can only gravitate endlessly. As Nigeria gravitates endlessly within the cocoon of hopelessness, grand corruption is perpetuated with impunity. Recently, it was revealed that

about 55 Nigerians stole more than N1.34 trillion between 2006 and 2013 (The Nation Newspaper, January 19, 2016).

An investigation panel headed by Air Vice Marshal O.N. Ode (Rtd) which looked at arms procurement between 2007 and 2015, discovered that the former National Security Adviser (NSA) to President Goodluck Jonathan, Col. Sambo Dabuki and others allegedly awarded contracts of more than N3.8 billion and shared about \$2.1 billion to party leaders (The Nation Newspaper, December 2, 2015) Through its investigative reportage, the people became aware of the details of the arms scam. The money shared was meant to buy weapons for the prosecution of the war against Boko Haram (see table 1).

Table 1: Names of those who Received Money from Col. Sambo Dasuki (NSA) from the \$2.1 Billion meant for Arms

S/N	NAME	AMOUNT (Millions)
1.	Olu Falae	N100
2.	Chief Jim Wobodo	N500
3.	Rashidi Ladoja	N100
4.	Olisa Metuh	N100
5.	Dr, Peter Odili	N100
6.	Chief Tony Anenih	N260
7.	Chief Olabode George	N100\$30,000
8.	Ahmadu Ali	N100
9.	Yerima Abdulahi	N100
10.	Tanko Yakassai	N63
11.	Gen. Bello Sarkin yaki	N200
12.	Bello Matawalle	N300
13.	ACACIA Holdings	N600
14.	Bashir Yuguda	N1,950,000
15.	BAM Properties	N300
16.	Dalhatu Investment Ltd	N1.5 billion.

Source: The Nation Newspaper January 11, 2016.

This Day Newspaper of May 23, 2016 also revealed that the Federal High Court had asked the former Minister of Finance Okonjo Iweala to account for the N30 trillion missing in the country's account four years ago. A N3. 1 billion allegedly paid to party leaders was brought to the public domain by the Media (see table 2).

Table 2: How N3.14 Billion was Shared

S/N	NAME	AMOUNT (Millions)
1.	Femi Fani-Kayode	N840
2.	Goodluck Support Group	N320
3.	Achike Udenwa and Viola Onwuliri	N350
4.	Nenadi Usman	N36.9
5.	Okey Ezenwa	N160
6.	Chief Olu Falae	N100

Source. The Nation Newspaper, March 5, 2016.

The 2015 presidential election which received wide publicity from the Media, was mired by unimaginable corruption. The sum of N23.3 billion was paid to the Independent Electoral Commission (INEC) officials so that they would subvert the process in favour President Goodluck Jonathan (The Nation Newspaper, April 19, 2016). As a result of the consistent campaign against corruption, the United States Government agreed to return the sum of \$480 million stolen by Sani Abacha family. Already, the sum of \$226.3 million had been recovered

from Liechtenstein, \$75.5 million euros from Associated Company, £22.5 million from Island of Jersey (The Nation Newspaper, April 18, 2016). Just a few months ago, the public became aware that the sum of N3.2 trillion was unpaid into the National Treasury in 2014. This was the summary of Mr. Samuel Ukura, Auditor- General of the Federation (The Nation Newspaper, March 15, 2016). This is a breach of section 80 of the 1999 constitution as amended. It stated that all revenues or moneys raised or recorded by the Federation not being revenues or other moneys payable under this or any Act of National Assembly into any other public fund of the Federation established for a specific purpose shall be paid into and form consolidated revenue fund of the Federation. By 2014 Bank fraud through electronic channels had risen to N6.2 billion.

According to Business Day February 5, 2016, Automated Teller Machine (ATM) fraud grew from N54.99million in 2013 to N2.68billion in 2014, while that of web related payment fraud rose from N109.29 million in 2013 to N1.031billion in 2014, and Point Of Sale(POS) terminal related fraud rose from N5.85million to N157.61million within the period under review It is pertinent to state that the major source of this stolen wealth is the sale of oil and gas. Naanen (2015:38) noted that from 12 million dollars in 1960, Nigerian's crude oil earnings rose to 94.44 million dollars in 1976. It earned 73.8 million dollars in 2008, took a plunge with the turbulence in world economy 2008-2009. Between 1960 to 2013 Nigeria earned a total of 1.02 trillion dollars. Sadly, this invigorated an inordinate venality, as the ruling class hastily manipulated the labyrinth of the state for primitive accumulation. As more than 60 percent of Nigerians are passing through extreme poverty, between 1960 and 1999, the amount stolen and kept in foreign accounts was between 400 billion to 600 billion dollars. Those stashed away in foreign account rose from 50 billion dollars in 1999 to 170 billion in 2013, (Akani, 2015, p. 45). Recently, it was discovered that the former wife of President Goodluck Jonathan had the sum of \$22.3million dollars in an account opened in the name of her steward, driver and other aids, but she is the sole signature of all the accounts. In the same vein, the Nigerian Television Authority (NTA) and the African Independent Television (AIT) reported that some Judges ranging from the Supreme Court, Court of Appeal and Federal High court were arrested by the Director of State Security (DSS) for having fabulous amount of money from litigants to pervert justice. This amount ranged from more than N900 million to two million dollars. This is the essence of the paradox of plenty. One begins to appreciate the concern of scholars of African studies that African leaders regard the common wealth as a patrimony to be shared among cronies and party loyalists. Taylor (2009:48) asserted that about 80 percent of Nigeria's oil and natural gas revenue accrue to just 1 percent of the country's population, such that Nigeria has the second lowest per capital oil export earnings in the world . Today, Nigerians have been condemning, commenting and suggesting on how their government should be run and how corrupt officials should be treated. The media explosion has opened the public for everybody, and this has placed a check on the overzealous tendencies of public officers. Indeed, if the Media was gagged it would have been easy to cover some of the obnoxious practices of some public officials , and the anti-corruption campaign would have gradually waned without public participation.

CONCLUSION

Our discussion so far has shown that the Media is an indispensable instrument of social reformation and transformation. Their indispensability is hinged on the vital and statutory role of educating, entertaining and informing the people on events that concerns them. Through this process, there is popular awareness and a social awakening to participate in public discourse and protect human rights. It is this daunting responsibility to the vast

majority of people that prompted Omojola (2010;23) to state that the media constitute the golden triangle (government, citizens and the media) of political communication-an equilateral triangulation of the political process whereby each party is a functional partaker, effectively adding value and contributing to development.

More importantly, the Media which represent various communication channels serve as a check on Government excesses and report any shoddy deals to the public. It is through this whistle blowing activity and watchdog role that society is stabilized and democratic governance sustained. Therefore to gag the Media from performing its duty, is to deny the people the benefit of communication, and invariably to guarantee a dead end and demote development. Since they can be used to maintain social equilibrium, facilitate change or seek radical alternatives (Oboh & Onu, 2008, p. 3), it becomes necessary that the Media must be at the vanguard of the anti-corruption in Nigeria.

Since the early 1960s, corruption has been noted as one of bane of the country's development. Disguised in various forms, it is anti-people and greatly inhibits human development. As a phenomenon that is primarily focused on personal satisfaction, it has the capacity to introduce mass poverty amidst of plenty. This is the paradox in the country. One of the aims of those who initiated the first military coup in Nigeria on January 15, 1966 was to curb the tide of profound corruption. They state that

Our enemies are the political profiteers, swindlers, the men in high and how places that seek to keep the country divided permanently so that they can remain in the office as ministers and VIPs of waste, the tribalists, the nepotistic those who make the country big for nothing before international circles, those that corrupted our society and put Nigerian political calendar back by words and deeds (Akani, 2001, p. 41).

Unfortunately, sixteen years into the twenty-first century, the virus of corruption is still growing fat into the marrows of our political economy. This is in spite of the legislations against graft. Today, the prodigious revelation by the media about corruption and corrupt practices has shown clearly that there are two inevitable options facing Nigeria. To confront corruption and all its manifestations, or succumb to the dictates and whims of the virus Nigeria has decided to take the former option. The trial of corrupt public officers and the conferences whose theme centre on anti-corruption attest to the seriousness of the country in confronting this menacing nuisance. Other affirmative measures include the setting up of the National Prosecution Coordination (NPCC) Committee by the Vice President, Prof. Yemi Osibanjo. It is made up of twenty people and headed by the Attorney-General of the Federation and Minister of Justice, Abubakar Malami (AGF) NPCC is to ensure effective investigation and prosecution of high profile criminal cases in Nigeria. The establishment of a special court to try corrupt offences is also considered as one of the options.

Globally, through the country's diplomatic appeal, many western countries have indicated their willingness to return looted money stocked in their countries. The recent Anti-Corruption summit in London, unequivocally asserted that 'we want, to send a clear signal to the corrupt that they will face consequences internationally. We want to make it harder for them to travel and do business in our countries'. This means that globally, there is no safer haven for the corrupt. Most interesting is the pledged support of the Stolen Asset Recovery Initiative (STARI) to assist Nigeria to recover stolen wealth. STARI is to be supported by the International Monetary Fund (IMF) and the United Nations Office on Drugs and Crime (UNODC). Nigeria has also pledged to publish the amount recovered from corrupt officials for accountability. Pursuant to this, This Day newspaper reported that about N78,325,354,631.82 billion, \$185,119,584.61 million, 3,508,355.46 British pounds and

11,250 Euros was recovered between May 29, 2015 and May 25, 2016. Funds waiting to be returned include \$321,316,726.1 million, 6,900,000 million British pounds and 11,826.11 Euros.

In conclusion, therefore, the media as a vital tool of communication has greatly assisted in exposing the endemic corruption in the country. This has generated a lot of interest in public affairs, and consequently placed the activities of those saddled with leadership responsibility on a social check. It has also made people to know that corruption does not have a divine origin, but a reflection of the historical integration of man and his environment in the production and reproduction of goods and services (Akani, 2001, p. 1). As a historical phenomenon it requires consistency, tenacity of purpose and the provision of the basic needs of life to minimize its corrosive effort on the society.

REFERENCES

- Adibe, K. N, et al. (2014). *Social Media, Electioneering and Sustenance of Democracy in Africa*. SWO: Analysis.
- Akani, C. (2001). *Corruption in Nigeria. The Niger Delta Experience*. Enugu: Fourth Dimension Publishers.
- Akani, C. (2015). *Nigeria and its Challenges*. Port Harcourt: Paragraphics
- Ake, C. (1996). *Is Africa Democratizing?* Port Harcourt: Centre for Advanced Social Science
- Anti-Corruption Summit/London 2016 Communiqué 12 May.
- Babalola, A. (2007). *Transparency Today and Tomorrow*. Abuja: ICPC.
- Basorun, D. (2013). *Honour for Sale. An Insider Account of the Murder of Dele Giwa*. Ibadan: Book Craft.
- EFCC (2015). Zero Tolerance. The Magazine of Nigeria's Economic and Financial Crimes Commission, 8(1),
- Ekekwe, E. (1986). *Class and State in Nigeria*. London: Longman
- Gambo, S., & Edward L. N. (2014). *Gender Politics Media and Democratization in Nigeria*. Africa Media and Democracy Journal Integrity Made Easy. A Publication of ICPC.
- Naanen, B. B. B. (2015). *The Prosperity and Poverty of Nations. Using Global Models to Explain and Mitigate Underdevelopment in Nigeria*. Inaugural Lecture Series No 119 University of Port Harcourt, Choba.
- Oboh, G. E. & Onu, F. I. A. (2008). *Mass Media in Nigerian Democracy*. Ibadan: Stirling Horden Publishers.
- Oboh, G. E. (2014). *Mediatisation of Nigerian Elections Issues and Perspective for African Democracy*. Ibadan: Stirling-Horden Publishers.
- Okara, G. (1997). *Nigeria Prometheus Bound*. Port Harcourt: Centre for Advanced Social Science.
- Omojola, O. (2010). *Mass Media Interest and Corruption in Nigeria*. *Communication Review*, 4(2),
- Taylor, I. (2009). *China's New Role in Africa*. London: Lynne Rienner Publisher.
- The 1992 Republic of Ghana Constitution as amended.
- The 1999 Nigerian Constitution as amended.
- Tom, D. F. (2006). *Nigeria Press Law*. Enugu: Cheneglo.
- Tsaaior, E. B., & Agina, A. T. (2011). *Journalism and New Media Technologies in Africa*. Lagos: Centre for Black and African Arts and Civilization.
- Wahl-Jorgensen, K., & Hanitzsch, T. (2009). *The handbook of journalism studies*. London: Routledge

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Developing a Checklist for Assessing the Appropriateness of Education Degree Research Projects in South–Eastern Universities, Nigeria

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Abstract

Due to lack of valid and reliable instruments for assessing the appropriateness of research projects in this era of global education, the researchers developed and validated an instrument for assessing the appropriateness of education degree research projects in Universities in South-East Geo-Political Zone of Nigeria. The study is an instrumentation research design. The population of the study consists of 3586 tutorial staff and the sample comprised of 1000 tutorial staff that were sampled using disproportionate by cluster random sampling technique. The instrument that was used for data collection for this study is a checklist titled “Appropriateness of Education Degree Research Projects’ Checklist (AEDRPC)” with 80 items in 7 components clusters. The instrument was initially face validated by 7 experts in the area of Measurement and Evaluation. Content validity of faculty formats from various universities that offer education degree was used to answer the research question one, research question two was answered using Kendell Coefficient of Concordance (W) Statistics, while research question three was answered using Phi Coefficient (ϕ) Statistics. It was revealed in this study that the 80 items of the instrument AEDRPC, were acceptable and as such seen to be suitable for use in the study. The results of the study also showed that AEDRPC is reliable, and therefore and can be used to measure the appropriateness of education degree research projects in Universities in South-East Geo-Political Zone of Nigeria. Based on the findings, it was recommended among others that evaluators and researchers in universities should adopt this instrument in assessing the appropriateness of research projects in their Universities.

Keywords: Development, Validation, Instrument, Education Degree, Research Projects.

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INTRODUCTION

The roles of educational research in knowledge contribution and societal development cannot be overemphasized. Educational research is a systematic and a set of coordinated activities which is used to expose the issues concerned with teaching and learning, which invariably helps to improve its immediate practice for national development. On another definition of educational research, Amaechi, Amaechi and Emerole (2015), defines it as a systematically controlled investigation of an event, place, individual or object associated with education and its practices with the aim of understanding or verifying knowledge that will help to solve academic and societal problems. Also, the definition implies that every research study has a goal or purpose. This implies that educational research plays a crucial role towards societal development. This could be why the Federal Republic of Nigeria (FRN, 2014) stipulates that tertiary institution research shall be relevant to the nation's development goals. Students in tertiary institutions are to undertake projects and action research, while the institutions disseminate research results to both government and industries for proper utilization. In pursuance of this goal, it has been enshrined in the curriculum for all levels of the tertiary education that undertaking a project work and successful presentation of the research project report would be pre-requisite for graduating in any degree programme of universities.

Project research is seen as a student's Master Piece. It gives the student the opportunity of looking into various problems in his or her area of specialization and following scientific method to systematically proffer solution to the problem (Ifedili & Omiunu, 2012). At the final year of university programme, education students conduct researches and report them in writing. For B.Sc.Ed./B.A.Ed. students the research is called projects, M.Ed. students write theses while the Ph.D.s are called dissertations. In some universities, the masters project is called dissertation while that of Ph.D. is called thesis. It is expected that the researcher follow their faculty format in conducting a research. No matter the university involved, in as much as it is faculty of education, they have similar format for writing their research work.

Educational research writing in faculties of education in universities or colleges of education consists of five chapters, beginning from introduction to the summary. In chapter is titled; 'Introduction', it is where the students lay foundation on which the study will be build highlighting key issues that surround the topic of investigation in line with the objectives that will lead the study through. Chapter two reviews literature that have bearing to the key concepts of the study. In this chapter two, the researcher conceptualizes the key issues of the topic with theoretical foundation and empirical evidence. Chapter three is on the method that allows the researcher to systematically arrive at a solution to the identified problem. The researcher will lay emphasis on the design of the study, instrumentation and how to conduct such study (Amaechi, 2016). In chapter four, the analysis of data collected for the study are done either in tabular or graphical forms. In the same chapter, statistical analyses are used to represent the ideas the researcher intends to expose for easy understanding by answering the research questions and testing the hypotheses. In the chapter five, the researcher summarizes the study and discusses the findings of the study in line with recommendations and other relevant issues.

Amaechi, Amaechi and Emerole (2015), found out that post graduate students perceived that they find it difficult to identify the best method for analysis, best statistics to answer the research questions and suitable statistics to test the research hypotheses. However, Ogomaka (2004) revealed that the extent to which the project reports, thesis or dissertations are appropriately, conventionally and meaningfully written is certainly far below the expectation. Ibe (2008) findings reported that majority of Nigerian students and researchers make their efforts less rewarding and of less consequence because of the way and manner;

research topics are formulated and the designs of such studies chosen and results of data analysis are interpreted. Nwana (2007), advised that data which are not related to the study should not be collected no matter how interesting or how easily available they may be. This spelt out the relevance of instrument for data collection of every research. Isangedighi and Ogomaka (1992), then believed that without data collection instrument, there exists no research. Looking at the issues above, development of appropriate (validated and reliable) instrument that will be researchers in conducting a good and reliable research project is important in this contemporary society. Two major properties are considered essential for developing an instrument, they are; validity and reliability. For an instrument to achieve the objectives to which it was developed, validity of such instrument is crucial. Validity of an instrument refers to the capability of an instrument to measure whatever it is designed to measure (Nwana, 2007). On the other hand, reliability of an instrument refers to the capacity and consistency of a measuring instrument to give the same information each time it is used (Egwim & Amaechi, 2015). This implies that if an instrument persistently and consistently measure what it set out to measure anytime it is used, that instrument can be relied upon (Amaechi, Onah & Nosike, 2016).

Empirically, Balogun and Mustapha (2014), concluded that test items that have high factor loading and satisfy other psychometric properties are important for selection in any instrument development and validation study. Similarly, Onye and Amaechi (2016) found out that their scale had a high reliability index of 0.84. Awofala (2011) found out that their instrument had good reliability with Cronbach alpha coefficient of 0.70. It is therefore expected of any developed instrument to be valid and reliable.

The issue of appropriateness or otherwise of the manner of reporting educational research in some universities is a thing of concern in the academic environment. A glance through some undergraduate and postgraduate banded projects/thesis may suggest that some areas in some chapters may not have been appropriately reported. One could see some topics that are experimental in nature having the design of survey; others misunderstand correlational designs to ex-post facto design, while others shy away from conducting experimental studies due to its tedious procedures. In most cases, researchers always use questionnaire in their research while the appropriate instrument could not have been questionnaire. They have bastardized the use of questionnaire because it is easy to use. A close look at some research works in university libraries could reveal that most research projects do not have evidence of instrument validation; even some have errors in their statistical analyses while others may have had a poor discussion of their findings. If these practices are allowed to persist, the aim of research writing in the universities may be defeated. It is on this foundation that the researchers deemed it fit to develop a checklist for assessing the appropriateness of education degree research projects in Universities in South-East Geo-Political Zone of Nigeria. This study posed as a question: what is the content validity and consistency of the developed items of “Appropriateness of Education Degree Research Projects Checklist (AEDRPC)” in South East State-owned Universities in Nigeria? The answer to the above question becomes the thrust of this study.

The central purpose of this study is to develop an instrument (checklist) for assessing the appropriateness of education degree research projects in Universities in South-East Geo-Political Zone of Nigeria. Specifically, the study sought to:

- Ascertain the content validity of AEDRPC,
- Examine the reliability of AEDRPC using Kendell Coefficient of Concordance (W), and
- Determine the reliability of AEDRPC using Phi Coefficient (0).

Research Questions

The following research questions were posed to guide the study:

- What is the content validity of AEDRPC?
- What is the reliability of AEDRPC using Kendell Coefficient of Concordance (W)?
- What is the reliability of AEDRPC using Phi Coefficient (0)?

METHOD

The design of this study is instrumentation research design. The population of the study consists of 3586 tutorial staff from 5 State-owned universities where 1000 tutorial staff that was sampled using disproportionate by cluster random sampling technique. The instrument that was used for data collection for this study is a checklist titled “Appropriateness of Education Degree Research Projects’ Checklist (AEDRPC)” with 80 items with seven component clusters. The instrument was face validated by 7 experts/specialists in the area of measurement and evaluation. The checklist is formed with two options of appropriate and inappropriate. Content validity of faculty formats from various universities that offer education degree was used to answer the research question one, research question two was answered using Kendell Coefficient of Concordance (W) Statistics, while research question three was answered using Phi Coefficient (0) Statistics.

RESULTS

Research Question One: What is the content validity of AEDRPC?

Table 1: Result of content validity of AEDRPC

S/N	Item Statement	Decision
	Preliminary Pages	Relevant
1	Has cover page different from title page	√
2	Title page is written in a sequential manner	√
3	Title page contained the appropriate information required by the faculty	√
4	Well written certification page	√
5	Dedicated the project to a living person and not to the dead or God	√
6	Used third person pronoun in writing acknowledgements	√
7	Acknowledged the personalities of interest that contributed to the project	√
8	Has a well written abstract	√
9	Contained a well arranged table of content	√
10	Has list of tables and figures	√
	Chapter One	
11	Issues are discussed in the background appropriate to the topic	√
12	Covered the variables of the topic in the background	√
13	Has non-ambiguity of statement	√
14	Has non double barreled statements	√
15	Research questions do not lead to a yes or no answer	√
16	Statement that can be measured are used	√
17	Aligned to the purpose of the study	√
18	Hypotheses are testable	√
19	The testing power of the hypotheses is clear	√
20	Research questions are suitable for the topic	√
	Chapter Two	
21	Introduced the chapter very well	√
22	Outlined the major areas of the chapter	√

23	Discussed the issues raised in the purpose of the study to be also in the conceptual framework	√
24	Reviewed the relevant variables of the topic	√
25	Used appropriate theory/model to explain the topic	√
26	Related the theory to the topic	√
27	Reviewed relevant empirical studies	√
28	Related the empirical studies to the present topic	√
29	Established gap to be filled in the study	√
30	Critiqued others view in line with the present topic	√
31	Adhered to APA format in citation	√
	Chapter Three	
32	The design is appropriate to the topic	√
33	The research explained the need to use such design	√
34	The design explained the procedure of for data collection	√
35	The design explained the use of its statistical technique	√
36	Instrument is in line with the topic	√
37	Items in the instrument are not ambiguous	√
38	Variables of the study is covered by the instrument(s)	√
39	Instrument is aligned with the purpose of the study	√
40	Explained the scoring pattern of the instrument	√
41	Clearly explained the instrument	√
42	Sample size is a fair representation of the population	√
43	Sampling technique is appropriate and well stated	√
44	Reliability of the instrument is well written	√
45	Method of data collection is well explained	√
46	Experts and specialist in the field of Educational Measurement and Evaluation are consulted for validation	√
47	Appropriate method of data analysis was stated	√
48	Required validity is carried out (face, content, criterion-related and construct)	√
	Chapter Four	
49	Collation of data was ensured	√
50	Scoring of responses to items of instruments is ensured appropriately	√
51	Computation of statistics/parameters are in order	√
52	Use of statistics/parameters are clearly stated	√
53	Appropriate statistical formula/formulae are stated and used	√
54	The basic assumptions underlying test of hypotheses/statistical tests were considered	√
55	Established the degree of freedom in testing hypotheses	√
56	Established the tail test for each test statistics	√
57	Units of analyses is considered	√
58	Used appropriate statistical tests	√
59	Non forgery of statistics/data	√
60	Acceptance/rejection of null hypotheses were stated	√
61	Ensured that descriptive statistics are explained well for the research questions	√
62	Deductions are made from the hypotheses	√
63	Inference are made from the findings	√
64	Summary of findings are explained	√
	Chapter Five	
65	If the recommendations are in line with the findings	√
66	If the recommendations are directed to the stakeholders involved	√
67	Discussion of findings is aligned with the variables discussed	√
68	Lacks found in the findings were incorporated to be improved on	√
69	Direct and linked recommendation statements are used	√
70	Discussions were adequately done and contribution to knowledge established	√
71	Findings of previous studies are compared to the present study	√
72	Conclusion was drawn	√
73	Implication for the study was well explained	√
74	Suggestion for further studies was outlined	√
	References and Appendix	
75	Used APA formatting in referencing	√
76	Copy(s) of the instrument is attached at the appendix	√

77	Population table is attached at the appendix	√
78	Sample table is attached at the appendix	√
79	Validation evidence is attached	√
80	Reliability calculation is attached	√

Table 1 shows the content validity of AEDRPC. It was indicated that the all the 80 items developed by the researcher met the content of format used in writing education research projects for degree (undergraduate and postgraduate) students. The conclusion is that the items on the checklist met the required content and can measure what they are set to measure.

Research Question Two: What is the reliability of AEDRPC using Kendell Coefficient of Concordance (W)?

Table 2: Validity coefficient of the items on Economics Mock Examination (EME) as judged by the three experts on its content

n	W	Decision
80	0.92	Very High Reliability

Table 2 shows the reliability of AEDRPC using Kendell Coefficient of Concordance (W). The result of the analysis indicated that the number of items is 80 while the Kendal's coefficient of concordance validity is 0.92. The result indicates that all the objectives and content areas were well covered. Thus, the agreement among the seven judges and the distribution items to the objectives and content areas are enough evidence that the instrument is reliable. The conclusion is that there is a very high agreement/reliable among the judges on the items of AEDRPC.

Research Question Three: What is the reliability of AEDRPC using Phi Coefficient (ϕ)?

Table 3: Phi Coefficient (ϕ) reliability for AEDRPC

n	(ϕ)	Decision
1000	0.72	Highly Reliable

Table 3 shows the Phi Coefficient (ϕ) reliability for AEDRPC. The result of the analysis indicated that n is 1000 while Phi Coefficient (ϕ) reliability co-efficient is 0.72. This helped to establish the consistency of the AEDRPC. The result reveals that the AEDRPC has a high reliability and should be used. The conclusion is that AEDRPC is highly reliable for assessing the appropriateness of education degree research projects in Universities in South-East Geo-Political Zone of Nigeria.

DISCUSSION

The result of the study revealed that the items on the checklist met the required content and can measure what they are set to measure. In line with this finding, Balogun and Mustapha (2014), concluded that test items that have high factor loading and satisfy other psychometric properties are important for selection in any instrument development and validation study. This implies that the items on AEDRPC are good to be used by assessors to assess the

appropriateness of education degree research projects in Universities. This is prove that the items on the checklist adequately measure what it set out to measure.

It was further revealed in this study that there is a very high agreement/reliable among the judges on the items of AEDRPC. This implies that the instrument can consistently measure the set objectives for which it was design to measure. In agreement with the above finding, Onye and Amaechi (2016) found out that their scale had a high reliability index of 0.84. This implies that the checklist can consistently and trustily measure the set objectives.

It was also found in this study that AEDRPC is highly reliable for assessing the appropriateness of education degree research projects in Universities in South-East Geo-Political Zone of Nigeria. This implies that the items on the checklist are internally consistent to measure the traits it ought to measure. Awofala (2011) found out that their instrument had good reliability with Cronbach alpha coefficient of 0.70. The value indicated that there is agreement in the scoring pattern of the items. This implies that researchers and evaluators can use AEDRPC in assessing the appropriateness of education degree research projects in Universities.

CONCLUSION

Based on the findings of this study, it can be concluded that the 80 item checklist titled “Appropriateness of Education Degree Research Projects’ Checklist (AEDRPC)” are valid, suitable and reliable, to measure the appropriateness of education degree research projects in Universities in South-East Geo-Political Zone of Nigeria. Therefore the evaluators and academia should always adopt the instrument to ensure quality in research writing.

Recommendations


Based on the findings of this study, the researchers recommend that:

- Evaluators and researchers in universities should adopt this instrument in assessing the appropriateness of education degree research projects in Universities.
- The university administration can adopt the instrument in assessing the appropriateness of education degree research projects in Universities.
- The instrument should be adopted as a means for maintaining uniformity and effectiveness in the management of university research.

REFERENCES

- Amaechi, C. E. (2016). Evaluation of education post-graduate students’ adherence to instrument validation practices in research writings in Universities in Abia State. A *paper* presented at the 18th annual national conference of the Association of Education Researchers and Evaluators of Nigeria (ASSEREN).
- Amaechi, C. E., Amaechi, N. V., & Emerole, P. M. C. (2015). Postgraduate education students’ rating of difficult areas in research writing in Imo State University, Owerri. *Journal of Educational Media and Technology*, 19(3), 24-35.
- Amaechi, C. E., Onah, F. E., & Nosike, M. C. (2016). Development of a scale for assessing effectiveness of entrepreneurship education administrators in south-east universities, Nigeria. *Paper* presented at the 31st annual congress of Nigerian academy of education.

- Awofala, A. O. (2011). Development and factorial structure of students' evaluation of teaching effectiveness scale in mathematics. *Cypriot Journal of Educational Sciences*, 7(1), 33-44.
- Balogun, K. O., & Mustapha, A. O. (2014). Development validation of psycho-productive test in sheet metalwork for assessing students in Technical Colleges in Bauchi, State, Nigeria. *Journal of Home Economics Research*, 18(1), 21-29.
- Egwim, C. C., & Amaechi, C. E. (2015). Reformed classroom procedures and steps for assessing students' learning outcomes in schools. In S.G.N. Eze, K.A. Achuonye, & G. O. Uzoehina (Eds.), *Teacher Education in Nigeria: Innovations and Reforms*(92-118). Onitsha: Global Academic Group Online Academic Resources.
- Federal Republic of Nigeria (2014). *National policy on education*. Lagos: NERDC.
- Ibe, H. N. (2008). An assessment of B.Ed. projects in A.I.F.C.E. *Nigerian Journal of Educational Research and Evaluation*, 8(1), 85-91
- Ifedili, C., & Omiunu, S. (2012). Supervision of undergraduate final year's project requirement in Nigerian universities-the way out of the wood. *Asian Culture and History*, 4(2), 153-160.
- Isangedighi, A.J., & Ogomaka, P.M.C. (1992). *Educational research methods*. Owerri: Totan Publishers.
- Nwana, O. C. (2007). *Introduction to educational research*. Ibadan: HEBN Publishers.
- Ogomaka, P. M. C. (2004). *Inferential statistics for research in education and social sciences*. Owerri: Peace Systems & Prints.
- Onye, C. O., & Amaechi, C. E. (2016). Development and validation of instrument for assessing human resource management effectiveness in tertiary institutions in Imo State, Nigeria. *A paper presented at the 1ST Annual National Conference of Department of Educational Management, Faculty of Education, Enugu State University of Science And Technology (ESUT)*.

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The Influence of Goal setting, Motivation, Job demand, Parental support, Unemployment and Peer influence on Scrambling for Postgraduate studies among Nigerian Youths

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Abstract

The need to fully engage the youths so as to reduce the rate of crime and insecurity has posed a great challenge to many societies, Nigeria in particular. With the rapid spread of universities in the country, candidates seeking enrolment into postgraduate programmes is also on increase year by year. This study investigates factors that influence candidates scrambling for postgraduate programmes in the University of Ibadan. The study makes use of survey research design to select 300 participants. Seven validated instruments constructed on likert format were used, while two research questions were formulated to find the composite and relative influence of goal setting, motivation, job demands, parental support, unemployment and peer influence on candidates scrambling for postgraduate programmes. The result showed that there was significant composite influence of goal setting, motivation, job demands, parental support, unemployment and peer influence on candidates scrambling for postgraduate programmes (Adj. R square = 0.96 = 96% of the total variance for the criterion measure, and the F-ratio shows ($F_{(6,293)} = 1574.813, P < 0.005$). Also, the result showed that the most potent factor for scrambling for postgraduate studies was unemployment (Beta = .973, $t = 55.253, P < 0.001$); followed by goal setting (Beta = .117, $t = 8.647, P < 0.001$), job demands (Beta = .064, $t = 3.479, P < 0.005$) and peer influence (Beta = .028, $t = 2.381, P < 0.05$) while motivation and parental support made no significant contribution. It was recommended that all undergraduate programmes should accommodate the following trainings: skills acquisition, creativity and innovation, entrepreneurship, agricultural-reengineering and development of individuals innate potentials that will make graduates to be self-employed and less dependent on the government for job. It was concluded that a re-ordering of priorities must be ensured so that education can truly be a means to an end.

Keywords: Scrambling, PG. Programmes, Goal setting, Motivation, Job demand, Parental support, Unemployment, Peer influence.

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INTRODUCTION

It is becoming increasingly difficult to distinguish between postgraduate students and undergraduates. Age and number are some of the factors that once ensured that both categories of students remained distinct. But a cursory look at postgraduate programmes today shows that the situation has indeed changed dramatically as large number of students turn in for postgraduate studies. Large classes are typically associated with undergraduate studies but now, an average postgraduate class in Nigeria is ridiculously overcrowded.

With the number of students increasing radically by the day in postgraduate classes, students who looked forward to closer teacher-to-student interaction in postgraduate programmes would be in for a rude shock. The rising demand for university education by Nigerians should be intended to create more job opportunities and expertise for the workplace but the increasingly competitive global unemployment and information technology-driven environment make the dream a mirage.

One of the major problems facing postgraduate university education in the country is that increasing demands are not matched with expansion in infrastructures to make learning conducive. Students' enrolment into postgraduate programmes seems to have been on increase since the last two decades in spite of increasing joblessness in the employment market. However, thrilling this development may be, it raises some key questions. Is it truly the desire to acquire more knowledge that propels students to pursue postgraduate degrees? Or is it the need to gain better employment? Are employers dissatisfied with the level of knowledge attainable in first degree programmes and are now in search of holders of higher degrees, or is it just a method to make recruitment exercises swifter, more manageable and more entertaining? Or possibly, it is just meant to while away the time and just not to be idle? A number of factors could be responsible for the drastic increase in candidates clamouring for postgraduate programme. This study investigates the following factors: goal setting, motivation, job demand, parental support, unemployment and peer influence scrambling for postgraduate studies.

Goal setting is the process of deciding what one wants to accomplish and devising a plan to achieve desired results. It involves the development of an action plan designed to motivate and guide a person or group toward an achievement. Goal setting is a powerful process for thinking about ideal future, and for motivation to turn vision of this future into reality. The process of setting goals helps choose where to go as they jointly and relatively influence life. By knowing precisely what to achieve, definitely one will know where to concentrate his/her efforts. A goal is a specific idea that one forms consciously, as opposed to motives or desires, which more often occur on a subconscious level. This makes goal-setting an interesting hybrid of the internal/external motivator. It could almost be said that a goal is an extrinsic manifestation of intrinsic motivation. However, students lacking intrinsic academic motivation may be incapable of setting their own goals but if they are helped to set goals, they may be able to establish motivation and boost their achievement. Researchers such as Dabalén, Oni and Adekola (2000), and National University Commission (2004) have revealed that apart from the qualifications that graduates possess, there are other attributes (non-academic skill requirements) which employers of labour emphasize. According to them, these attributes include analytical skills, good communication skills, good personal and social skills, technical and managerial skills among others. Boeteng and Ofori-Sarpong (2002), in relating these attributes to experience, stress that experience requirements are now stated in terms of competencies and skills rather than years. Employers of labour force are not only interested in those having higher education but also

practical skills appropriate for job fulfillment (Abiodun, 2010). Mackinnon (2004) summarizes the influences on the graduate experience as personal, professional and organizational factors. Graduate studies therefore have both an intellectual and a psychological component that need to be acknowledged. Mackinnon (2004) and McAlpine and Norton (2006) therefore argue that graduate students' needs need to be addressed at institutional, departmental and individual levels. The question now is whether these students actually set their goals to pursue postgraduate studies or environmental circumstances impose this on them?

Motivation is another factor responsible for candidates scrambling for postgraduate programmes. Why would a mature person decide to continue schooling? Motivation literally is the desire to do things. Motivation is defined as the process that initiates, guides, and maintains goal-oriented behaviours. It is the crucial element in setting and attaining goals. Motivation can depend on internal or external factors that stimulate desire and energy in people to be continually interested and committed to a certain thing, or to make an effort to attain a goal. Motivation results from the interaction of both conscious and unconscious factors such as the (1) intensity of desire or need, (2) incentive or reward value of the goal, and (3) expectations of the individual and of his or her peers. These factors are the reasons one has for behaving in a certain way. Motivation is the process that initiates, guides, and maintains goal-oriented behaviours. Motivation is what causes us to act, whether it is getting a glass of water to reduce thirst or reading a book to gain knowledge. It involves the biological, emotional, social, and cognitive forces that activate behaviour. In everyday usage, the term motivation is frequently used to describe why a person does something. Different types of motivation are frequently described as being either extrinsic or intrinsic. The most basic distinction between them is that intrinsic motivation, which refers to doing something because it is inherently interesting or enjoyable, and extrinsic motivation, which refers to doing something because it leads to a separable outcome. The desire to pursue higher education is constantly increasing. School leavers recognize that higher educational qualifications result in more job options, lower rates of unemployment, and, in most cases, a higher salary than those with a lower qualification. Not only are school leavers entering colleges and universities, but working and mature adults are also entering or returning to higher education (Safahieh & Singh, 2006). These adults hope to use the higher educational qualification to play a more ambitious role in their organization or society, to fulfill a personal desire to acquire new knowledge and abilities, or respond to a need to develop intellectually. We need to ask therefore whether the current postgraduate students are motivated to go for the programme or find themselves there accidentally.

Job demand refers to the degree to which the working environment contains stimuli that require some efforts to achieve work goals (Jones & Fletcher, 1996; Demerouti, Bakker, Nachreiner & Schaufeli, 2001). Job demand is physical, psychological, social, or organizational aspects of the job, that require sustained physical and/or psychological effort or skills. Job demand is what a particular job requires for progress and productivity. The need to evaluate job demand is prompted by the fact that the nature of work is changing. Environmental, political, and socio-cultural forces have contributed to the restructuring of work over the last half century (Cooper, Dewe & O'Driscoll, 2001). For instance, new technologies and ideas are major reasons for the emergence of new forms of working, and consequently, new form of mental job demands. In some organizations, workers are compelled to have additional qualifications in order to stay in the organization or for promotion. For instance, Ajayi (1990) examined the state of graduate training in economics for Africans, with particular reference to Nigeria and Ghana. The study looked at the conditions affecting the quality and relevance of graduate training, overall numbers

and output of MA and PhD graduates in Nigeria and Ghana, and revealed an implicit demand for graduates for the purposes of economic research, training and management from both the public and the private sectors. Current concern on candidates seeking admission for postgraduate programmes is that: is it their job demand that put them in line to compulsorily get admission for postgraduate programmes or something else? We even need to ask whether they are currently employed or still searching for a job.

Part of the parental commitment to their offspring is to be a source of support to depend upon. In cases of abandonment, young people can wrestle with such issues as anxiety, insecurity, and basic distrust, fear of commitment, low self-esteem, or high need for control. In cases of over-pampering, young people can wrestle with such issues as dependency, lack of confidence, low self-reliance, immaturity, or irresponsibility. Parents strive to cultivate personal characteristics in their offspring that will enable them to function successfully and independently once they leave the parental home. This cultivation must occur throughout the child's life if he or she is to develop the self-confidence and skills required to meet the challenges of adult life. Studies also confirmed that family, peers, and agents have an impact on education choice and affect the persistence of students in the education system (Joseph & Joseph, 2000; Mazzarol & Soutar, 2002), especially in the area of information, recommendation and financial support. Encouragement and support from parents, parents' educational attainment, and student achievement have been described as the strongest predictors of postsecondary aspirations and college enrollment (NPEC, 2007). Meanwhile, before a student who does not have any source of income aside of the one coming from the parents put in for postgraduate programme he/she must have the support of the parents in order to meet the financial implication of the postgraduate programme.

Unemployment which is a major problem Nigerian youths are facing can be defined as what occurs when people are without work and actively seeking for one. It is a condition where qualified citizens of many nations who are supposed to engage in one function or the other and have them paid by the employers are not employed. According to Nigeria's National Youth Development Policy (2001), the youth comprises all young persons between the end of childhood and entry into the world of work. People in this age bracket definitely constitute a sizeable chunk of a nations population on which the burden of nation building falls. Many governments of different countries are treating unemployment without kid gloves, yet the rates keep growing day after day. According to National Bureau Statistics of Nigeria, more than 200,000 graduates graduate from Nigeria tertiary institution yearly. The question is: how many of these graduates secure jobs after their graduation? The growing rate of unemployment in Nigeria is one of the factors that is actually responsible for candidates scrambling for postgraduate programme as they want to be up to date in their different specialty as the world keep changing every day. Had it been that many graduates that were turned out by Nigerian universities are gainfully employed there may be decrease in the number of candidates seeking admission into the University for Postgraduate Programmes.

Peer influence refers to the pressure that a group of colleagues exerts that encourages others to change their attitudes, values, or behaviours to conform to group norms. Children and adults alike are influenced by their peers. Peers become an important influence on behavior during adolescence, and peer pressure has been called a hallmark of adolescent experience (Brown, 2004; Steinberg & Monahan, 2007). Peer pressure is commonly associated with episodes of adolescent risk taking (such as delinquency, drug abuse, sexual behaviours and reckless driving) because these activities commonly occur in the company of peers (Steinberg &

Monahan, 2007). Peer pressure can be positive when youths are pressed by their peers toward positive behaviour, such as volunteering for charity or excelling in academics (Brown, Eicher & Petrie, 1986). The importance of peers declines upon entering adulthood (Allen, Porter, McFarland, Marsh & McElhaney, 2005). Peer influence on behaviour gradually becomes more dominant and have an even stronger influence than that of parents. Peer conformity in young people is most pronounced with respect to style, taste, appearance, ideology, and values (Kevin, 1996). The perspectives of others will affect how they feel about their own families. Research has found that adolescents' peer relationships are related to their educational attainment outcomes, however, to a lesser degree than parents' relationships (Steinberg, Brown, Cider, Kaczmark & Laaro, 1998). Further research has suggested that students who spend a great deal of their time with peers form aspirations and values based on the manner in which peer groups define success (MacLeod, 1995). Many youths seek admission into postgraduate programmes simply because their peers are also doing the same.

The concern of every society about their youths is not only on being morally upright that has been on the decline and consequently detrimental to the development of any society, but also on what they stand to achieve in all their activities. The need to fully engage the youths has posed an alarming challenge to many societies, Nigeria in particular. Many of Nigerian undergraduates struggle for Postgraduate education in order not to be idle. However, it is like postponing evil days because they finish the programme and return to the society with nothing to do again, which now becomes more painful, and could make them to be too desperate because they have advanced in age and should settle down for their own family life. However, when there is nothing to do, many of them could engage in various kinds of antisocial and criminal behaviours. In fact, the current insecurity saga, kidnapping, ritual killings, abduction, gangsterism, terrorism, insurgencies etc in Nigeria could not be divulged from the youths and adolescent idleness in the society.

The purpose of this study therefore, is to observe the predicting factors of goal setting, motivation, job demand, parental support, unemployment and peer influence on candidates clamouring for postgraduate programme in University of Ibadan.

Research Questions

- What is the composite influence of goal setting, motivation, job demands, parental support, unemployment and peer influence on candidates scrambling for postgraduate programmes in Nigeria?
- What are the relative influences of goal setting, motivation, job demands, parental support, unemployment and peer influence on candidates scrambling for postgraduate programmes in Nigeria?

METHODOLOGY

The study adopted a survey research design of the expost-facto type using a self-report questionnaire in collecting data from the participants. While the population includes all postgraduate students in Nigeria, Postgraduate students of the University of Ibadan were purposively selected for the study because it is the University where the rate of struggling for postgraduate admission is high; it is the first National University in Nigeria, where students also pay less; and also consists of candidates cutting across all states, ethnic and religious groups in

Nigeria. The sample consists of 300 students randomly selected at the registration point at the University Postgraduate School, based on consent, interest and convenience.

Instrumentation

Seven instruments constructed on 5-point likert scale, each of them having 10 items, constructed and validated by the author were used for the study. Test-re-test reliability of each of the scale revealed: Goal setting ($r=.86$), Motivation ($r=.77$), Peer influence ($r=.89$), Job demand ($r=.67$), Parental support ($r=.79$), Unemployment ($r=.68$), and Ambition for Postgraduate studies ($r=.73$).

Procedure for Data Collection

The researcher obtained permission from the authority of the Postgraduate School, sought the consent of the prospective participants before administration, and were briefed on the research purpose and assured of confidentiality of their responses to the questionnaires. The retrieved questionnaires were sorted and only the completed ones were used for data analysis.

Data Analysis

Data collected were analysed using the Linear Multiple regression analysis to find the composite and relative influences of the independent variables on scrambling for postgraduate studies.

RESULT

Research Question 1

What is the composite influence of goal setting, motivation, job demand, parental support, unemployment and peer influence on candidates scrambling for postgraduate studies?

Table 1: Summary of regression showing the joint contribution of independent variables to the influence on scrambling for postgraduate studies

R =.980 R Square =.960 Adjusted R square =.960 Std. Error =2.75443						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	71687.309	6	11947.885	1574.813	.000 ^b
	Residual	2966.462	293	7.587		
	Total	74653.771	299			

Table 1 reveals a significant combined contribution of the independent variables (job demand, unemployment, goal setting, motivation, parental support and peer influence) to the influence of scrambling for postgraduate studies. The result yielded a coefficient of multiple regressions $R=0.980$, multiple $R^2 = 0.960$ and Adjusted $R^2 = .960$. This suggests that the six independent variables combined accounted for 96% (Adj. $R^2 = .960$) variation in the influence of scrambling for postgraduate studies. The other variables accounting for the remaining percentage are

beyond the scope of this study. The ANOVA result from the regression analysis shows that there was a significant joint influence of the independent variables on scrambling for postgraduate studies ($F(6,293) = 1574.813, P < 0.005$). This implies that all the variables in the model had contributions to the influence of scrambling for postgraduate studies.

Research Question 2

What are the relative influences of the independent variables (job demand, unemployment, goal setting, motivation, parental support and peer influence) to the prediction of the dependent variable (scrambling for postgraduate studies)?

Table 2: Summary of regression for the relative contributions of the independent variables to the prediction of scrambling for postgraduate studies

Model		Unstandardized Coefficients		Standard Coefficients	T	Sig.
		B	Std. Error	Beta		
1	Constance	24.260	1.011		24.002	.000
	Job Demand	.105	.030	.064	3.479	.001
	Unemployment	1.211	.022	.973	55.253	.000
	Goal Setting	.249	.029	.117	8.647	.000
	Motivation	-.017	.010	-.021	-1.680	.094
	Peer Influence	.042	.018	.028	2.381	.018
	Parental Support	-.024	.020	-.013	-1.156	.248

Table 2 shows that four out of the six predictor variables (job demand, unemployment, goal setting and peer influence) are potent predictors of scrambling for postgraduate studies. The most potent factor was unemployment ($Beta = .973, t = 55.253, P < 0.001$), followed by goal setting ($Beta = .117, t = 8.647, P < 0.001$), job demands ($Beta = .064, t = 3.479, P < 0.005$) and peer influence ($Beta = .028, t = 2.381, P < 0.05$) except motivation and parental support with beta weight of $-.021$ and $-.013$ respectively. This implies that an increase in the influence of unemployment, goal setting, peer influence and job demands will increase the tendency for scrambling for postgraduate programme.

DISCUSSION

The findings in this study indicated that goal setting, motivation, job demand, peer influence, unemployment and parental support jointly influence candidates scrambling for postgraduate programme. The factors jointly accounted for 96% of the variance in the prediction of candidates scrambling for postgraduate programme while the remaining 4% can be attributed to other variables not considered in the present study. This finding corroborates the assertion of Mackinnon (2004), Safahieh and Singh (2006) that those adults hope to use the higher educational qualification to play a more ambitious role in their organization or society, to fulfill a personal desire to acquire new knowledge and abilities, or respond to a need to develop intellectually.

Also, all the factors except motivation and parental influence independently influenced candidates scrambling for postgraduate programme. Unemployment was found to be the highest influence, followed by goal setting in this study. This may not be unconnected with the prevalent poverty and economic hardship in Nigeria. The economy of the country is such that a greater percentage of the population lives below poverty line and the middle class has almost gone into

extinction. The labour market is saturated with unemployed people and the inability on the part of government to generate and sustain power supply has forced many companies and industries to fold up thereby compounding the unemployment problem. This finding corroborates the submission of Phillips and Pugh (2000); Spear (2000); Mavondo & Zaman, (2000); and Safahieh & Singh (2006) who concluded that not only are school leavers entering colleges and universities, but working and mature adults are also entering or returning to higher education based on lack of satisfaction with present condition. In corroborating this study further, Oviawe (2010) found that the Nigerian youths will learn to be happy and fulfilled, as they will be productive and committed as employees or employers of labour rather than looking for the white collar job that is not there again. They will allow their unique abilities to be used for the development of the national and global goals rather than becoming wanderers in major cities of the country or abandoning their country for greener pastures (Oviawe, 2010).

Lin and Cranton (2005) also submitted that the process of graduate study was growing from a scholarship student to becoming a responsible scholar while Lovitts (2005) believed that graduate students are often ill prepared to deal with the challenges graduate studies pose to them, and often face daily series of problems, ranging from poverty, unemployment, conflicts and diseases. However, the study opposed to the findings of Kuppens, Grietens, Onghena and Michiels (2009); and Latendresse et al. (2009) who stressed that parental encouragement was a deciding factor in postgraduate plans.

CONCLUSION

The reasons to pursue a postgraduate programme emanate from several external factors rather than internally planned motives. This study has used some factors to evaluate the source of interest and motivation to obtain postgraduate programme. The motivating factors used cannot be said to be all inclusive but unemployment has proved to be the main reason for the current mad rush for the programme. However, this trend is very dangerous because it is like the affected candidates are postponing evil days. If they fail to secure a job after the programme, they become more desperate and could become criminals overnight. Honestly, the search for university education as an end in itself should be discouraged.

Recommendations

- The current undergraduate curriculum in Nigerian Universities tailoring towards preparing candidates for white collar jobs is moribund, inappropriate, irrelevant, and should be jettisoned and completely overhauled.
- University undergraduate programmes should accommodate skills acquisition trainings, creativity and innovation, entrepreneurship development, agricultural re-engineering, development of innate potentials etc.
- Every course taught at the University should focus on the dimension of self-employment, utilizing creativity and innovation for better exploration of the field.
- The quality of university's academic activities in Nigeria should be improved and standardized to meet the educational requirements by the labour market in Nigeria rather than the proliferation of universities.

- All final year undergraduate students of the universities and youth corps members should be well alerted and tutored to acquire knowledge about the existing small scale artisan jobs that they could decide to employ.
- Young graduates should be taught to re-order their priorities to meet the demand of the current challenges rather than postponing evil days.
- Graduate unemployment can also be reduced by reviewing the present admission policy in Nigerian Universities. Manpower planners should ensure that only the number that is needed by the economy is admitted by the universities.

REFERENCES

- Abiodun, S. O. (2010): *Analysis of mismatch between demand and supply of skills and university graduate unemployment in Nigeria*. Unpublished M.Ed. Dissertation, Lagos State University.
- Ajayi, S. I. (1990). *Graduate training in economics in Nigeria and Ghana*. African Economic Research Consortium, Special Paper 6. Nairobi: Initiatives Publisher.
- Allen, J. P., Porter, M. R., McFarland, F. C., Marsh, P., & McElhaney, K. B. (2005). The two faces of adolescents' success with peers: adolescent popularity, social adaptation, and deviant behavior. *Child Development*, 73(3), 747–760. doi:10.1111/j.1467-8624.2005.00875.x.
- Boeteng, K., & Ofori-Sarpong, E. (2002). *An analytical study of the labour market for tertiary graduates in Ghana*. World Bank / National Council for Tertiary Education/ National Accreditation Board Project, Ghana.
- Brown, E. E., Eicher, S. A., & Petrie, S. (1986). The importance of peer group ("crowd") affiliation in adolescence. *Journal of Adolescence*, 9(1): 73–96. doi:10.1016/S0140-1971(86)80029-X.
- Brown, B. B. (2004), Adolescents' relationships with peers. In R. M. Lerner & L. Steinburg (Eds.), *Handbook of adolescent psychology, 2nd ed*, New York: Wiley, p 363-394.
- Cooper, C., Dewe, P. J., & O'Driscoll, M. P. (2001). *Organizational stress: A review and critique of theory, research and applications*. Thousand Oaks, CA: Sage.
- Dabalén, A., Oni, B., & Adekola, O. A. (2000): *Labour market prospects for university graduates in Nigeria*. The Nigeria University system Innovation Project Study.
- Demerouti, E., Bakker, A. B., Nachreiner, F., & Schaufeli, W. B. (2001). The job demands resources model of burnout. *Journal of Applied Psychology*, 86, 499–512.
- Jones, F., & Fletcher, B. (1996). Job control and health. In M. J. Schabracq, J. A. M. Winnubst, & C. L. Cooper (Eds.), *Handbook of work and health psychology* (pp. 33–50). Chichester, England: Wiley.
- Joseph, M., & B. Joseph (2000). Indonesian students' perceptions of choice criteria in the selection of a tertiary institution: strategic implications. *International Journal of Educational Management*, 14(1), 40-44.
- Kevin, D. (1996). Peer pressure. In: S. Anthony, R. Manstead and M. Hewstone (Eds.), *The blackwell encyclopedia of social psychology*, 1996.
- Kuppens, S., Grietens, H., Onghena, P., & Michiels, D. (2009). Measuring parenting dimensions in middle childhood. *European Journal of Psychological Assessment*, 25(3), 133–140, doi:10.1027/1015-5759.25.3.133.

- Latendresse, S. J., Rose, R. J., Viken, R. J., Pulkkinen, L., Kaprio, J., & Dick, D.M. (2009). Parental socialization and adolescents' alcohol use behaviors: predictive disparities in parents' versus adolescents' perception of the parenting environment. *Journal of Clinical Child and Adolescent Psychology, 38*(2), 232–244. doi:10.1080/15374410802698404.
- Lin, L., & Cranton, P. (2005). From scholarship student to responsible scholar: A transformative process. *Teaching in Higher Education, 10*(4), 447-459.
- Lovitts, B. E. (2005). Being a good course-taker is not enough: a theoretical perspective on the transition to independent research, *Studies in Higher Education, 30*(2), 137-154.
- Mackinnon, J. (2004). Academic supervision: seeking metaphors and models for quality. *Journal of Further and Higher Education, 28*(4), 395-405.
- MacLeod, J. (1995). *Ain't no making it*. Boulder, CO: Westview Press.
- Mavondo, F., & Zaman, M. (2000). Student satisfaction with tertiary institution and recommending it to prospective students. In A. O'Cass (Ed.), ANZMAC2000.Proceedings of the Australia New Zealand Marketing Academy, (pp. 787–792). Gold Coast. Australia: Griffith University.
- Mazzarol, T., & G. Soutar (2002). Push-pull factors influencing international students destination choice. *International Journal of Educational Management, 16*(2), 82-90.
- McAlpine, L.& Norton, J. (2006). Reframing our approach to doctoral programs: an interactive framework for action and research. *Higher Education Research and Development, 25*(1), 3-17.
- National Postsecondary Education Cooperative. (2007). *Deciding on postsecondary education: Final report*. Washington, DC: U.S. Department of Education.
- National University Commission (2004). *Labour market expectations of nigerian graduates*. Report of National Needs Assessment Surveys.
- Oviawe, J. O. (2010). Repositioning Nigerian youths for economic empowerment Through Entrepreneurship Education. *European Journal of Educational Studies, 2*(2), 113-118
- Phillips, E. M., & Pugh, D. S. (2000). *How to get a Ph.D.: A handbook for students and their supervisors*. Buckingham: Open University Press.
- Safahieh, H., & Singh, D. (2006). Information needs of international students at a Malaysian University. In C. Khoo, (Eds.), *Proceedings of the Asia-Pacific Conference on Library and Information Education and Practice 2006 (A-LIEP2006), Singapore, 3-6 April 2006* (pp. 479-485), Singapore: School of Communication and Information, Nanyang Technological University.
- Schalock, R. L., Borthwick-Duffy, S. A., Bradley, V. J., Buntinx, W. H. E., Coulter, D. L., Craig, E. M., et al. (2011). *Intellectual disability: Definition, classification, and systems of supports* (11th ed.). Washington, DC: American Association on Intellectual and Developmental Disabilities.
- Spear, H. J., & Kulbok, P. A. (2001). Adolescent health behaviors and related factors: A review. *Public Health Nursing 18*(2): 82–93. doi:10.1046/j.1525-1446.2001.00082.x.
- Spear, R. H. (2000). *Supervision of Research Students: Responding to Student Expectation*. Canberra: The Australian National University.
- Steinberg, L., Brown, B., Cider, M., Kaczmark, N., & Laaro, C. (1998). *None instructional influences on high school student achievement: The contributions of parents, peers, extracurricular activities, and part-time work*. Madison, Wis.: National Center on Effective Secondary Schools.

Steinberg, L., & Monahan, K. C. (2007). Age differences in resistance to peer influence. *Developmental Psychology*, 43(6), 1531–1543. doi:[10.1037/0012-1649.43.6.1531](https://doi.org/10.1037/0012-1649.43.6.1531).

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Effects of Ethno–Science Instructional Approach on Students’ Achievement and Interest in Upper Basic Science and Technology in Benue State, Nigeria

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Abstract

This study determines effects of ethno-science instructional approach (ESIA) on students’ achievement and interest in Basic Science and Technology in Benue State, Nigeria. A quasi-experimental control group design was adopted. Two validated instruments were administered to a sample of 485 out of 14,925 Upper Basic II students. Research questions were answered using mean and standard deviation, while analysis of covariance was used to test null hypotheses. The findings revealed a significant difference in the mean achievement and interest scores of students taught using ESIA and their counterparts taught using demonstration teaching method (DTM). Based on the findings, the conclusion was that ESIA enhances students’ achievement and interest. Recommendations were made that seminars, conferences and workshops should be organized by government and relevant professional bodies to sensitize science teachers on the proper use of ESIA in teaching of science; curriculum should be restructured to reflect Nigerian culture (indigenous science).

Keywords: Ethno-Science Instructional Model, Achievement, Interest, Upper Basic.

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INTRODUCTION

Basic science and technology as fulcrum for sustainable national development can simply be seen as the bedrock for man's systematic way of acquiring scientific knowledge and skills for understanding and explaining of natural phenomena such as albinism, rainbow, diffusion, eclipse, mirage, surface tension, capillarity, adhesion and cohesion forces among others as well as application of the acquired scientific knowledge and skills to meet the needs of the contemporary societies (Ezeudu, 2011; Ityokaa, 2013). Basic Science and Technology as a subject come in existence as a result of curriculum reform movement in Nigeria to make science education (teaching about science) more functional for sustainable national development.

The curriculum of Basic Science and Technology is a product of the restructuring and integration of four primary and junior secondary school science curricula namely; Basic Science, Basic Technology, Physical and Health Education and Computer Studies/Information Communication Technology (FRN, 2012). Nigerian Educational Research and Development Council (NERDC) (2012) posit that the need for integration of these science curricula became necessary for the following reasons:

The recommendation of the presidential summit on education (2010) to reduce the number of subjects offered in primary and junior secondary schools; feedback from the implementation of the curricula in schools that identified repetition and duplication of concepts as the major cause of curriculum loaded; need to encourage innovative teaching and learning approaches and techniques that promotes creativity and critical thinking in learners; need to promote the holistic view of science at the Basic Education level for better understanding of contemporary and changing world and need to infuse emergent issues that are of national and global concern such as gender sensitivity, globalization and entrepreneurship.

The main objectives of teaching and learning of Basic Science and Technology in Nigeria schools as stipulated by NERDC (2012) is that learners are expected to; develop interest in science and technology; acquire basic knowledge and skills in science and technology; apply scientific and technological knowledge and skills to meet contemporary societal needs; take advantage of the numerous career opportunities provided by science and technology; become prepared for further studies in science and technology; avoid drug abuse and related vices; and to be safety and security conscious.

In order to achieve the objectives of Basic Science Technology, the thematic approach to content organization was adopted by NERDC for the holistic presentation of scientific and technological concepts, knowledge and skills to learners. While selecting the contents by NERDC (2012), major issues shaping contemporary growth and development of the nations and influencing knowledge driven societies were identified and infused into the curriculum content at various levels of Basic Education system, from basic 1-9 with a progression in infusion of concepts as class advances. These include; environmental education; climate change; drug abuse education; food and drugs safety education; disaster risk reduction education; consumer education; safety and security as well as entrepreneurship.

The topics in each theme are spirally sequenced, from simple to complex across 9 years of schooling in order to sustain the interest of students in science and promote meaningful learning and skills development. The content, context and methodology of Basic Science and Technology curriculum places emphasis on guided inquiry, field studies, guided discovery, laboratory techniques and activity-based teaching and learning using locally made sourced materials (FGN, 2013). This means that teaching and learning of Basic Science and Technology is expected to be culturally and environmentally oriented to provide students with adequate foundations, which are capable of solving their problems and of the

contemporary society. Obiekwe (2008) reported that all is not well with science instruction, which Basic Science and Technology is a foundation. The author maintains that teaching of science today lays extreme emphasis on content and the use of conventional methods by the science teachers neglecting the cultural based approach which enhances teaching and learning. The negligence attitude of science teachers from cultural oriented approach of teaching led to poor achievement and lack of students' interest in science (Ugwuanyi, 2015). In line with this, Atran (2007), earlier suggested that the development of culturally relevant activities as part of science curriculum would help the students make sense out of what they learn both in their culture and science classes which will improve their achievement and interest in pure science (Biology, Physics and Chemistry).

Achievement in opinion of Ogundukun and Adeyemo (2010), is the exhibition of knowledge attained or skills developed by students in a subject as determined by test scores of students, assigned by teachers. Achievement according Abakpa (2011) is the measure of accomplishment in a specific field of study. The authors argue that achievement of students is the demonstration of their abilities to attain certain levels of instructional objectives outcome of their classroom instructions and experiences. The achievement of students in Basic Science and Technology cannot be compromised, because it is essential for the productive economic sector of our nation, for the production of labour force that is scientifically and technologically literate to bring about the desired changes for sustainable national development (Adejoh, 2008).

Atadoga and Lakpini (2013) report that the persistent poor achievement of students and their lack of interest in science subjects are attribute to their poor foundation and instructional methods used by the science teachers. Adesoji (2008) agrees that instructional method used by science teachers has a significant influence on achievement and interest of students. That is why NERDC (2012) recommended child-centered and culturally oriented instructional approaches for the teaching and learning of Basic Science and Technology. According to James (2006) the study of cultural values and perception of students on science and technology, the appropriate alternative approaches to science education and technology practice can have a positive effect on students' achievement and interest. One of the approaches for teaching and learning of Basic Science and Technology that relates to the cultural heritage of students environment and their culture is ethno-science. In this study, the researchers investigate the effects of ethno-science instructional model on Upper Basic II (UBII) students' achievement and interest in Basic Science and Technology, as one of the cultural oriented approaches using demonstration teaching method as a control variable to determine its effectiveness.

The ethno-science refers to the materials, ideas, beliefs and technology in a given society or environment, that derived from the past and present cultural practice and traditions of students. These evolved from myth, supernatural, and mystical realities as well as ongoing acculturation in the environment (Ugwuanyi, 2015). Sanga (2004) posits that ethno-science is the knowledge that is of indigenous to particular groups of people, their language, beliefs, technologies and cultures. In other words ethno-science is the study of humans' interaction with the natural environment and the construction of realities that link culture with advance scientific knowledge. Speaking on the rationale of ethno-science Aderson (2009), explains that western science is like a smoke screen, while its force is direct at the resolution of Nigerian most urgent problems, it makes those problems more numerous because it covers up the root of the technical problem. In the rhetoric of harmony it enshrouds the reality of imperialism and in so doing it traps our traditional scientific growth. Anderson further revealed that dominance of the capitalists' technology and constant relegation of our ethno-scientific process deforms most attempts of our society and indigenous science to create in our cultural ways. This means that Basic Science and Technology as a fulcrum for

sustainable national development, if taught using ethno-science instructional approach will improve students creativity, critical thinking, achievement and interest in science for sustainable national development.

Demonstration teaching method deals with demonstrating and doing for the students to watch, observe and learn. Cyril (2013) asserts that demonstration involves arranging materials, tools and equipment by the teacher to show students how an operation is performed or a practical is being carried out. The method is effective in introducing lesson and new skills to students; however it has numbers of limitations when there is a need for making lesson activity-based that students should actively participate in the teaching-learning process. This necessitated the researchers to determine the effectiveness of ethno-science instructional model on UBII students' achievement and interest in Basic Science and technology.

Interest can be defined as persistent tendency to pay attention and enjoy some activities or contents (Nworgu 2006). Interest in Basic Science and Technology refers to students' reactions, feeling and impression about Basic Science and Technology contents and concepts as well as related tasks. Abakpa (2011) asserted that interest is an energized power of learning, without which meaningful learning cannot take place. Achinugu in Ugwuanyi (2015) pointed out that the type of interest a student brings into the classroom is a very important factor for his/her achievement or otherwise in science. This implies that, if students have positive interest towards Basic Science and Technology they will not only enjoy studying it but would also derive satisfaction from the knowledge and skills acquire from it. Students' achievement and interest in science have direct link with instructional methods. This means that methods of instruction are functions of students' achievement and interest in science.

Statement of the Problem

The objectives of teaching Basic Science and Technology is for students to develop interest in science and technology, acquire basic knowledge and skills in science and technology and apply scientific and technological knowledge and skills acquired to solve contemporary societal problems. These objectives have hardly been achieved over the years. This has been attributed to methods of instruction used by the science teachers which do not take care of the cultural background and the needs of the students. As a result, students have been viewing science taught to them in schools as foreign, abstract, unreal and meaningless. As a result, students merely memorize the contents and concepts taught, to pass their examinations with little or no interest which results in persistent poor achievement.

Various studies revealed that the effective utilization of ethno-science instructional approach influences students' achievement and interest in science. Most of these research works focused in other areas of Biology, Chemistry and Physics. Much is yet to be done on Basic Science and Technology which is considered as foundation for students' acquisition of scientific and technological knowledge and skills for sustainable national development. The foregoing in mind necessitated the researchers to investigate effects of ethno-science instructional approach on students' achievement and interest of Upper Basic II students in Basic Science and Technology.

Purpose of the Study

The main purpose of this study is to determine the effects of ethno-science instructional approach on students' achievement and interest in Basic Science and Technology in Benue State, Nigeria. The specific objectives of this study are to find out the differences in:

- The mean achievement scores of students taught, Basic Science and Technology using ethno-science instructional approach and those taught, using demonstration teaching method.
- The mean interest scores of students taught Basic Science and technology, using ethno-science instructional approach and those taught using demonstration teaching method.

Research Questions

The following research questions were raised to guide the study:

- What is the difference between the mean achievement scores of students taught Basic Science and Technology using ethno-science instructional approach and those taught using demonstration teaching method?
- What is the difference in the mean interest scores of students taught Basic Science and Technology using ethno-science instructional approach and those taught using demonstration teaching method?

Hypotheses

The following null hypotheses were formulated and tested at 0.05 alpha levels of significance:

- HO₁: There is no significant difference in the mean achievement scores of students taught Basic Science and Technology using ethno-science instructional approach and those taught using demonstration teaching method.
- HO₂: There is no significant difference in the mean interest scores of students taught Basic Science and Technology using ethno-science instructional approach and those taught using demonstration teaching method.

Methodology

A quasi-experimental of non-randomized, pre-test, post-test control group design was adopted in this study. The population of the study was 14,925 Upper Basic II students of Benue state. A sample of 485 drawn from six secondary schools in education zone A of Benue State was used for the study. Education zone A was randomly chosen out of three education zones of Benue State by simple random sampling technique of balloting. The simple random sampling technique was used in selecting sampled schools. Only six schools were randomly chosen because of the experimental nature of the study. Three schools each were assigned to experimental and control group.

The instruments for data collection were Basic Science and Technology Achievement Test (BSTAT) and Basic Science and Technology Interest Scale (BSTIS) they were developed by the researchers. The BSTAT consists of 20 multiple choice items, drawn from Basic Science and Technology of Upper Basic II curriculum based on the following topics; diseases, pollution, drug abuse and habitats. BSTIS consists of 20 items and it scored on a four point scale of strongly agree (SA) = 4 points, agree (A) =3 points, disagree (D) =2 points and strongly agree (SD) =1 point, for the positive items and in the revised order for the negative items. The validation of BSTAT and BSTIS were done by three experts in the Department of Science Education; University of Agriculture Makurdi. The reliability of the BSAT and BSTIS were determined using Kuder-Richardson 20 formula (K-R₂₀) and Cronbach Alpha Coefficient which gave the values of 0.76 and 0.78 respectively. These

values showed positive relationship within the test items which means the instruments are both internally consistence and reliable.

The regular Basic Science teachers were used for the study in both experimental and control groups. One week training programme was organized for the research assistant by the researchers. They were properly trained on how to teach using ethno-science instructional approach and administration of BSTAT and BSTIS. The training lasted for one week, the teachers practiced by demonstrating on how to teach, using the researchers' prepared lesson plans that contained the necessary steps of ethno-science instructional approach in form of micro teaching.

BSTAT and BSTIS were administered to students as pre-test to establish their initial level of achievement and interest in Basic Science and Technology before the commencement of the experiment. Immediately after the pre-test the teachers taught the experimental group, adhering to 12 ethno-science instructional approach lesson plans; procedures prepared by the researchers. The control group was also taught the same contents using 12 demonstration teaching method lesson plans. The treatment lasted for six weeks. Each teacher in experimental and control group completed the content as stipulated in the researchers' guideline. Immediately the conclusion of the teaching, the BSTAT and BSTIS were given as post-test and scores were recorded. The mean and standard deviation were used for answering of research questions. Analysis of Covariance (ANCOVA) was used to test null hypotheses at 0.05 alpha level of significance. The choice of ANCOVA is to check the group initial difference that might exist due to the random assigning of schools.

RESULTS

Research Questions 1

What is the difference in the mean achievement scores of the students taught Basic Science and Technology, using ethno-science instructional approach and those taught, using demonstration teaching method? To answer research question one, the analyzed Basic Science and Technology achievement scores of students is presented in Table 1.

Table 1: Mean and Standard Deviation on Students' achievement in Basic Science and Technology

Group	N	Pre-BSTAT		Post-BSTAT		Mean Gain
		Mean	SD	Mean	SD	
Experimental	288	32.43	3.16	56.75	2.04	24.32
Control	237	32.55	3.28	43.67	3.19	11.12
Total	485					
Mean difference		-0.12		13.08		13.20

Table 1, shows that students taught using ethno-science instructional approach had pre-BSTAT and post-BSTAT scores of 32.43 and 56.75 with standard deviations of 3.16 and 2.04 respectively. Students taught using DTM had pre-BSTAT and post-BSTAT of 32.55 and 43.67 with standard deviation of 3.28 and 3.19 respectively. The mean gain for the experimental group was 24.32, while the mean gain in the control group was 11.12 with the mean difference of 13.20, which showed the difference in mean achievement scores between experimental and control groups. This result is further investigated by testing of hypothesis one in the table 2.

Hypothesis 1

There is no significant difference in the mean achievement scores of students taught Basic Science and Technology using ethno-science instructional approach (ESIA) and those taught using demonstration teaching method (DTM).

Table 2: Analysis of Covariance on Students' Achievement in Treatment Groups

Source	Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	1372.124 ^a	2	686.062	1304.376	.023
Intercept	4804.802	1	4804.802	352.017	.213
Pretest	502.411	1	502.411	21.932	.003
Group*	432.678	1	432.678	156.402	.000
Error	250.640	482	.520		
Total	36405.000	485			
Corrected Total	78065.129	484			

a. R Squared = .992 (Adjusted R Squared = .991)

Table 2 results reveal that the experimental group have F-value of 156.402 and significant value of 0.000, this significant value is less than p-value of 0.05 (i.e. $p = 0.05 > 0.00$). With this result, the null hypothesis one which stated that there is no significant difference in the mean achievement scores of students taught Basic Science and Technology using ethno-science instructional approach and those taught using demonstration teaching method is rejected. This implied that there is a significant difference in the mean achievement scores of students taught Basic Science and Technology using ethno-science and those taught using demonstrating teaching method. This confirms that the earlier observed difference in the mean achievement scores of the two groups was due to the treatment in favour of ethno-science instructional approach.

Research Question 2

What is the difference in the mean interest scores of students taught Basic Science, using ethno-science instructional approach and those taught using demonstration teaching method? The data answering this research question are presented in table 3.

Table 3: Mean and Standard Deviation of Students' Interest Scores in BSTIS

Teaching Method	N	Pre-interest		Post-interest		Mean Gain
		Mean	SD	Mean	SD	
ESIA	288	2.43	1.09	3.87	0.05	1.44
DTM	237	2.48	1.08	2.96	0.25	0.48
Total	485					
Mean difference		-0.05		0.91		0.96

Table 3 shows that students taught Basic Science and Technology with ESIA had Pre-interest and Post-interest mean scores of 2.43 and 3.87 with the standard deviation of 1.09 and 0.05 respectively, while that of students' in DTM had pre-interest and post-interest mean scores of 2.48 and 2.96 with standard deviation of 1.08 and 0.25 respectively. The mean gain in experimental group was 1.44, while mean gain in the control group was 0.48, with mean difference of 0.96. This indicates that mean interest scores of students taught Basic Science and Technology using ESIA was higher than those taught using DTM. This answers the

question of differences in the mean interest scores of students taught Basic Science and Technology using ESIA and those taught using the DTM. Hypothesis two was tested for level of significance to confirm this result.

Hypothesis 2

There is no significant difference in the mean interest scores of students taught Basic Science and Technology using ethno-science instructional approach and those taught using demonstration teaching method.

Table 4: Analysis of Covariance on Students' Interest in Basic Science and Technology

Source	Sum of squares	df	Mean Square	F	Sig.
Corrected Model	69264.630 ^a	2	34632.315	2516.235	.000
Intercept	424.875	1	424.875	212.409	.001
Pretest	465.736	1	465.736	12.159	.032
Interest*	12.466	1	12.466	9.836	.000
Error	1565.054	482	3.247		
Total	238127.000	485			
Corrected Total	41661.318	484			

a. R Squared = .918 (Adjusted R Squared = .901)

Table 4 indicates that F-value is 9.836 at the significant value of 0.000, which is less than the p-value of 0.05. Hence, hypothesis two which state that there is no significant difference in the mean interest scores of students taught Basic Science and Technology using ethno-science instructional approach and those taught using demonstration teaching method is rejected. This means that there is a significant difference in the mean interest scores of students taught Basic Science and Technology using ethno-science instructional approach and those taught using demonstration method. This confirms the observed difference in the mean interest scores of students in Basic Science and Technology interest scale.

The following are summary of major findings:

- There is a significant difference in the mean achievement scores of students taught Basic Science and Technology using ethno-science instructional approach and those taught using demonstration teaching method.
- There is a significant difference in the mean interest scores of students taught Basic Science and Technology using ethno-science instructional approach and those taught using demonstration teaching method.

DISCUSSION

The main purpose of this study is to find out whether the use of ethno-science instructional approach is effective in improving the achievement and interest of students in Basic Science and Technology. Before treatment commenced, pre-test was given to determine the equivalent knowledge and interest of students in Basic Science and Technology. Therefore the observed differences in the results are owing to the treatment. The results of the analysis of data on research questions and null hypotheses are hereby discussed based on the objectives of the study.

The result of the analysis revealed that the students taught Basic Science and Technology using ESIA achieved higher than those taught using DTM. This result was

further supported by the testing of hypothesis one which showed a significant difference in the mean achievement scores of students in the experimental and control groups. This finding is in agreement with that of Atran (2007), Obiekwe (2008) and Ugwuanyi (2015) whose results indicated that students taught using ethno-science instructional approach scored higher in their post-test mean achievement scores than students taught using conventional teaching method. This implies that if ethno-science instructional approach is implemented in Nigerian schools, it will enhance students' achievement in science in general and Basic Science and Technology in particular.

The result of this study indicated that mean interest scores of students taught Basic Science and Technology using ESIA was higher than their counterparts taught using DTM. This was further confirmed by hypothesis two, which showed a significant difference in the mean interest scores of the students taught Basic Science and Technology using ESIA and those taught using DTM. This finding is in consonance with the findings of Aderson (2009) and Ugwuanyi (2015) who in their different studies at different times reported there is a significant difference in the mean interest scores of student taught with ethno-science approach and those taught with conventional methods. In the other hand this study disagrees with James (2006) who found out that cultural oriented instructional approach do not have a significant influence on students' interest in science. However this study shows that ethno-science instructional approach is effective in teaching science because it arose and sustained students' interest in Basic Science and Technology.

CONCLUSION

Based on the findings of this study, the researchers concluded that ethno-science instructional approach enhances students' achievement and interest in Basic Science and Technology. Therefore, it is an effective approach of teaching science, especial Basic Science and Technology subject.

Recommendations

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

Seminars, conferences and workshops should be organized by government and relevant professional bodies such as Nigerian Educational Research and Development Council and Science Teachers' Association of Nigeria to educate and sensitize science teachers on the proper use of ethno-science instructional approach in teaching of science.

Curricula of universities and colleges of education should be review to incorporate ethno-science instructional approach to their training programmes so that the prospective science teachers will be taught how to teach, reflecting Nigerian culture and environment when they enter the teaching profession.

REFERENCES

- Abakpa, B. O. (2011). *Effects of mastery learning approach on senior secondary school students' achievement and interest in geometry*. Unpublished PhD thesis; University of Agriculture, Makurdi, Nigeria.
- Adejoh, M. J. (2008). Improving the quality of integrated science and technology curricula in secondary schools. *Nigerian Journal of Teacher Education*, 4(1), 43-52.
- Adesoji, F. A. (2008). Students' ability levels and effectiveness of problem-solving instructional strategy. *Journal of Social Science*, 17(1) 5-8.

- Anderson, A. (2009). *Learning strategies the missing things in physical education and coaching. A practical guide to the development of strategies learning*. Toronto: Sport Books publishers.
- Atadoga, M. M., & Lakpini, M. A. (2013). *A comparison of numeracy achievement of primary school pupils taught using whole class and varied classroom organization instructions*. Proceedings of Multicultural African Conference, Held at Faculty of Education, Ahmadu Bello University, Zaria, 11th – 15th June, 2013.
- Atran, S. (2007). Cultural mosaic and mental model of nature. *Proceedings of the National Academic of Science*, 104(35) 13868-13874.
- Cyril, M. U. (2013). Effects of individualized, demonstration and discovery methods of teaching mechanical craft practice in technical colleges in Adamawa state. *Nigerian Vocational Association Journal*, 18(2), 79-86.
- Ezeudu, F. O. (2011). *Fundamentals of science education for colleges and universities*. Enugu: City and Company.
- Federal Government of Nigeria (2013). *National policy on education*. Lagos: NERDC Press,
- Ityokyaa, F. M. (2013). *Evaluation of the implementation of biology programme in secondary schools in benue state*. Unpublished Master Thesis: University of Agriculture Makurdi, Benue State.
- James, K. (2006). Identify cultural values and American Idians' perceptions of science and technology. *American Indian Culture and Research Journal*, 30(3) 53-58.
- Nigerian Educational Research and Development Council, (2012). *9-year basic education curriculum: Basic Science for Upper Basic Education 7-9*: NERDC PLC.
- Nworgu, B. G. (2006). *Educational research; basic issues and methodology*. Enugu: University Trust Publishers.
- Obiekwe, C. L. (2008). *Effects of constructivist instructional approach on students' achievement and interest in basic-ecological concepts in biology*. Unpublished master thesis: University of Nigeria Nsukka.
- Ogundokun M. O., & Adeyemo D. A. (2010). Emotional intelligence and academic achievement: the moderating influence of age, intrinsic and extrinsic motivation. *The African symposium*, 10(2), 127-141.
- Sanga, G. (2004). *Natural knowledge: Ethno-science, cognition and utility*. New York: Berghalin Books publisher.
- Ugwuanyi, E. C. (2015). *Effects of an ethno-science based instructional model on students' academic achievement and interest in the senior secondary school biology*. Unpublished master thesis: University of Nigeria Nsukka.

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The Attitudes of Turkish and Croatian University Students towards Exercise

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Abstract

The purpose of this study is to compare the attitudes of university students in Croatia and Turkey towards exercise and to develop recommendations for improving the health training programs when needed. Research indicates that exercising attitude approaches are significant factors affecting the quality of student life. Students should present effective methods in their pre-service education. If students used effective exercising attitude approaches in their own life, they would foster these same attitudes towards their friends or family members. For this reason, an investigation of exercising attitude approaches of university students is very important in order to see how well we develop our future generation and to enhance health training programs. Data were gathered from 230 Croatian and 580 Turkish university students who volunteered to participate in this study. In this study, attitude scale towards physical activities and its adaptation into English were used. The inventory contains 30 statements and responses indicating their agreement with each statement by using a five-point Likert scale.

Keywords: Activity, Burdur, Football, Handball, Osijek, Sport.

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INTRODUCTION

This study was carried out in order to compare the attitudes of Turkish and Croatian university students towards exercise and to make recommendations to establish environments that enable university students' improving their level of exercise for a healthy life when needed.

In this study, a scale that was developed by the researcher was used. It is determined by various studies that there is a positive and significant relationship between the level of exercise and the attitude towards exercise. Physical activity and exercise improve individuals' physical fitness and thus promotes a healthy life style. Although the positive effects of physical activity on health are determined by various studies carried out in a good number of countries in different parts of the world, the habit of sedentary life still remains an important public health concern. Modern lifestyle and the change in the socio-cultural structure have made human need less physical activity. This has resulted in sedentary lifestyle.

The children, who spent their spare time by playing out in gardens or street alleys 20 years ago, now spend their time in front of television and computer, influenced by the changing social structure and insecure streets. Besides, with the change in eating habits, the prevalence of obesity in childhood is increasing.

According to the research report of the project, monitoring the growth of school-age children (6-10 years of age) in Turkey (TOCBI) that was carried out by the Ministry of Health, 8.5% (M: 9.7%; F: 7.1%) of children in cities and 7.5% (M: 4.8 %; F: 3.2%) of children in rural areas are obese. In total, 14.3% of children are overweight and 6.5% of them are obese. Istanbul is the city where obesity is most commonly seen (13.0%) (TOCBI, 2011).

The absence of the habit of physical activity directly affects the prevalence of obesity. The absence of secure environment is the leading factor that affects physical activity. Families do not consider their children's playing on the street as safe, this constitutes the basic obstacle for physical activity (Lumeng et al., 2006). It is found that families' not considering the environment as safe quadruples the possibility of the child's being fat (Matthieu, 2008).

Physical environment, social, school and workplace environment, transportation system, urbanization might be a preventer or developer for doing physical activity; moreover it can cause inequalities in society (Pekcan et al, 2009). Walking areas, cycle paths, parks, playgrounds, traffic density, pedestrian zones, pavements, transportation system and the quality of these are important factors that affect the level of physical activity in structural environment.

Under recent conditions, especially in big cities, children are imprisoned in indoor areas because of such reasons that green areas are decreasing, there are not enough playgrounds, streets are not safe, mothers work, children spend most of their time in front of television or computers. Even if their school is near, children go to schools by school bus or they are brought by their parents with their private car. Moreover, children spend a long period of time sitting when they are at training center or while they are studying. Parents' not having the habit of doing exercise frequently, using the lift instead of the stairs, and the easiness that is provided in order not to tire the children cause inactivity of children, thus they are spending less energy. Increasing physical activity and doing exercise should be converted into a lifestyle for children. For this purpose, children should be taken to sport clubs and the duration and content of physical education courses should be enriched (Miller, 2011; WHO, 2007). It is also noticed that the physical environment of schools is a preventer for physical activity and it contributes to obesity in children. According to the results of TOÇBI study, 16.9% of children who play sports do so in a sport club. It is determined that there is not an

indoor sports hall in 87.4% of the schools, there is not an outdoor playground in 8.9% of the schools and sport club activities are carried out just in 65.2% of the schools.

Health has been accepted as an essential condition for a high quality of life. Individuals make use of technological developments to reduce the intensity of each activity in their life, but these developments have a negative impact on health and increase the number of inactive individuals in the long term (<http://www.eskisehir.gov.tr/2011>).

Overweight or obesity is defined as an abnormal or intensive fat build up; these can affect health negatively. Overweight or obesity can cause an imbalance between energy intake and the energy consumed, an increase of intake such as fat, sugar, salt in energy-rich foods and in the most working form changes, development of transport system and an increase in the rate of urbanization caused obesity by the decrease in the level of physical activity. Obesity is a preventable disease (WHO, 2011). An unhealthy diet and inactive life are risk factors for chronic diseases such as cardiovascular diseases, cancer and diabetes (WHO, 2010a).

Worldwide, about 43 million children under 5 years of age were overweight in 2010. The people who are obese in childhood are most probably expected to be obese and have a risk of chronic diseases in the future. For this reason, gaining weight should be prevented at early ages (WHO, 2010b)

Participating in physical activity frequently increases health and the physical strength in children. When active young children are compared to inactive young people, cardiorespiratory fitness, muscular endurance and muscle strength of active young is greater than inactive young. At the same time, active young children have decreased body fat, increased bone health and reduced symptoms of depression and anxiety symptoms and their cardiovascular and metabolic disease profile is favorable. Young children and children aged 5-17 should participate in severe or moderate intensity physical activities for at least 60 minutes per day. In addition, children should participate in the muscle-force activities such as pushing, pulling, climbing and playing with materials in children's playground 2-3 days a week (WHO, 2010c).

According to data from a series of disease studies from all over the world, in 2004 approximately 5.5% of the leading causes of death risk was physical inactivity, and 4.8% obesity. Physical inactivity was the fourth and obesity the fifth leading cause of mortality all over the world (WHO, 2009). World Health Organization (WHO) recently recommends that member countries develop policies and initiatives to increase physical activity. WHO particularly focuses on school-based training in this aspect (WHO, 2007).

Regular physical activity is accepted as doing a favored activity every day in a week or doing an activity at least 30 minutes 5 or more days in a week. Another way about regular activity is accepted as doing severe and nonstop activity during twenty to sixty minutes in three or more days a week) (Caspersen, Powell, Christenson, 1985; Arıkan, Metintas, Kalyoncu, 2008; Hoeger & Hoeger, 2010).

Sedentary lifestyle causes several health problems for each age group. Chronic diseases, especially the ones that emerge after a certain age, cause a number of problems. In order to get rid of all these negative conditions and to keep the organism fit and healthy, great attention is being paid to activities such as lifelong sport, sport for a healthy life, fitness, aerobics, jogging etc (Bompa, 1998; Ersoy, 1998; Shengel, 1986; Saygın, Dükkancı, 2009).

The loss of function in basic motor skills, such as strength, flexibility and durability in all muscles and easy mutilation, loss of bone mineral density, osteoarthritis and loss of function occur. Besides the increase in blood sugar and blood lipid levels, and obesity and formlessness because of not being able to spend the energy that is taken through food, the physical and mental problems brought by obesity are adverse effects of long-term sedentary life on organism (Biçer, Peker & Savucu, 2005). To get rid of all these adverse conditions

and to keep the organism fit and healthy, the necessity to do exercise emerges as a must (Arcury et al., 2006). As a result, the habit of physical activity is in interaction with family, school and environment and these effects directly affect the child's health.

The Benefits of Exercise

The benefits of exercise are emerging day by day for people of all ages. The importance of sports activities that are seen as necessary for solving a number of health and psychological problems which are experienced by individuals who choose a monotonous life style manifests itself in all areas of life. Exercise reduces blood pressure, reduces the risks of falling by losing balance and injury (hip or wrist fractures), slows down the loss of body muscle and bone mass, increases flexibility, improves balance and mobility, helps keeping the ideal weight, provides a sleeping pattern, keeps away from tension and stress and provides a healthy and long life (Chapek, 1994). It is stated in the related studies that a 1% increase in total cholesterol causes a 2% increase in coronary heart disease while a 1% decrease causes a 2-3% decrease in the risk of heart attack; an 11% decrease in LDL cholesterol causes a 19% decrease in coronary heart disease, a 1mg/dl increase causes a 3% decrease in the risk of coronary heart disease (Studd, 2000).

This study attempts to answer the following questions:

1. Is there a difference between the attitudes of Turkish and Croatian students towards exercise?
2. Is there a significant difference between the time that Turkish and Croatian students allocate for exercise and their attitudes?
3. What are the sports preferences of Turkish and Croatian students?

METHODS Descriptive method was used in this research. The population of this study was composed of students from Mehmet Akif Ersoy University in Turkey and Croatia's Josip Juraj Strossmayer University in Osijek. Sampling consisted of students from both countries who volunteered to take part in the study. Answers by 230 students from Josip Juraj Strossmayer University and 580 students from Turkey were accepted as valid. It was seen that while the Croatian students ranged between the ages of 18-37 and had an average mean of 21.97, Turkish students ranged between the ages of 18-37 and had an average mean of 22.62. While the average time that was allocated for exercise was 3.13 hours for Croatian students, it was 2.44 hours for Turkish students. It was determined that the time for doing regular exercise was 3.27 years for Croatian students while it was 1.66 years for Turkish students.

Data Collection Tool and Adaptation Studies

In this study, a scale that was developed by the researcher was used (Celik Kayapınar & Savas, 2013). In order to determine the attitudes of Croatian students towards exercise, a version that was translated into English was used. The sum of both English and Turkish scales and subscale reliability coefficients for Turkey was found to be 0.896 while it was 0.900 for Croatia (Pallant, 2003).

In the analysis of data obtained in this study

Independent T Test; Pearson's correlation test was used depending on the features of the questions to be answered.

RESULTS

Table 1: Independent T-Test Results for attitude Point of Turkish and Croatian University Students

Variables	N	Mean	SD	t	df	p
Croatia	230	97.743	12.426	10.462	808	.000
Turkey	580	107.782	12.269			

Independent sample T test was conducted to compare the attitude of exercise scores for Turkish and Croatian university students and there was significant difference in scores for Turkish students ($M=107,7828$, $SD=12,269$) and Croatian students ($M=97,743$, $SD=12,426$; $t_{(808)}=-10,462$, $p<0,000$). The magnitude of the difference in the means was moderate ($\eta^2=0,119$).

Table 2: Pearson Correlation Results between Total Attitude Points and the Duration of Doing Exercise of Turkish and Croatian University Students

Country	Correlations	Total attitude point	Duration of exercise	
Croatia	Total attitude point	Pearson Correlation	1	
		Sig. (2-tailed)	.302**	
		N	230	
	Duration of exercise	Pearson Correlation	.302**	1
		Sig. (2-tailed)	.000	
		N	230	230
Turkey	Total attitude point	Pearson Correlation	1	
		Sig. (2-tailed)	.184**	
		N	580	
	Duration of exercise	Pearson Correlation	.184**	1
		Sig. (2-tailed)	.000	
		N	580	580

** . Correlation is significant at the 0.01 level (2-tailed).

In the Croatian example presented above there is a medium correlation between the two variables ($r=0,302$, $n=230$, $p<0,001$), suggesting quite a moderate relationship between duration of doing exercise and total attitude points. In the Turkish example presented above there is a small correlation between the two variables ($r=0,184$, $n=580$, $p<0,001$), suggesting quite a weak relationship between the duration of doing exercise and total attitude points.

Table 3: Sports Preferences of Croatian and Turkish University Students

Preference Ranking	Sports	Croatia		Preference Ranking	Sports	Turkey	
		n	%			n	%
1.	Handball	62	25.3	1.	Football	84	15.0
2.	Football	43	17.5	2.	Volleyball	68	12.1
3.	Volleyball	39	15.9	3.	Swimming	61	10.8
4.	Basketball	28	11.4	4.	Basketball	55	9.8
5.	Tennis	13	5.3	5.	Walking	44	7.8
6.	Swimming	12	4.8	6.	Tennis	36	6.4
7.	Running	5	2.0	7.	Table tennis	25	4.4
8.	Table tennis	7	2.9	8.	Pilates	20	3.5
9.	Walking	1	0.4	9.	Running	34	6.0
10.	Pilates	0	0.0	10.	Handball	10	1.7
11.	None	24	9.7	11.	None	42	7.5
12.	Others	21	8.6	12.	Others	81	14.4

In the comparison of the two countries, the first three of the sports chosen are handball, football, and volleyball for Croatian students; while football, volleyball, and swimming were chosen by Turkish students.

CONCLUSIONS

According to findings; after comparison the attitude of exercise scores of university students that are participated from Croatia (N=230) and Turkey (N=580) were significant difference in attitude scores for Turkish students according to Croatia students.

Total attitude points and the duration of doing exercise in the Croatian example was a medium correlation between the two variables. A moderate relationship between duration of doing exercise and total attitude points for Croatian students. In the Turkish example was a small correlation between the two variables. A small correlation between doing exercise and total attitude points for Turkish students.

The first three of the sports chosen are handball, football, and volleyball for Croatian students; while football, volleyball, and swimming were chosen by Turkish students.

REFERENCES

- Arcury, T. A., Snively, B. M., Bell, R. A., Smith, S. L., Stafford, J. M., Wetmore, L. K., & Quandt, S. A. (2006). Physical activity among rural older adults with diabetes. *The Journal of Rural Health, 22*(2), 164–168.
- Arıkan, İ., Metintas, S., & Kalyoncu, C. (2008). The comparison of the two methods at determining the physical activity level at adolescent. *Osmangazi Medical Journal, 30*, 19-28.
- Bıçer, Y. S., Peker, İ. & Savucu, Y. (2005). The effect of planned regular walking on body composition values in women patients who have heart and vascular congestion. *Journal of Fırat University Health Sciences, 19*(4), 241-248.
- Bompa, T. O. (1998). Theory and method of training, (Trans. Keskin, İ.), Ankara Bağırgan Press, 1st Sportive Family Works Series.
- Caspersen, C. J., Powell, K., & Christenson, G. M. (1985). Physical activity, exercise and physical fitness: Definitions and distinctions for health-related research. *Public Health Reports, 100*, 126-131.
- Çelik Kayapınar, F., & Savaş, B. (2013). Editors; Strelova, O., at all. *Improving attitude scales study for physical activities*. The science and education at the beginning of the 21st century in Turkey Vol. 3, 495-499.

- Chapek, C. L. (1994). *Physical fitness programs microform*, Publications Instate For Sport and Human Performances Institute, University of Oregon, Eugene.
- Ersoy, G. (1998). *Healthy life sport and nutrition*, (3thed.). Ankara: Damla Press.
- Hoeger, W. K., & Hoeger, S. A. (2010). *Importance of increased physical activity: Life time physical fitness & wellness* (9thed.). USA, Thomson Wadsworth.
- Lumeng, J. C., Appugliese, D., Cabral, H. J., Bradley, R. H., & Zuckerman, B. (2006). *Neighbourhood safety and overweight status in children. Arch Pediatr Adolesc Med.* 160(1), 25-31.
- Matthieu, J. (2008). *Safe play and its effect on childhood obesity. J Am Diet Asssoc.*, 108(5), 774-775.
- Miller, D. P. (2011). *Associations between the home and school environments and child body mass index. Social Science & Medicine*, 1-8.
- Pallant, J. (2005). *SPSS Survival manual*. Allen & Unwin
- Pekcan, G., Robertson, A., & Pomerleau J., Knai, C. (2009). *EURO-PREVOB-Prevention of obesity in Europe project report for Turkey*. Ankara, Project no. 044291. www.europrevob.eu
- Physical activity knowledge (2011). /on-line/. Retrieved October 07, 2016 from: <http://www.eskisehir.gov.tr/sarici/saglik/fiziksel-aktivite-serisi/E-A4-fiziksel-aktivite-bilgi-serisi-tumu.pdf>.
- Saygın, Ö., & Dükkancı, Y. (2009). The research of relation health related physical fitness and intensity of physical activity of girls. *International Journal of Human Sciences*, 6(1).
- Shengel, T. R. (1986). *The training effects of a vigorous aerobic exercise program upon the changes of body composition neuromuscular endurance, flexibility and cardio respiratory capacity of 24 males aged 49 to 69 years as measured annually over three years*, Microform Publication, University of Oregon, Eugene, Ore.
- Studd, J. (2000). *The management of the menopause*, The Millennium Review, Parthenon Publishing.
- TOCBİ. (2011). *The project of monitoring the growth of school-age children (6-10 years of age) report in Turkey*, Republic of Turkey Ministry of Health General Directorate of Primary Health Care Publications No: 834.
- WHO. (2007). *A guide for population-based approaches to increasing level of physical activity, implementation of the who global strategy on diet, physical activity and health*, WHO Press, Geneva. Switzerland.
- WHO. (2009). *Global Health Risks: Mortality and burden of disease of attributable to selected major risks*. WHO Library Cataloguing-in-Publication Data.
- WHO. (2010a). *Diet and Physical Activity: A public health priority*, Retrieved October 20, 2016 from: <http://www.who.int/dietphysicalactivity/en/index.html>
- WHO. (2010b). *Population-based prevention strategies for childhood obesity*. WHO Press. Geneva. Switzerland.
- WHO. (2010c). *Global recommendations on physical activity for health*. World Health Organization. (ISBN 9789241599979).
- WHO. (2011). *Obesity and overweight*./on-line/. Retrieved October 20, 2016 from: <http://www.who.int/mediacentre/factsheets/fs311/en/index.html>.

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Effect of Explicit Problem Solving Instruction on Secondary School Students' Achievement in Physics

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Abstract

In this study, the author examined the effect of explicit problem solving instruction on senior secondary school one students' (Age 16+) achievement in Physics. Pretest-posttest quasi experimental design was adopted. Two groups of students participated in the study; these were Experimental Group and Control Group. The experimental group received explicit instruction on solving problems while the control group did not receive explicit instruction for solving problem. Data were collected using Physics Achievement Test. Results indicate that giving explicit instructions on problem solving has positive effect on Physics Achievement. In this study, both boys and girls benefited from giving explicit instructions on problem solving. On the basis of the findings of this study, Physics teachers should give, to their students, explicit instruction on problem solving during lessons in order to enhance their students' achievement in Physics.

Keywords: Instruction, Problem solving, Problem solving technique, Physics Achievement, Problem solving skills, Secondary school, Nigeria.

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INTRODUCTION

In recent times, the level of performance of candidates in Physics in public examinations being conducted by the West African Examination Council (WAEC) and National Examination Council (NECO) has improved slightly. In Nigeria, for example, on the average, in the past five years (2011-2015) about 60% of the total candidates who sat the Physics Examinations passed at the credit and distinction levels. When compared with the results before 2011, there was an increase in the number of candidates who passed Physics. However, the ultimate has not been achieved. This is because, between 2011 and 2015, about 40%, on the average, of the candidates who sat the examinations failed Physics. This should be a source of concern to major stakeholders (Physics teacher, researchers, parents, and government) in physics education. After all nobody (parent) sends his or her child to school to fail.

Researchers in Physics education are expected to come up with plausible reasons why about 40% of the population of candidates failed. In addition, researchers in Physics education are expected to come up with the best ways of assisting all secondary school students who offer Physics, to not only learn Physics meaningfully but also do well in both public and school-based examinations. It is on the basis of this that researchers need to continually examine and critique the methods of teachings that are being employed by Physics teachers in the classroom.

According to Chief Examiners' Report WAEC 2011-2015, one of the reasons why some candidates failed Physics was their low level of problem solving skills. Specifically in the questions where candidates were expected to solve problems, most of the candidates were unable to handle correctly equations, formulas and arithmetic processes and conversion of units. More importantly most candidates display poor understanding of the theoretical bases of Physics concepts. These inadequacies have a link with the instructional strategies being employed by Physics teachers.

Examinations of the teaching strategies being employed by some Physics teachers show that classroom teachings and practical instructions are carried out using traditional lecture method and emphasis was always on finishing the syllabus at the specified time. Research (Adegoke, 2013; Chukwuneye & Adegoke, 2014) has shown that this strategy does not give enough opportunity for students to be actively engaged in teaching and learning activities and consequently students do not have a firm grasp of the fundamental and theoretical foundations of Physics concepts. The learner thus, acquires an unstable level of knowledge which is not transferrable to problem solving situation (Akuche, 2008; Çalişkan, Selçuk & Erol, 2010).

Among the lifelong learning skills that students of all ages need to acquire is problem-solving (Jonassen, 2010 in Mataka, Cobern, Grunert, Mutambuki & Akom 2014). Individuals solve different types of problems of varying complexities throughout their life cycle. Some of the problems are well-structured while others are ill-structured (Jonassen, 2010). Normally, individuals meet these problems during formal education and informally in other endeavors. Mataka, Cobern, Grunert, Mutambuki, and Akom (2014) states, that, most often, during formal education, students encounter well-structured problems. These problems “engage a limited number of rules and principles that are organized in a predictive and prescriptive arrangement; possess correct, convergent answers; and have a preferred, prescribed solution process” (Johansen, 2010, p. 2). Although ill-structured problems are usually more difficult, some well-structured problems do pose a great challenge for students (Jonassen, 2010).

Generally problem solving involves defining a problem, collecting information related to the solution process, reasoning through the problem state to the solution checking and evaluating

the solution. According to Dale and Balloti (1997), problem-solving skills cannot be inherited but can be learned and improved upon. Students learn better when they have opportunities to participate in the arranged activities directly, and when they succeed in solving the presented problems. Hence, education in the sciences must address the crucially important task of teaching students to become more proficient in problemsolving.

Cognitive interventions directed towards teaching of problem solving in a systematic way are called often called “strategy instruction” (Owen & Fuchs in Çalışkan, Selçuk, & Erol, 2010). By means of strategy of instruction programmes, students are facilitated and are able to follow a series of steps to simplify understanding and solve the problem. However, one of the most important instructional methods that have been used to address problem solving performance is explicit problem solving instruction, According to Huffman (1997), “explicit problem solving is instruction that directly teaches students how to use more advanced techniques for solving problems.

Schoenfield (2013, p. 11), as stated in Mataka, Cobern, Grunert, Mutambuki, and Akom (2014), believes that success in problem solving depends among other factors on the “individual’s use of problem solving strategies, known as heuristic strategies.” Heuristics help to “convert a non-procedural cognitive skill to a procedural one (VanLehn et al., 2004, p. 522). Metallidou (2009, p. 76) in Mataka, Cobern, Grunert, Mutambuki, and Akom (2014) define problem solving as a “goal-directed behavior [that] requires an appropriate mental representation of the problem and the subsequent application of certain methods or strategies in order to move from an initial, current state to a desired goal state.”

Problem solving, as viewed by cognitive psychologists, encompasses self-analysis, observation, and the development of heuristics (Hardin, 2002 in Mataka, Cobern, Grunert, Mutambuki, and Akom (2014)). Cognitive psychologists (such as Sternberg, 1981; De Jong and Ferguson-Hessler, 1986) in their investigations on mental processes involved when individuals learn and solve problems stressed the need for knowledge organization in order to improve efficiency of its retrieval from the conceptual schemata during problem solving. According to Johnstone (1991) the hope is to organize and connect knowledge in long-term memory such that it is easily recalled when needed. This led to the development of cognitive approaches to solving problems. A notable cognitive psychologist, Polya (Hardin, 2002 in Mataka, Cobern, Grunert, Mutambuki, and Akom (2014), developed a stepwise model of problem solving. This included “(1) understand the problem, (2) devise a plan, (3) carry out the plan, and (4) look backward”. These steps are not content specific hence are just referred to as general problem solving skills (Hardin, 2002 in Mataka, Cobern, Grunert, Mutambuki, and Akom (2014). Although Polya’s steps seem to follow a linear path, researchers (such as Carson & Bloom, 2005) have found that the steps are actually cyclic in nature. In Carson and Bloom’s (2005) study on how mathematicians approach problem solving, it was reported that mathematicians while solving problems, usually pass through one step, remember something, go back and check before proceeding. Carson and Bloom (2005) stated that when the solution was not acceptable during checking, the mathematicians usually returned to the planning phase.

Successful problem solvers understand the problem by initially constructing a description of the problem to help in the search of an appropriate solution (Reif, 1981 in Mataka, Cobern, Grunert, Mutambuki, and Akom (2014). This is done by translating the problem into an easily understandable form. This summary must include key concepts required to describe the problem. In physics, the statement of a problem is usually in some verbal form which requires a careful analysis to determine what the problem is, what the pertinent data are, and within what

mathematical system and physics principles and laws one is working. In problem-solving students have to translate verbal statements of relationships into formulas by the use of letters symbols to represent the related elements and then use the relationship as expressed by the equation to solve problem. For example in linear motion, the Distance travelled equals rate of speed multiplied by time. When this is put into symbols we have: $d = v \times t$ (where d = distance, v = rate of speed and t = time). Finding the d may not be so difficult, but difficulties arise when the student is to find either the v or the t .

The difficulties inherent in problem-solving in physics fall into four distinct categories. These are:

- *comprehension,*
- *structure,*
- *operation, and*
- *judgment*

There are suggestions on the instructional patterns that the teacher can adopt to deal with each of the problems. In this study, the major focus is on testing the effectiveness of these instructional patterns on achievement of secondary school students in physics.

The first type of difficulty which many students face in problem-solving in physics is that of *comprehension*. Let us examine a question culled from Physics (Essay) Paper 2 May/June, WAEC, 2015 to illustrate the problems that some students encounter while solving problems. The comments of the Chief Examiners' (Physics) shall also be examined.

Question 2 Physics (Essay) Paper 2 May/June, WAEC, 2015

A body is projected at an angle of 30° to the horizontal with a velocity of 150ms^{-1} . Calculate the time it takes to reach the greatest height. [Take $g = 10\text{ms}^{-2}$ and neglect air resistance]

The comments of the WAEC Chief Examiners' Report (Physics) are as reported:

The question on projectile numerical was popular among the candidates and it was fairly attempted. Some candidates could not differentiate total time of flight 'T' from the time taken to reach the maximum height 't'. The time **t** was needed to solve the question. Few candidates omitted correct unit of time while others wrote wrong units.

The content of the WAEC Chief Examiners' report (Physics) shows that some candidates had difficulty in solving the problem. When a problem such as this is given and a student seems unable to solve it then the following questions must be asked: Does the student have a clear understanding of what the problem is? Does the student know the data to be used in seeking solution? Does the student know within what context, or restrictions, the solution is to be sought? And what type of information is to be furnished by the solution, if and when it is found? When a student is confronted with any of such difficulty, his or her troubles very likely are due to vocabulary weakness, inefficient reading habits, inability to distinguish known from unknown, inability to phrase the essential part of the problem in one's own words, or inability to detect

hidden questions, interpretations, and implications. Though it might seem dated, Johnson and Gerald (1967) suggested some instructional techniques which might be used to remove such difficulty. Some of the instructional techniques suggested were: Physics teachers should assist in giving specific training in the use of a dictionary; Physics teachers should encourage and train students to ask oneself pertinent questions and provide answers to discover hidden questions and meanings; Physics teachers should inculcate in the students the habit of slow, careful, and critical reading; and the practice of telling in one's own words what one has read.

The next type of difficulty likely to cause trouble in problem solving is that of determining the *structure* of the solving process. Some of the sources of such difficulty are inability to distinguish between essential and nonessential data, and inability to recognize basic relationships. In order to help students overcome such problems the Physics teacher should: Direct students attention to the selection of pertinent data with such questions as -what is given? What are required to be found? What should be known in order to answer the question? And why does one need to use certain data and not other data supplied in the statement of the problem?

The physics teacher should also instruct students on how to identify basic relationships, pertinent formulas, hidden questions which need to be answered, and help students acquire the ability to formulate similar problems which have the same basic pattern but not so difficult to solve. The third type of difficulty associated with problem-solving is that of being able to perform the *operation* needed to accomplish the solution. Among the sources of this type of difficulty are inadequate comprehension of basic principles, fundamental laws and principles of physics within which the problem is stated, unfamiliarity with the implications of the basic algorithms and formulas of the mathematical system, and carelessness in working procedures. In order to improve the problem-solving skills, Johnson and Gerald (1967) suggested that the teacher should help students learn how to: review basic laws and principles underlying the concept for clearer understanding; and analyse the algorithms (problem solving strategies that may or may not involve mathematical equations) and formulas for better comprehension of the structure of the physics concept. This is necessary, because according to Cohen, Kennedy-Justice, Pai, Torres, Toomey, DePierro, and Garafalo, (2000), if students do not have adequate understanding of the fundamental mathematical concepts used in solving problems, such as meaning of ratios, change of subject and formula, inverse and linear relationships, problem-solving has the potential of becoming “an exercise in mere symbol manipulation. For example, an introductory student (senior secondary school One students) (Age 16+) may memorise the algorithms for determining the height attained by an object in a motion under gravity such as $H = \frac{1}{2}gt^2$.

While this algorithm is correct in the sense that it will give the correct answer for the height attained, it shows no understanding of the concept of motion of objects under gravity. This is because students who lack problem-solving skill may find it difficult to find time to reach maximum height. An introductory student lacking in conceptual knowledge may not understand why this algorithm works. They will, however, be able to correctly apply this meaningless algorithm to homework and exam questions. Using this algorithm without conceptual understanding does not enhance or improve a student's problem solving abilities.

Cohen et al. (2000) respond to this common occurrence by proposing “meaningful” problem solving in the classroom. When students are solving quantitative problems, instructors should not be satisfied with numerically correct answers. Rather, they should require students to demonstrate their conceptual understanding of every aspect of the problem, including the

equations and ratios used to solve the problem. Cohen et al. propose that this process of developing conceptual understanding of problem solving should occur at the secondary level, as it requires more time than may be available in a college course.

Generally the instruction on problem solving should include inculcating in the students the following skills, among others: The skill to:

- Construct an informative diagram of the physical situation;
- Identify and list the given information in variable form;
- Identify and list the unknown information in variable form;
- Identify and list the equation that will be used to determine unknown information from known information;
- Substitute known values into the equation and use appropriate algebraic steps to solve for the unknown information;
- Check final answer to insure that it is reasonable and mathematically correct.

Some past studies (such as Cohen et al. 2000; Bunce & Heikknen, 1986) on the effect of problem-solving instruction on students' achievement in science show that there was no improvement in the achievement of students. In Bunce and Heikkne's (1986) work in which they implemented a curriculum focused on teaching students how to solve problems in general chemistry. In the study the students were trained to follow a series of problem solving steps with hopes that they would improve their ability to successfully solve mathematical problems in chemistry. Results showed no improvement in problem solving success with the trained students. Similarly the results of the study of Cohen et al. (2000) show that instruction in problem solving techniques, including explanations and examples has little value in helping students become better problem solvers.

However, some studies (Çalışkan, Selçuk & Erol, 2010; Ghavami, 2003; Jeon, Huffman & Noh, 2005) reported that instruction in problem solving could bring about improvement in achievement of students. In the study of Jeon, Huffman and Noh (2005) in which thinking aloud pair problem-solving instruction was used in Chemistry lesson, the achievement of students in the experimental group improved better than those in the conventional group. In the study of Çalışkan, Selçuk and Erol, (2010), results of their study showed that students who received instruction in problem-solving performed better in Physics Achievement Test than their colleagues in the traditional method in which instruction in problem-solving method was not used.

These contrasting results show that there is the need for further studies in this field. Moreover, the extent to which these results can be generalized to African setting has not been properly documented in literature in physics education. It is on the basis of this that in this study the author examined the extent to which instructions in problem-solving can enhance the achievement of students in secondary school physics.

Gender as a strong predictor of human behavior has been a central focus in classroom research. Efforts made through research to link sex difference to learning outcomes in Physics have been inconclusive, as there has been conflicting results in an attempt at finding gender related differences in physics achievement. Generally studies have shown that boys are better at more logical and theoretical subjects such as mathematics and science, while girls have been found to be better in creative subjects like art and reading (Ariyibi, 2010). However, in the literature there is little information on the extent to which instructions on problem-solving can

improve or otherwise the achievement of girls in physics. However in physics education programme in secondary schools, boys enrolled more than girls. If effort must be made to increase the enrolment of girls, instructional techniques that will encourage more girls into physics must be sought. It is on the basis of this that in this study the author examined the extent to which problem-solving instruction can improve girls' achievement in physics, with a view to encouraging more girls into physics. This is because, according to Adegoke (2012), if girls perform in physics there is likelihood that more girls will be attracted to physics.

Hypotheses

- Hypothesis One: There is no significant difference in the mean scores in Physics of students who received instruction in problem-solving and those who did not receive instruction in problem-solving.
- Hypothesis Two: There is no significant gender effect on the mean scores in Physics of students who received instruction in problem-solving and those who did not receive instruction in problem-solving.
- Hypothesis Three: There is no interaction effect of treatment and gender on the mean scores of the students in Physics Achievement Test.

METHODS

Sample

In this study, quasi-experimental design was adopted. Two schools were randomly selected from Ona-Ara Local Government Area, Oyo State, Nigeria. In each of the senior secondary schools (SSS), only science class one (SSS I) was selected. In most Nigeria schools, in science class, students offer physics, chemistry and further mathematics. In this study, only students who were offering physics, chemistry and further mathematics as part of their probable subjects for senior secondary school certificate examination. In all, there were 108 students (62 boys and 46 girls). Their ages ranged between 14 years and 16 years (Mean Age = 16.7; Standard Deviation = 0.78). There were two groups: Group I - school in which students received instruction on problem solving techniques while learning projectile motion. In this group there were 53 students (37 boys and 16 girls). Group II - school in which students learnt projectile motion without the teacher emphasizing on problem solving techniques. In this group there were 55 students (36 boys 19 girls).

Materials

In this study, two instruments were used. These were: Instruction Guides and Physics Achievement Test (PAT).

Instructional Guides: There were two forms of Instructional Guides viz: Form A and Form B. Form A contains guidelines for the teacher in the problem-solving group, while Form B contains the guidelines for the teacher in conventional method group. The two forms present the steps to be taken by the teacher in each group.

Group I – Form A

The students in this group were exposed to problem solving techniques in addition to instruction on the meaning of the concept of motion under gravity.

Steps

In a typical lesson the teacher and the students activities were the following:

Introduction

The teacher

Step I: Introduces the topic by writing it on the chalkboard and communicates the focus of the lesson

Step II: Link the new lesson with previous knowledge.

Presentation

The teacher

Step III: Explains the content of the topic by giving the definition and explaining the concepts

Step III: Instructs the students to check for the meaning of the concepts, using dictionary

Step IV: Gives formulas and equations for solving numerical problems

Step V: Explains how to change the subject of the formula

Step VI: Gives and solves three examples of problems using the formula and equations

Evaluation

The teacher

Step VII: Writes three questions on the chalkboard for the students to solve

Step VIII: Instructs the students to solve the three questions in their note books

Step IX: Instructs the students to explain the content of each problem and what they were asked to solve

Step X: Instructs the students to explain why they think the answers to the problems were correct

The students

Step XI: Using the techniques learnt, solve the problems in their note books and explain how they got their solutions to the problems

The teacher

Step XII: Gives correct solutions to the problems for the students to review the steps for getting correct answers

Step XIII: The teacher and the students discuss the deficiencies and mistakes on the solutions which the students give to the problems

Group II – Form B

The students in this group were exposed to instruction on the meaning of the concept of motion under gravity and no explicit instruction on techniques for solving problems was given. In a typical class the teacher and the students activities were the following:

Introduction

The teacher

Step I: Introduces the topic by writing it on the chalkboard and communicates the focus of the lesson

Step II: Link the new lesson with previous knowledge.

Presentation

The teacher

Step III: Explains the content of the topic by giving the definition and explaining the concepts

Step IV: Gives formulas and equations for solving numerical problems

Step VI: Gives and solves three examples of problems using the formula and equations

Evaluation

The teacher

Step VII: Writes three questions on the chalkboard for the students to solve

Step VIII: Instructs the students to solve the three questions in their note books

The students

Step XI: Using the the equations and formulas, solve the problems in their note books.

The teacher

Step XII: Calls on a volunteer student who has solved the problem to show the solution to the problem on the board. The teacher however guides the student.

Step XIII: If a problem could not be solved by the student the teacher then explains how to solve the problem on the chalk board.

The major differences in the instructional techniques of the contrasting groups are in steps

Physics Achievement Test (PAT)

The PAT consists of five constructed response items in Physics (See Appendix 1). The items were selected from the topic in motion under gravity. Each item was scored on a 5-point scale of 0, 1, 2, 3, and 4. The difficulty indices and discrimination index of each item were determined using General Partial Credit Model of Item Response Theory. The maximum obtainable score was 20 and minimum obtainable score was 0.

Procedure

Two physics teachers (A and B) participated in this study. Each of the teachers holds B.Ed (Physics). They were unemployed. Teacher A taught students in Group I, while teacher B taught

in Group II. The two teachers made use of the instructional guides and the study lasted one week.

Before the commencement of the experiments in the two schools, the researcher visited the school and solicited the assistance of the physics teacher and the school principal. The students were encouraged to participate in the study. There were three sessions of teaching and one session was used for pretest and one session for posttest. These took place during the normal time scheduled for physics on the official time table. This was to avoid disruptions to normal school schedules.

The two tests, that is pretest and posttest was the PAT. During the posttest, the students used 43 minutes, while during posttest the average time used by the students was 35 minutes.

Method of data Analysis

The groups mean scores and standard deviation were calculated. The hypotheses were tested using Analysis of Covariance (ANCOVA) at 0.05 level of significance. This was to test for significant differences between the group means and to control for the effects of covariates.

RESULTS

The results are presented in the order in which the hypotheses were stated.

Hypothesis One: There is no significant difference in the mean scores in Physics of students who received instruction in problem-solving and those who did not receive instruction in problem-solving?

Pre-test:

In the pre-test (not shown in the table) the students in group one had a mean score of 2.02 (SD = 1.01), while the students in group two had a mean score value of 2.19 (SD = 1.12). This shows that the two groups were quite equivalent before the experiment.

Post-test:

Table 1 presents the mean score and the standard deviation of the two groups in the PAT

Table 1: Mean and Standard Deviation of the Groups in PAT

Treatment/Groups	Number	Mean	Std. Deviation	Mean Difference
Group I	60	10.87	2.95	2.48
Group II	48	8.39	3.71	

From the table, students in Group I had higher score than their colleagues in Group II. The mean difference of 2.48 was significant $F(1, 103) = 10.89, p = 0.001$. The null hypothesis was therefore rejected. The calculated effect size of 0.096 was moderate showing that the observed difference in the mean scores of the two contrasting groups was due to the methods of instructional technique that was adopted. More importantly, about 9.6% of the observed variance in the students' mean scores was due to treatment. That is instructing students the techniques of problem solving can enhance their achievement in Physics. This is because students in Group I

had better gain in score of 8.85 (Posttest [10.87] – pretest [2.02]) than their colleagues in Group II who had gain in score of 6.20 (Posttest [8.39] – pretest [2.19]).

Table 2: Tests of Between Subjects Effects

Source	SS	Df	MS	F	Sig.	η^2
Corrected Model	208.275 ^a	4	52.069	4.725	.002	.155
Intercept	2300.275	1	2300.275	208.759	.000	.670
Covariate2	13.684	1	13.684	1.242	.268	.012
Treatment	119.970	1	119.970	10.888	.001	.096
Gender	3.596	1	3.596	.326	.569	.003
Treatment * Gender	20.192	1	20.192	1.833	.179	.017
Error	1134.938	103	11.019			
Total	11649.000	108				

Hypothesis Two: There is no significant gender effect on the mean scores in Physics of students who received instruction in problem-solving and those who did not receive instruction in problem-solving. Table 3 presents the mean score and the standard deviation of the boys and girls in the PAT.

Table 3: Mean and Standard Deviation of the Boys and Girls in PAT

Gender	Number	Mean	Std. Deviation	Mean Difference
Male	67	9.60	3.46	0.45
Female	41	10.05	3.70	

From the table, it girls had higher score than boys. However, the mean difference of 0.45 was small and not significant $F(1, 103) = 0.36, p = 0.569$. The null hypothesis was therefore not rejected. The calculated effect size of 0.003 was very small.

Hypothesis Three: There is no interaction effect of treatment and gender on the mean scores of the students in Physics Achievement Test.

A further analysis of boys and girls scores in the two contrasting groups was carried out to note which of the gender benefitted more from instructions in problem-solving. Table 4 shows the results of the analysis

Table 4: Mean Score and Standard Deviation of Treatment by Gender

Treatment	Gender	N	Mean	Std. Deviation
Group I	Boys	37	11.05	3.05
	Girls	23	10.57	2.95
Group II	Boys	30	7.80	3.11
	Girls	18	9.39	4.49

From table 4, both boys and girls in Group I performed better than boys and girls in Group II. In fact boys in Group I with Mean Score of 11.05 gained better than their colleagues (Mean score of 7.80) in Group II. The mean difference was 3.25. However, the mean difference in the mean score of girls in the two Groups was small (1.18). These results point to the fact that instructions in problem-solving are useful for both boys and girls. It enhanced girls' achievement in Physics

while boys were not at any disadvantage.

DISCUSSION

The results of this study show that students' achievement in Physics can be enhanced by giving explicit instructions to students on problem-solving. This is so because physics by its nature involves solving numerical and word problems. As indicated in the preceding paragraph, Physics is filled with equations and formulas that deal with such concepts and topics as angular motion, fluids and fluid motion, forces, moments of inertia, linear motion, projectile motion, motion under gravity, simple harmonic motion, thermodynamics, and work and energy. Many concepts in Physics are explained by using equations and formulas, therefore for a students to do well in physics he or she must have the ability to use these equations and formulas to solve numerical problems. The results of this study, that is, that instruction in problem-solving improved students' learning outcomes in physics are in line with that of Çalışkan, Selçuk, and Erol, (2010), McCalla (2003) and Ghavami (2003) who found out that giving students instruction on problem solving in Physics could help enhance their achievement.

However, the results of this study were in contrast with some studies such as Cohen et al. (2000). For example in the study of Cohen et al. (2000) on the effect of problem-solving instruction on students' achievement in science the results of their study showed that there was no improvement in the achievement of students. Specifically, the study of Cohen et al. (2000) show that instruction in problem solving techniques, including explanations and examples has little value in helping students become better problem solvers.

One of the reasons why the results of this study were not in consonance with that of Cohen et al. was that in this study efforts were made to have the students have conceptual understanding of the concepts that were taught during the experiment. For example, the teacher in experimental Group I took time to explain the difference between the "*time of flight*" and the "*time that the object took to reach the maximum height*". In the teaching and learning of motion under gravity, many students are always confused between the two terms, that is, "*time of flight*" and the "*time that the object took to reach the maximum height*". Also usually the concept of time as defined in motion under gravity requires that $t = \sqrt{\frac{2h}{g}}$. Some students when asked to find t gives the formula as $t = \sqrt{\frac{g}{2h}}$. This problem usually arises as a result of lack of understanding of change of subject of formula.

Moreover, during the problem solving process, students are required to use their prior knowledge and find their deficiencies in learning. In addition, as indicated by Huffman (1997), while in the traditional problem solving focuses only on quantitative aspects, in explicit problem solving process, a problem is dealt with from both quantitative and qualitative dimensions. This qualitative aspect of the explicit problem solving process may have not only improved students' problem solving performance but also enhanced their understanding of physics concepts and principles. In this context, it can be said that explicit problem solving instruction is more effective than traditional problem solving instruction on students' achievement in Physics.

CONCLUSION AND RECOMMENDATION

In line with the findings of this study, physics teachers should endeavour to in addition to

teaching the concepts in physics, instruct their students on how to solve numerical problems. This can be achieved by making sure that students have adequate understanding of the concepts and techniques for solving problems. Physics teachers should teach students how to select pertinent data which are required to solve the problem. The student must know what and what information are given? What are required to find? What should be known in order to answer the question? And why does the one need to use certain data and not other data supplied in the statement of the problem? In this study, both boys and girls benefited from explicit instruction on problem solving, this suggests that more girls can be attracted to Physics if Physics teachers can adopt this method while teaching Physics at the secondary school level.

REFERENCES

- Adegoke, B. A. (2012). Impact of Interactive Engagement on Reducing the Gender Gap in Quantum Physics Learning Outcomes among Senior Secondary School Students. *Physics Education*, 47(4), 462–470.
- Adegoke, B. A. (2013). A survey of Nigerian Senior Secondary School Students' Interest in Physics. *Nigerian Journal of Clinical and Counselling Psychology*, 19(1), 1-7.
- Akuche, E. U. (2008). Effects of four instructional strategies on students' learning outcomes in Physics. Unpublished doctoral thesis, Institute of Education, University of Ibadan, Nigeria.
- Ariyibi, A. O. (2010). An assessment of gender differences in achievement motivation among adolescents students in the Federal Capital Territory, Abuja. *Ibadan Journal of Educational Studies*, 7(1&2) 72-80.
- Bunce, M. D., & Heikkinen, H. (1986). The effects of an explicit problem-solving approach on mathematical chemistry achievement. *Journal of Research in Science Teaching*, 23(1), 11–20.
- Çalışkan, S., Selçuk, G. S., & Erol, M. (2010). Instruction of problem solving strategies: Effects on Physics achievement and self-efficacy beliefs. *Journal of Balitic Science Education*, 9(1), 20- 34.
- Carson, M. P., & Bloom, I (2005). The cyclic nature of problem solving: an emergent: Multidimensional problem solving framework. *Educational Studies in Mathematics*, 58(1), 45-75.
- Chukwunye, J. N., & Adegoke, B. A. (2014). Catching students' interest in physics using computer simulated experiments. *West African Journal of Education*, XXXIV, 295-309.
- Cohen, J., Kennedy-Justice, M., Pai, S., Torres, C., Toomey, R., DePierro, E., & Garafalo, F., (2000). Encouraging meaningful quantitative problem solving. *Journal of Chemical Education*, 77, 1166-1173.
- Dale, P. M. & Balloti, E. (1997). An approach to teaching problem solving in the classroom. *College Student Journal*, 31(1), 40-76.
- De Jong T., & Ferguson-Hessler M. G. M. (1986). Cognitive structures of good and novice problem solvers in physics. *Journal of Educational Psychology*, 78, 279-288.
- Foster, T. M. (2000). *The development of students' problem-solving skill from instruction emphasizing qualitative problem solving*. (Doctoral dissertation, The University of Minnesota, 2000). Retrieved from ProQuest Digital Dissertations (UMI No.9972959).
- Ghavami, P. (2003). *Cognitive aspects of problem solving and the achievement of first year college Physics students*. Doctoral dissertations, University of Houston.

- Hardin L. E. (2002). Problem solving concepts and theories. *JVME* 30(3) AAVMC <http://www.utpjournals.com/jvme/tocs/303/226.pdf>.
- Huffman, D. (1997). Effect of problem solving instruction on high school students' performance and conceptual understanding of Physics. *Journal of Research in Science Teaching*, 34(6), 551 -570.
- Jeon, K. Huffman, D. & Noh, T. (2005). The effects of thinking aloud pair problem solving on high school students' chemistry problem-solving performance and verbal interactions. *Journal of Chemical Education*, 82(10), 1558-1565.
- Johnson, D. R., & Gerald, R. R. (1967). *Guidelines for teaching Mathematics* Belmont, California: Wadsworth Publishing Company
- Johnstone A. H. (1991). Thinking about thinking. *International Newsletter on Chemical Education*, 36, 7-11.
- Jonassen, D. H. (2010). Research issues in problem solving. The 11th International Conference on Education Research New Educational Paradigm for Learning and Instruction September 29 –October 1, 2010.
- McCalla J. (2003). Problem solving with pathways. *Journal of Chemical Education*, 80(1), 92 – 98.
- Metallidou, P. (2009). Pre-service and in-service teachers' metacognitive knowledge about problem-solving strategies. *Teaching and Teacher Education*, 25, 76-82.
- Schoenfeld, A. (2013). Reflections on Problem Solving Theory and Practice. *Time*, 10(1&2), 9. Retrieved November 30, 2016 from http://www.math.umt.edu/tmme/vol10no1and2/1-Schoenfeld_pp9_34.pdf.
- Sternberg R. J. (1981). Intelligence and nonentrenchment. *Journal of Educational Psychology*, 73, 1- 16.
- VanLehn, K., Bhembé, D., Chi, M., Lynch, C., Schulze, K., Shelby, R., Taylor, L., Treacy, D., Weinstein, A., & Wintersgill, M. (2004). *Implicit versus explicit learning of strategies in a non procedural cognitive skill*. In J. C. Lester, R. M. Vicari, & F. Paraguacu (Eds.), *Intelligent Tutoring Systems: 7th International Conference* (pp. 521-530). Berlin: Springer-Verlag.
- West African Examination Council (2011). *Examiners' Report: Physics 2*, Lagos, Nigeria: Afi Prints.
- West African Examination Council (2012). *Examiners' Report: Physics 2*, Lagos, Nigeria: Afi Prints.
- West African Examination Council (2013). *Examiners' Report: Physics 2*, Lagos, Nigeria: Afi Prints.
- West African Examination Council (2014). *Examiners' Report: Physics 2*, Lagos, Nigeria: Afi Prints.
- West African Examination Council (2015). *Examiners' Report: Physics 2*, Lagos, Nigeria: Afi Prints.

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Appendix 1
Physics Achievement Test

Instruction: Answer all questions. Each question carries five marks.

Time: 1 hour

1. A mango fruit is projected horizontally from the top of a mango tree with a speed of 6ms^{-1} . It lands on the ground level at a horizontal distance of 15 m from the foot of the mango tree. Calculate the height of the mango tree. [Take $g = 10\text{ms}^{-1}$]
2. The horizontal component of the initial speed of a particle projected at 30° to the horizontal is 50ms^{-1} . Calculate its initial speed. [Take $g = 10\text{ms}^{-1}$]
3. A stone of mass 0.5kg is thrown vertically upwards from the ground with a speed of 15ms^{-1} . Calculate its potential energy at the maximum height. [Take $g = 10\text{ms}^{-1}$]
4. A ball thrown vertically upwards reaches a maximum height of 40 m above the level of projection. Calculate the time it takes the ball to reach the maximum height. [Take $g = 10\text{ms}^{-1}$]
5. A ball is projected at an angle of 60° to the horizontal with a speed of 50ms^{-1} . Calculate the speed of the ball at its maximum height. [Take $g = 10\text{ms}^{-1}$]



Evaluation of the Application of ICT in Continuous Assessment by Academic Staff of Universities in Abia State, Nigeria

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Abstract

The study evaluated the application of ICT in continuous assessment by academic staff of Universities in Abia State. The study focused on why and how academic staff of Universities use or do not use ICT in assessment and the frequency of ICT use during instruction as well as the level of application of ICT in classroom assessment in universities in Abia State. The study adopted an exploratory descriptive design. The population of the study comprised five hundred and fifty nine (559) academic staff of two universities in Abia State. A sample of two hundred and one (201) academic staff was drawn randomly from Michael Okpara University of Agriculture, Umudike and Abia State University Uturu. The instrument used for data collection was questionnaire titled Application of ICT in Continuous Assessment (AICTCA) and made up of 20 items using 4 points modified scale measuring the level of application of ICT in classroom assessment and the use of ICT by academic staff of Universities in Abia State. It was validated by three experts in the department of science education Michael Okpara University of Agriculture Umudike. The instrument was subjected to test re-test method of reliability with co-efficient of $r = 0.87$. All the research questions were analyzed using mean and pooled mean while Anova was employed in testing hypotheses. The results revealed low use of ICT by academic staff of the universities in teaching. Low extent of application of ICT in classroom assessment by academic staff among others. It was recommended that academic staff should take advantage of the available ICT facilities and use them for teaching and assessing students in the classrooms.

Keywords: Evaluation, Application, Assessment, Academic Staff, ICT, Nigeria.

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INTRODUCTION

Information and communication technologies (ICTs) are information handling tools that are used to produce, store, and process, distribute and exchange information. These different tools are now able to work together, and combine to form networked world- which reaches into every corner of the globe (UNDP Evaluation Office, 2001). All over the world, countries seem to have identified the significant role of information and communication technology (ICT) in improving education. Nigeria for instance has invested heavily in ICT by increasing the numbers of computers in schools and in the networking of classrooms.

However, the integration of technology in the school curriculum continues to be a complex and challenging process and seamless integration of ICT in teaching and learning has yet to be achieved (Kozma & Anderson, 2002). Teachers roles in the integration of ICT in school especially in assessment is obviously very important. It is against this background that Cuban (2000) observed that every educational reform effort should take into consideration teacher's knowledge and skills in using ICT for classroom assessment. Hence, continuous assessment was defined by the federal ministry of education science, and technology as a 'mechanism where the final grading of a student in the cognitive affective and psychomotor domains of behaviour takes account of all his performance during a given period of schooling. It is a technique of determining the learners' achievement in cognitive affective and psychomotor domains taking into account all their scores in tests, assignments, projects, interviews, sociogram and so on during a school term session or programme (Unachukwu & Onunkwo 2004).

If effectively conducted by teachers, continuous assessment is expected to give teachers greater involvement in the overall assessment of learners, to provide more valid assessment of learners' ability and performance to make teachers become more flexible and innovative in their instruction and to improve on their instructional strategies and more importantly to reduce examination malpractice as is the bane of the one-shot /one-in-all summative evaluation. Hence, the application of ICT in continuous assessment can be defined as a formative or summative assessment of an educational programme using the ICT resources like computer. The assessment is electronically administered and scored. The folder of leveled indicators of students' progress using ICT has been developed by the Essex ICT curriculum advisory team in United Kingdom (UK). The software provided can enable individuals, groups to be assessed, their progress to be tracked and targets to be identified. Individual reports can be automatically generated. The software produces a statement of what the child has achieved and the next step target. One of its laudable features is that feedback on students' progress could be e-mailed to the child or parent or guardian. Data can be compared between classes within a school. Using ICT applications, a number of educational institutions are not only able to run courses concurrently, but lectures/assessment can also be administered simultaneously, as they are being delivered, in different lecture rooms that are located in places far away from the actual point of delivery.

Successful integration of ICT in Nigeria universities especially in Abia State depends largely on availability, competence and the attitude of academic staff towards the role of modern technologies in teaching and learning. A practical observation have shown that universities in Abia State have either insufficient or no ICT tools to cater for the ever increasing population of students in the institutions and where they are available, they are by implication a matter of out-of-bound to academic staff and the students. The unavailability of some ICT components in the institutions are likely to hampers teachers' use of ICTs especially for the assessment of students. Looking at the developing countries according to Beukes-Amiss and Chiware (2006) there is generally limited access time per month using ICT by both teachers and students, and even less time spent with reliable internet access. This

is not an exception in tertiary institution in the state where majority of academic staff seem not to have access to ICT components and most unfortunately do not possess a personal computer. Based on this observation therefore, it is worthwhile to note that teacher's role in the integration of ICT in classroom assessment cannot be over emphasized and every educational reform effort should take into consideration teachers' knowledge, skills, beliefs and attitudes towards the use of ICT in classroom assessment.

Research evidence indicates that technology reform efforts in integrating ICT in classroom assessment have failed because teacher's beliefs, skills, and attitude were never taken into consideration (Cuban, 2000; Becker & Ravitz, 1999; Brush, 1998). A study conducted by Papanastasiou and Angeli (2008) revealed a very low frequency with which software programs were actually used in various school subjects by teachers. The average amount of use per week was found to have ranged from 0 to 0.86 times. Salman, Ogunlade, Ogunlade and Adegbami (2013) study on assessment of secondary school teachers' professional development in the use of information communication technology for teaching mathematics revealed amongst others, that there was awareness among teaching and students on the use of information communication technology (ICT) in teaching mathematics at the secondary schools but there was a significant differences in its use by teachers in private and public secondary schools.

Fakeye (2010) also found out in a study carried in Ibadan that most of the schools covered in the study do not have computers, hence were not connected to the internet. He added those who have computers do not use for teaching but solely for administrative purposes. Okwudishu (2005) found out that the unavailability of some ICT components in school hampers teacher's use of ICTs. Lack of adequate search skills and access points in the schools were reported as forces inhibiting the use of internet by secondary s (Adomi & Kpangban, 2010). Another study by Adul-Salaam (2011) found that most teachers used as the samples for the study were not competent in the use of ICT. The use of ICT in tertiary institutions by academic staff generally seems of education by academic staff generally seems to be increasing and dramatically growing. However, while there is a great deal of knowledge about how ICT is used in continuous assessment in developed countries, there is not much information on how ICT is being used by academic staff in tertiary institutions in Abia State. The focus of most studies from literature on what students learn from technology has left a gap in understanding why and how academic staff in Abia State Universities use or do not use ICT In assessment. Based on these observations the study raised the following research questions:

- What is the frequency of ICT use during instruction by academic staff of the universities in Abia State?
- What is the level of application of ICT in classroom assessment by academic staff of the universities in Abia State?

Hypotheses

- There is no significant difference in the use of ICT in classroom assessment by academic staff of the two universities.
- The use of ICT in classroom assessment does not significantly vary with years of teaching experience.

METHODS

The study adopted an exploratory descriptive research design. Therefore, it was not rigorous with respect to sampling. The population of the study comprised academic staff of two public universities in Abia state. The population of the study comprised five hundred and fifty nine (559) academic staff of two universities in Abia State. A sample of two hundred and one (201) academic staff was drawn randomly from Michael Okpara University of Agriculture, Umudike and Abia State University Uturu. The choice of the institution was based on the fact it was an institution with the highest number of departments and schools and to a large extent academic staff that are suitable for conducting the study. It was also the most convenient and security risk free institution in the state at the time the study was conducted. Therefore, simple random sampling technique was used to elect two hundred and one academic staff from the two selected universities for the study.

The instrument used for data collection was questionnaire titled Application of ICT in Continuous Assessment (AICTCA) and made up of 20 items using three response key of “Always,” “sometimes and “never”. This was based on the assumption that the response to such issue is “not an all or none affair”. That is although an item may not be used; when it is used, it is Always or Sometimes and when it is not, it is never. It was validated by three experts in measurement and evaluation, in the department of science education Michael Okpara University of Agriculture Umudike. For the purpose of estimating the reliability of the questionnaire the categories of responses were weighed: Always = 3, Sometimes = 2 and Never =1. The test-retest method of reliability of the instrument was used and the data obtained were analyzed using Pearson Product Moment Correlation and yielded a correlation coefficient of 0.87.

A self-inductor letter was written by the researchers to the university authorities seeking for permission to conduct the study and the approval was granted. The researchers met all academic staff in all departments and their consent led to the administration of the instrument. This was because it was during the semester examination and all the academic staff were on ground. The (ASQICTU) was administered on 201 academic staff in their offices and during the period of distribution of examination questions and 197 were successfully retrieved, which gave a return rate of 98%. It took an average of 4 hours 45 minute in 4 days to administer the questionnaire. The data obtained from this study were analyzed using percentage frequency; the percentage of response to each of the response category was computed per item in the scale. The percentage was rounded up to the nearest whole number for brevity. The hypothesis 1 was tested with analysis of variance (ANOVA) while hypothesis 2 was tested with Analysis of Covariance (ANCOVA) set at 0.05 level of significance.

RESULTS

Research Question One

The frequency of ICT use during instructions by academic staff of the universities is presented is on Table 1.

The result from Table 1 indicated low use of ICT by academic staff of universities during teaching. Only 56% responded that they always use public address system when I have large class. Although 73% claimed to sometimes use computer to record information and distribute to students, 99% never used educational games in lectures.

Table 1: Percentage of ICT Use by Academic Staff of the Universities

S/N	Statement	Always	Sometimes	Never	Total
1	I use the internet to search for teaching materials	6	15	79	100
2	I use internet for sending message to my students	1	10	89	100
3	I use computer to record information and distribute to students	20	73	7	100
4	I visit ICT center to develop my teaching skills	0	59	41	100
5	I use computer to present learning materials to students	12	50	38	100
6	For effective lecture delivery I use computer	2	46	52	100
7	I employ the use of computer in teaching students.	2	31	67	100
8	For effective lecture delivery I use power point presentation	0	6	94	100
9	I use educational CDs when delivering my lecture	0	2	98	100
10	I use educational games in my lectures	0	1	99	100
11	I use projector for my lecture delivery	1	5	94	100
12	I use public address system when I have large class	56	31	13	100
13	I use interactive boards for presentation of lesson	0	4	96	100

Research Question Two

The level of application of ICT in classroom assessment by academic staff of the universities is presented on Table 2.

Table 2 indicated that there is low level of application of ICT in classroom assessment by academic staff of the universities. Those that give students assignment to search the internet always were 73% while 99% never ask students to submit their assignments through e-mail. It is interesting that 78% sometimes use computer to prepare all assessment, 90% never use computer to keep data base of tests items bank, 98% never ask students to submit their assignments to them on CD Rom, 96% never use SMS to communicate assessment results to students.

Table 2: Level of Application of ICT in Classroom Assessment in Percentage

S/N	Statement	Always	Sometimes	Never	Total
14	I give my students assignment to search on the internet	73	19	8	100
15	I consult the internet to help me plan my class assessment	12	69	19	100
16	Students submit their assignments to me through e-mail	0	1	99	100
17	I ask students to submit their assignments to me on CD Rom	0	2	98	100
18	For effective and quick assessment delivery I use computer	2	51	47	100
19	Students score are processed by me using excel sheet	2	34	64	100
20	I use Microsoft excel to type student's assessments records	3	21	76	100
21	I use Microsoft excel to compute student CGP	1	54	45	100
22	I use computer to score student assessments	0	19	81	100
23	I use computer to prepare all my assessment	7	78	15	100
24	I use computer to type semester examination questions	15	33	52	100
25	I use computer to keep data base of my tests item bank	1	9	90	100
26	I use SMS to communicate assessment results to students	0	4	96	100

Hypothesis One

There is no significant difference in the use of ICT in classroom assessment by academic staff of the two universities. Data obtained from the responses of academic staff on the use of

ICT during instructions were tested with analysis of variance at the 0.05 level of significance. The results are presented on Table 3a and b.

Table 3a: Analysis of variance on the use of ICT in classroom assessment by academic staff of the two universities

Source of variation	Sum of Squares	DF	Mean Square	F	Sig.
Between Groups	8.969	1	8.969	.080	.778
Within Groups	21907.204	195	112.345		
Total	21916.173	196			

Table 3b: Mean and Standard Deviation

Academic Staff	Mean	Std. deviation	N
MOUAU STAFF	67.4272	10.52690	103
ABSU STAFF	67.0000	10.67809	94
Total	67.2234	10.57437	197

Result from table 3a and b showed no significant difference in the use of ICT in classroom assessment by the academic staff of the two universities ($P > 0.05$). The null hypothesis in this case has been accepted. This statistically means that the academic staff does not significantly differ on the use of ICT in classroom assessment.

Hypothesis Two

The use of ICT in classroom assessment does not significantly vary with years of teaching experience. Data obtained from the responses of academic staff on the use of ICT during instructions were tested with Analysis of Covariance (ANCOVA) at the 0.05 level of significance. The results are presented on Table 4a and b.

Table 4a: Analysis of covariance on the use of ICT in classroom assessment with vary years of teaching experience

Source of variation	Sum of Squares	df	Mean Square	F	Sig.	Remarks
Corrected Model	2114.510 ^a	3	704.837	7.153	.000	S
Intercept	445197.883	1	445197.883	4518.126	.000	
Years of teaching experience	2114.510	3	704.837	7.153	.000	
Error	19017.439	193	98.536			
Total	976239.000	197				
Corrected Total	21131.949	196				

a. R Squared = .100 (Adjusted R Squared = .086)

Table 4b: Mean and Standard Deviation

Years of teaching	Mean	Std. deviation	N
1-9	68.1890	10.30698	127
10-19	73.9744	9.11473	39
20-29	74.5000	8.81088	20
30-39	62.0000	10.00000	11
Total	69.6294	10.38345	197

Result from table 4a and b showed significant difference in the use of ICT in classroom assessment as regards to their years of teaching experiences ($P < 0.05$). The null hypothesis in

this case has been rejected. This statistically means that the academic staff use of ICT in classroom assessment significantly differs based on their teaching experiences.

DISCUSSION

The study revealed low use of ICT by academic staff of universities in teaching, learning and continuous assessment. The result is consistent with Papanastasiou and Angeli (2008) whose study revealed a very low frequency with which software programs were actually used in various school subjects by teachers. This low use of ICT by academic staff could be as a result of low awareness of the importance of ICT in teaching and assessment. A reasonable number of them affirmed that they have not been having opportunities of attending seminars and workshops on ICT which would have increased their awareness on ICT use. This finding is in line with the finding of Okwudishu (2005), Adomi and Kpangban, (2010) that unavailability of some ICT components in schools and lack of adequate search skills and access points in the schools hampers teacher's use of ICTs and were viewed as forces inhibiting the use of internet by secondary school teachers. Although, the subjects of these studies were secondary school teachers and Colleges of Education academic staff. Academic staff of universities also reported similar trend. The implication is that, more effort is needed to be done by the University authorities to expose academic staff to ICT facilities so that they improve their skills in ICT for academic purpose. Academic staff on the other hand should take it as a challenge that the need for them to be ICT complaints was long overdue.

The study revealed low level of application of ICT in classroom assessment Academic staff of universities. This finding is in agreement with the findings of Cuban (2000); Becker and Ravitz (1999) and Brush (1998) that technology reform efforts in integrating ICT in classroom assessment have failed because teachers' beliefs, skills and attitudes were never taken into consideration. Result obtained by Abdul-Salaam (2011) that most teachers used as the sample for her study were not competent in the use of ICT suffices here. This is because for effective integration of ICT in assessment, teacher must be competent in handling the necessary ICT software that could enhance assessment. Academic staff expressed their concern about high cost of ICT tools which they were not capable of purchasing during the time of data collection suggesting that except the government could subsidize. In other word, academic staff of universities in Abia State still lags behind in modern technological modes of instruction and assessment. For effective use of ICT for classroom assessment, academic staff and students must be cognitively and affectively prepared to embrace the innovations in teaching and learning particularly in using ICT for classroom assessment.

There was no significant difference in the use of ICT in classroom assessment by academic staff of the two selected universities. The finding aligned with Kozma and Anderson (2002) submission that the integration of technology in the school curriculum continues to be a complex and challenging process and the seamless integration of computers in teaching and learning has yet to be achieved. There was a significant difference in the use of ICT in classroom assessment by academic staff based on years teaching experience. The results showed that academic staffs with 30-39 year of experience never use ICT gadgets in classroom teaching, learning and assessment. This finding is in agreement with the finding of Adul-Salaam (2011) finding that most teachers used as the sample for her study were not competent in the use of ICT. It appears that academic staff might not have been familiar with the changing trend in ICT. Effective integration of ICT in teaching and assessment required that academic staff must be competent in handling the necessary ICT software that could enhance teaching assessment. Teacher's role in the integration of ICT in schools especially in assessment is obviously very important. It is against this background that Cuban (2000)

observed that every educational reform effort should take into consideration teacher's knowledge and skills in using ICT for classroom assessment.

CONCLUSION

This study evaluates the application of ICT in continuous assessment by academic staff of Universities in Abia State. From the findings, the researcher can deduce and conclude that there are low uses of ICT by academic staff of universities in teaching, learning and continuous assessment and the academic staff of the selected universities in Abia State are of the same view on the level of Information and Communication Technology utilizations in continuous assessment. This calls for urgent attentions as the use of Information and Communication Technology in continuous assessment is a welcome development that will improve instructional strategies and more importantly reduce examination malpractice.

Recommendation

- Academic staff should take advantage of the available ICT facilities and use them for teaching and assessing students in the classrooms.
- National University Commission should ensure that academic staff takes advantages of the available ICT facilities so they can use it in teaching, learning and assessing students;
- University authorities should provide opportunities of attending seminars and workshops on ICT by academic staff to increase their awareness on ICT use.

REFERENCES

- Abdul-Salaam, A. O. (2011). Assessment of schools teachers' use of information and communication technology (ICT) in Oyo Metropolis of Nigeria. *Journal of Education and Social Research*, 1(5), 131-136.
- Adomi, E. E., & Kpanngban, E. (2010). Application of ICT's in Nigerian secondary schools. *Library Philosophy and Practice*. Retrieved June 16, 2016 from <http://digitalcommons.unl.edu/libphilprac/345>.
- Allen, M. J., & Yen, W.M. (1979). Introduction to measurement theory. California: Brooks/Cole Publishing Company Belmont.
- Anastasi, A., & Urbina, S. (2008). *Psychological testing* (7th Edition). New Jersey: Upper Saddle River Prentice Hall.
- Becker, J. H., & Ravitz, J. L. (2001). Computer use by teachers: *Are Cuban's predictions correct?* Paper presented at the 2001 annual meeting of the American Educational Research Association, Seattle, Washington.
- Beukes-Amiss, C. M., & Chiware, E. R. T. (2006). The impact of diffusion of ICT's into educational practices, how good or how bad? A review of the Namibia situation. Retrieved June 16, 2016 from <http://www.dspace.unam.na>.
- Brush, T. A. (1998). Teaching pre-service teachers to use technology in the classroom. *Journal of Technology and Teachers Education*, 6(4), 243-258.
- Cuban, L. (2000). So much high-tech money invested, so little use and little and change in practice: How come? Paper presented for the council of chief State School Officers' *Annual Technology Leadership Conference*, Washington, DC.
- Fakeye, D. (2010). Assessment of English language teachers' knowledge and use of information communication technology (ICT) in Ibadan South West Local

Government Oyo State. *American-Eurasian Journal of Scientific Research*, 5(4), 270-276.

Kozma, R., & Anderson R. E. (2002). Qualitative case studies of innovative pedagogical practices using ICT. *Journal of computer Assisted Learning*, 18, 387-394.

Okwudishu, C. H. (2005). Awareness and use of information and communication technology (ICT) among village secondary school teachers in Aniocha South Local Government Area of Delta State. Unpublished B.Sc (LIS) Project Delta State University.

Papanastasiou, E. C., & Angeli, C. (2008). Evaluating the use of ICT in education: Psychometric properties of the survey of factors affecting teachers teaching with technology (SFA-T3). *Educational Technology & Society*, 11(1), 69-86.

Pelgrum, W. (2001). Obstacles to the integration of ICT in education: Results from a worldwide educational assessment. *Computers & Education*, 37, 163-178.

Salman, M. F., Ogunlade, O. O., Ogunlade, A. A., & Adegbam, O. A. (2013). Assessment of secondary school teachers' professional development in the use of information communication technology for teaching mathematics in Ejigbo, Nigeria. *IOSR Journal of Research & Method in Education*, 2(1), 48-55.

Terhemba G. A. G., Mustapha, A. G., & Mohammad, A. K (2015), Evaluation the application of ICT in continuous assessment by academic staff of college of education in Borno State, Nigeria. *Nigeria Journal of Educational Research and Evaluation*, 13(1) 196-207.

Tella, A., Oluwole M., Ijebu- O., Adika, L. O., & Adeyinka, A. A. (2015). An Assessment of Secondary School Teachers Uses of ICT's: Implications for Further Development of ICT's Use in Nigerian Secondary Schools. Retrieved June 16, 2016 from <http://www.tojet.net/articles/v6i3/631.pdf>.

APPENDIX

Academic staff questionnaire on ICT usage (ASQICTU)

Please indicate the extent to which you make use of ICT in teaching and assessing students by marking the appropriate column.

Educational

Qualification: _____

Sex _____ male _____ female _____

How many years have you been teaching? _____

S/N	Frequency of use of ICT	Always	Sometimes	Never
1	I use internet to search for teaching materials			
2	I use internet for sending message to my students			
3	I use computer to record information and distribute to students			
4	I visit the ICT center to develop my teaching skills			
5	I use computer to present learning materials to students			
6	For effective lecturer delivery I use computer			
7	I employ the use of computer in teaching students			
8	I use television to deliver lectures			
9	I use radio to deliver lectures			
10	For effective lecture delivery I use power point presentation			
11	I use educational CDs when delivering my lectures			
12	I use educational games in my lectures			
13	I use projector for my lecture delivery			
14	I use public address system when I have large class			
15	I use interactive boards for presentation of lesson			

	Level of application of ICT in classroom assessment			
16	I give my students assignment on the internet			
17	I consult the internet to help plan my class assessment			
18	Students submit their assignment to me through email			
19	I ask students to submit their assignment on CD rom			
20	I asked students to submit their assignment to floppy disk			
21	For effective and quick assessment delivery I use computer			
22	Students' scores are processed by using excel sheet			
23	I used Microsoft to type student assessment records			
24	I use Microsoft excel to type students assessment records			
25	I used computer to score students assessments			
26	I use computer to prepare all my assessments			
27	I use computer to type semester examination questions			
28	I use computer to keep data base of my test item bank			
29	I use SMS to communicate assessment results to students			
30	I use Microsoft word to type			

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Teachers Variables and Application of Test Blue Prints in Learners Assessment in Secondary Schools in Cross River State

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Abstract

The study was aimed at investigating teachers' variables and application of test blue print in learners assessment in secondary schools in Cross River State. The study was a survey research design. Three null hypotheses guided the study. A sample size of 400 teachers was selected through multiple sampling techniques. Stratified random sampling was adopted in selecting the schools. The data were collected through a validated questionnaire with a reliability coefficient of 0.89 that was carried out using the Cronbach alpha. Data were statistically analysed using Independent T-test and One - Way Analysis of Variance (ANOVA) set at 0.05 level of significance. The result showed that there was no significant influence of gender on application of test blue print among secondary school teachers at $t = 0.64$, $p > 0.05$ respectively. There was also no significant influence of the years of experience on teachers' application of test blue print as $F = 1.885$, $p > 0.05$. The extent of application of test blue print were found statistically significant with; $t = 147.72$ and $p < 0.05$ respectively. It was recommended that teachers should be trained on the use of test blue print through regular workshops and placement of emphasis during their professional training in colleges and universities to ensure that their instrument are valid measures of the learners ability.

Keywords: Learners assessment, Test-blue print, Teachers variables Teachers' gender, Years of experience.

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INTRODUCTION

Measurement of knowledge of the learner has become an important aspect of the teaching and learning process in our educational system. Although, many scholars have argued intelligently that examination is not a true test of learners ability but the teacher in the classroom setting has no better alternative to testing in assessing learning outcome. Where test are not utilized, Oyinka (2007) noted that it leaves the teacher in a difficult situation of ascertaining the extent to which instructional objectives have been achieved, the appropriateness of a chosen methodology, and teachers general competencies in delivery of lesson. Test therefore becomes an indispensable tool in the hand of the teachers. Denga (2003) noted that like a measuring rules in the hand of the carpenter, tape in the hand of the tailor, thermometer for the medical doctor, compass for a surveyor, so is the test in the hand of the teacher.

Joshua (2005) defined test as an instrument used systematically to measure a sample of behaviour. Umoinyang and Nenty (2003) defined test as an instrument used systematically to elicit response from respondent in order to determine the presence of a particular ability. Unlike in the physical sciences where their instruments are calibrated and standardized, measurement in the behavioural sciences involves frequent calibrations and the teacher is faced with the challenge of developing and validating instrument that will be valid and reliable. Validity in this context cannot be achieved until the various processes that any test construction must follow are strictly followed. Gronlund as cited in Joshua (2005) noted that test follows four steps:

- Determination of the purpose of testing;
- Development of the test blue-print;
- Selecting appropriate item types; and
- Preparing relevant test item.

However, researches have suggested that the construction of a good test involves more than these steps. As suggested by Joshua (2005), Nwogwugwu (2001) and Ojatunji and Onofeghara (2008) steps in construction of a test ranges from purpose of the test, test blue print development.... That there cannot be any valid instrument in the cognitive domain that do not follow the processes of test construction especially, the development of a test blue print. Joshua (2005) noted that the test blue print is a two way dimensional table relating instructional objectives to course content. This is a means of achieving adequate representation of items and thus ensuring content validity.

Notar, Zuelke, William & Yunke (2004) posited that a test blue print helps teachers align objectives, instruction and assessment. Although, it could be used in varieties of assessment method, it is usually utilized with cognitive test. It shows the total number of items allocated, content taught of their various levels of cognitive (knowledge, comprehension, application, analysis, synthesis and evaluation). McGregor (2000) noted that it is an essential step in the development of a test as it helps to combine properly the objectives and the content area, bearing in mind the importance and weight attached to each area.

In outlining the relevance of test blue-print, Gregory (2006) noted that it enhances effective representation of items in content of a subject. Notar et al. (2004) observed that the table serve to clearly define the scope and focus of the test. It ensures that the teacher include items that tap different kind of cognitive complexities when measuring student's achievement.

Akon and Borch as cited in Bassey (2007) outlined that the purpose of test blue print will ensure that;

- i. Teachers prepare items in a text according to topics covered and thus reflect what students have learnt.
- ii. Content covered are not omitted in the test.
- iii. Ensure the validity of the test is achieved
- iv. Only those objectives hitherto stated are clearly assessed

But Ujah (2001), Silker (2003) and Ali (1999) noted that test construction requires utilization of skills that can enable a teacher to develop a test with precision, appropriateness of language use, objective communication, items validation and good grading scales. Teachers must not be experts in measurement and evaluation to construct valid and reliable instrument needed. They need to acquire the general test construction skills to ensure that item are structured to elicit clear and bring responses appropriate to the learner's age, abilities and other noticeable differences (Ali, 1999). That lack of test construction may result in poor performance and false assessment of student achievement. Simon (2002) still noted it is the poor test construction that have warranted examination malpractices, academic dishonesty in most secondary school in Nigeria.

The teacher is solely involved in preparing and utilizing this instrument to ensure that what he/she teaches and sets in a test corresponds with the course contents in order to avoid systematic error. Chan (2009) noted that classroom teachers pay little attention to the design and development of reliable assessment tool. Many have speculated that the inappropriate construction of a test instrument is due to lack of knowledge or low level of awareness on the part of teacher, inadequate experience in the preparation of a test blue- print as well as gender differences in issues of table of specification. It could also be that the level of application of this test blue-print is low. It in this backdrop that this paper is written to examine teachers' variables and utilization of table specification in learners' assessment.

Statement of the problem

Validity and reliability remain essential qualities of a good test. In test construction, one of the key area is to ensure that any test instrument developed to measure achievement of students must have content validity. A test is valid if it is suitable for the intended objective. On the other hand, a test is reliable if it consistently measures a trait under all conditions. The most instructionally relevant achievement test are teachers - made test if they are constructed in a way that will provide the teacher with the feedback of student trend of achievement in a subject matter. Aju (2013) pointed out that teachers perhaps more than ever have a need to be knowledgeable consumers of test information, construction of assessment and protocols are given teachers about testing. Unfortunately, Ebinye (2001) have observed that test construction has been found to be a major source of anxiety among teachers in Nigerian Schools. However, Esonmou (2002) and Paulson (2003) have all noted that these anxiety is as a result of poor knowledge of the relevance of test blue print and rigorous processes involved in the development and utilization of test blue print. These have resulted to examination malpractices, invalid and unreliable instrument for assessment. Moreso, teachers do not utilize test blue print in assessment of the learners. It is this basis that prompted this paper to examine teachers' variables and application of table of specifications in secondary schools in Cross River State, Southern Educational Zone, Cross River State.

Hypotheses

The following null hypotheses were stated for the study:

- The extent of teachers' application of test blue-print in learners' assessment in secondary school is not significantly high.
- There is no significant influence of teacher's gender on application of test blue print in learners. assessment in secondary schools'
- There is no significant influence of years of experience on teacher's utilization of test blue print in learner's assessment in secondary schools.

METHODS

The study used survey research design in view of the wide spread coverage of information and also the use of sample without any manipulation or control of sample subjects and variables justified the adoption of survey design (Cozby, 2003; Asika, 2009). The population of the study consisted of all the 8486 Cross River State government employed teachers in post primary schools. A sample size of 400 teachers was selected through multiple sampling technique. Stratified random sampling was adopted in selecting the schools. Questionnaires were used for data collection. The instrument was constructed by the researchers and validated through a pilot study and a panel of 3 experts. The researchers conducted the pilot study using a small sample of 50 subjects (teachers) chosen from outside the designated main areas of data collection. A total of 25 items were constructed. In each of the schools visited, the researchers personally administered the questionnaires assisted by the vice principal, an exercise that lasted for 3 weeks. Fortunate enough, our repeated visits to the sample schools produced a 100% return of appropriately filled questionnaires.

RESULTS

Hypotheses One

The extent of teacher's application of test blue-print in learners' assessment in secondary schools is not significantly high.

Table 1: Population t-test analysis on teacher's level of application of test blue print in learner's assessment in secondary schools

Variable	N	X	SD.	Df.	T	Sig.
Application of test blue print	400	34.94	4.73	399	147.72	.000

The result of as presented in the table above shows that at 399 degrees of freedom with a mean value of 34.94, standard deviation of 4.73, the t-value of 147.72 was obtained with a P-value of 0.000. Since the p-value is equal to 0.000, the null hypothesis is rejected which states that the extent of teachers application is not significantly high.

Hypothesis Two

There is no significant influence of teacher's gender on teacher's utilization of test blue print in learner's assessment in secondary schools

Table 2: Independent t-test analysis of teacher's gender on teacher's utilization of test blue print in learners' assessment in secondary schools

Variable	N	X	SD	Df	T	Sig.
Male	146	35.143	5.446	398	.645	.519
Female	254	34.826	4.27			

P > .05

The table above shows the means and standard deviations of both male and female teachers in the sampled areas. At 398 degrees of freedom, the t-value stood at 0.645 with significant value of 0.519. Since the P-value is greater than the 0.005, the null hypothesis is retained or accepted which implies that there is no significant differences among male and female teachers utilization of test blue print in learner's assessment in secondary schools.

Hypothesis Three

There is no significant influence of years of experience on teacher's utilization of test blue print in learner's assessment in secondary schools.

Table 3: One-way Analysis of Variance (ANOVA) result for teacher's years of experience on utilization of test blue print in learners assessment in secondary schools

Level of Experience	N	X	SD		
1-5 years	170	35.417	4.766		
6-10 years	150	35.253	5.271		
11-above years	80	34.417	3.3180		
Source of Variation	SS	Df	MS	F	Sig.
Between groups	84.007	2	42.004	1.885	.153
Within groups	8845.670	397	22.28		
Total	8929.67				

From the table above, the means of the variables stood at 35.417, 35.253 and 34.417 with a standard deviation of 3.310, 5.271 and 4.766 respectively. At 2, 397 degrees of freedom, the F-ratio was found to be 1.885 with a significant value of 0.153. Since the significant value is greater than .005 it implies that the null hypothesis is retained or accepted which states that there is no significant influence of years of experience on teachers' utilization of test blue print in learners assessment in secondary schools

DISCUSSION AND FINDINGS

The study is an investigation of teachers' variables and utilization of test blue print in learner's assessment in secondary schools. Five variables were identified for the study: gender, teachers' years of experience, awareness and academic qualification, and extent of application of test blue print. The result in table 1 revealed that teachers' extent of test blue print application is not significantly high. The result in table 2 showed that there is no significant influence of gender on teachers' utilization of test blue print in learners' assessment. This implies that there are no differences among male and female disposition to test blue print usage in learners assessment. The result is consistent with the findings of Izard (2005) who posited that the problem is not in the gender factor but on their ability to develop and utilize table of specification according to rules. This is so because most teachers irrespective of their gender exhibit little or no skills in utilizing this tool for cognitive

assessment and this account for poor development of instruments for learner assessment leading to poor performance and other attendant consequences in the assessment issues.

Hypothesis three shows that the null hypothesis stated is retained. This implies that there is no significant influence of teacher level of experience and their utilization of test blue print. The study is in line with the work of Chan (2009) that an individual's it is not the level of experience that matters. It is the actual usage of the instrument. He went further to posit that most teacher are aware and knowledgeable about the relevance of test blue print but the problem lies on their perception of developing and utilizing the instrument as at when appropriate. Downing (2003) further stated that teachers perceive these test construction procedures as waste of time and non-motivating. This is why even if they have the experience in doing it, they fail to utilize it.

CONCLUSION

Based on the findings in the study, it can be concluded that there is no gender differences and influence of teacher's level of experience on their utilization of test blue print in learner's assessment. Moreover, teacher's level of awareness and level of knowledge significantly influenced their utilization of test blue print in learner's assessment in secondary school in Cross River State

Recommendations

In view of the findings of the study, the following recommendations are made:

- Teachers should be encouraged to encourage utilize test blue prints in cognitive assessment;
- Teachers in training in federal colleges of education and universities should be exposed to the technicalities in preparing these table in order for their assessment instrument to be valid; and
- Government should make provisions for teachers to attend workshop, seminars, and conferences on assessment procedure in order to ameliorate the failure rate associated with teacher's inability to utilize a valid assessment tool in learner's evaluation.

REFERENCES

- Agu, N. N. (2013). Measuring teachers' competencies in constructing classroom-based tests in Nigerian secondary schools: need for a test construction skill inventory. *Educational Research and Review*, 8(8), 431-439.
- Ali, A. A. (1999). *Basic research skills in education*. Enugu: Orient Printing and Publishing.
- Asika, N. (2009). *Research methodology in the behavioural sciences*. Ikeja: Longman
- Bassef, N. (2007). *Testing principles and practices in education*. Uyo: Silvia Printing Press
- Chan, K. K. (2009). Using test blueprint in classroom assessments: why and how. Paper presented at the 35th *International Association for Educational Assessment (IAEA) Annual Conference*, Brisbane, Australia.
- Cozby, T. (2003) *Research in education and the social sciences*. Enugu: Tashiwa Networks.
- Denga, I. D. (2003). *Educational Test, Measurement and evaluation*. Calabar: University of Calabar, Printing Press
- Downing, S. M. (2003). Validity: on the meaningful interpretation of assessment data. *Medical Education*, 37(9), 83-100.

- Ebinye, P. O. (2001). Problems of testing under the continuous assessment Programme. *Journal of Quality Education*, *1*(1)12-19.
- Esonmou, A. (2002), Assessment of adherence to testing principles in classroom assessment. *Journal of Social Science and Development Studies*, *1*(1), 67-72.
- Gregory, T. (2006) *Introduction to research methodology*. Onitsha: African, First Publishers
- Izard, J. (2005). Overview of test construction. In K. N. Ross. *Quantitative Research Methods in Educational Planning*. Paris: UNESCO International Institute for Educational Planning.
- Joshua, M. T. (2005) *Fundamentals of test and Measurement in Education*. Calabar: University of Calabar Press
- Mcgregor, O. P. (2000) Fundamental Assessment Principles for Teachers and School Administrators. *Journal of PARE online*, *7*(8). Retrieved June 2, 2016, from <http://pareonline.net/getvn.asp?v=7&n=8>.
- Notar, C. E., Zuelke, D. C., Wilson, J. D., & Yunker, B. D. (2004). The table of specifications: insuring accountability in teacher made tests. *Journal of Instructional Psychology*, *31*, 115-129.
- Nwogwugwu, P. C. (2001). *Measurement and evaluation in education*. Calabar: Ush Printing & Publisher
- Olatunji, S. O., & Onofeghara, N. (2008). *Psychological testing: foreign and indigenous psychological test*. Lagos:San solid Publishers
- Oyinka, N. B. (2007). *Measurement and evaluation in education*. Owerri: Springbelt Publishers.
- Paulson T. U (2003). *The study of teaching*. New York: Holt, Rinehart and Winston.
- Silker R. T. (2003). *Teachers and tests*. London: Basil Blackwell.
- Simon, G. M. (2002). Testing to destruction: A problem in a small state. Unpublished Seminar Paper.
- Ujah E. U. (2001). Development and validation of an introductory technology achievement test. Unpublished M.Ed. Thesis, University of Nigeria, Nsukka.

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Assessment of Selected Science Process Skills Acquisition among Senior Secondary Schools Students in Calabar Education Zone of Cross River State, Nigeria

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Abstract

This study assessed selected science process skills acquisition among senior secondary students in Calabar Education Zone of Cross River State, Nigeria. To achieve this, three hypotheses were formulated to guide the study. Survey research design was adopted for the study. Using stratified random sampling techniques, a sample of 413 science students was selected from a population of 4212 science students for the study. The questionnaire was the main instrument for data collection. The instrument was subjected to both face and content validation. The reliability estimates of the sub-components of the instrument were established through the Cronbach coefficient alpha method that showed indices that ranged from .73 to .91. Population t-test statistical analysis technique was used to test the three null hypotheses at .05 alpha level. The results of the statistical analysis revealed that students' science process skills acquisition, with respect to computation, problem-solving, and making of inference were significantly high. Based on the findings of the study, it was recommended that proper training and re-training of science teachers should be made to ensure that they are equipped with pedagogical competence in identifying students' process skills acquisition.

Keywords: Science process, Skills acquisition, Computation skill, Problem-solving skills, Inference making skills, Assessment.

Reference to this paper should be made as follows:

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INTRODUCTION

As science and technology become increasingly complex and more integrated into the contemporary social fabric in the 21st century, there is a great emphasis placed on science education because science and technology is seen as the basic tool for the growth and development of any nation. Individual and group exclusion from science learning can lead to barriers that present their full participation in the society. It is on this note that the Federal Republic of Nigeria (2004) in her National Policy on Education emphasizes the teaching and learning of science process and principles. Thus, it is hoped that this will lead to fundamental and applied research in science at all levels of education.

One of the guiding principles of the National Science Education Standards (NSES) is simply science for all students (Sheridam, 2001). This principle underscores the belief that all students, regardless of race, gender, or disability, should have the opportunity to learn and understand the essential science content described in the standards. Despite these efforts, poor performance in science in general has become the primary worry of all serious minded stakeholders in the educational system at all levels. There have been incessant reports of general poor performance of students in sciences in public examinations in the school system. Some educators and parents are wary of aspects of the new standards and inclusion practices, which they see as potentially placing higher expectations on students without providing necessary support (Stock, Desoete & Roeyers, 2006). Similarly, Salau (2006) maintains that statistics abound to show that massive failure in science examinations is real and the trend of students' performance has been on the decline.

Science as used here entails major foundational science subjects like mathematics, biology, chemistry and physics. There are areas or skills of science that prepare students for scientific explorations and endeavours. One of such areas or skills is science process skills acquisition. Edem (2009) has traced the root cause of these problems in science education to; acute shortage of qualified science teachers; overcrowded science classroom; adherence to old teaching methods inspite of exposure to more viable alternatives, students' attitude towards science; and undue emphasis on syllabus coverage at the expense of meaningful learning of science concepts, to mention but a few. Little or no emphasis has been placed on the difficulty of learning science concept as well as individual differences with respect to students' science process skills acquisition.

Science process skills acquisition refers to a variety of abilities that affect the acquisition, retention, understanding, organisation or use of verbal and/or non-verbal information. Science process skills acquisition in a generic term refers to a heterogeneous group ability manifested in the acquisition and use of listening, speaking, reading, writing, reasoning, or mathematical abilities, or of social skills (Hallahan & Mercer, 20002). Among school-aged children, science process skills acquisition may be seen as deficient skills in computation, making inferences, problem-solving, and short attention span. These forms of skills may impede and/or promote science learning outcomes in one way or the other.

Computation skills refers to abilities to calculate basic addition, subtraction, multiplication, and division problems quickly and accurately using mental methods, paper-and-pen, and other tools, such as calculator. Computation skill required the selection of the appropriate arithmetic operation. It requires the execution of the steps to calculate the solution. Computation skills can be carried out only by humans, but with the aid of calculators or computers, as well (Lyon, 2008). Computation skills are important because they will enable students to easily navigate everyday life tasks such as finding the price of marked down merchandise, figuring out which size of item provides the best value for their money and accurately doubling or halving cooking recipes, to mention a few.

Galleto and Refugio (2011) conducted a study to find out the students' skills in mathematical computation using graphic calculator in teaching mathematics among freshmen of the College of Education of Jose Rizal Memorial State University, Philippines. It was an experimental study. The skills that the students possessed in both the control and the experimental groups on the topics included in this experiment is equivalent or comparable before the intervention. The study revealed that there is a significant variation in the students' skills in mathematical computation between the control group with the traditional method of teaching and the experimental group with the use of graphing calculator in teaching and learning mathematics. This concludes that students' in the experimental group performed skilfully better than their counterparts in the control group.

Problem-solving skills refer to mathematical tasks that have the potential to provide intellectual challenges for enhancing students' mathematical understanding and development (Lester & Charles, 2003). Problem-solving is one of major aspects in mathematics/science curriculum which requires students to apply and integrate many mathematical/scientific concepts and skills as well as making decisions. Many students struggled to accomplish mathematics especially problem-solving (Ibrahim, 1997; Tarzimah, 2005; Garderon, 2006). However, they still need to learn mathematics because of its importance in daily life (Meese, 2001; Aziz, 2002; Berch & Mazzocca, 2007; Kaufman, 2008). They must be able to solve problems because problem solving is important for the development of human competences (Subahan, 2007). In real life, students need to solve problems because that is a basic way to survive in our daily living. The primary and secondary mathematics curriculum emphasized on arithmetic; problem-solving, communication, mantic-thinking, connection-building and technology application skills (Curriculum Development Centre, Ministry of Education, 2003). Problem-solving is an integral part of science learning. Students learn and understand mathematics (and other science subjects) through solving mathematically rich problems and problem-solving skills are developed through learning and understanding mathematics concepts and procedures (Lester & Charles, 2003).

Lack of many mathematics skills caused difficulties in making inference and solving problem. Students are required to apply and integrate many mathematical concepts and skills during the process of making decision and problem-solving. Garderen (2006) stated that deficiency in visual-spatial skill might cause difficulty in differentiating, relating and organising information meaningfully as well as drawing inferences. However, the lack of mathematics skills among students varied (Hill, 2008; Kaufman, 2008).

Science process skills acquisitions are by far the most common needed elements among children of school-age (Hallahan & Mercer, 2002). In terms of science based subjects', students with science process skills acquisition need computation, making of inferences, and problem-solving skills. Without these skills, they often have problem in sustaining attention to task remembering procedures, deadlines, among others. Disability in computation impedes the child's ability to apply mathematical principles that are essential in the teaching and learning of sciences. Effective earning of sciences also revolves around problem solving as well as making of inference from observations.

According to Sinha (2003), in mathematics and science, students with science process skills acquisition often do not have problems in computation, problem-solving, making inferences, and integrating new and prior knowledge. Memory, motor, and attention deficits are also not common among them. Students associated with poor science process skills acquisition have challenges characterised by poor performance in computing and solving basic science problems. They may also have problem of making inferences. It is from this backdrop that this study was conducted on the assessment of science process skills acquisition among senior secondary school students in Calabar Education Zone of Cross River State, Nigeria. Therefore, the study assessed science process skills acquisition of senior

secondary two (SS₂) science students in; computation, problem-solving, and making inference.

Hypotheses

The following hypotheses were formulated to guide the study:

- The science process skills acquisition of senior secondary two SS₂ science students in computation is not significantly high.
- The science process skills acquisition of SS₂ science students in problem-solving is not significantly high
- The science process skills acquisition of SS₂ science students in making inferences is not significantly high.

METHODS

Survey research design was adopted for the study. This was considered most appropriate because it allows the researchers to make inference and generalisation of the population by selecting and studying the sample for the study. The research area for this study is Calabar Education Zone of Cross River State, Nigeria. It comprises seven local government areas, namely: Akamkpa, Akpabuyo, Bakassi, Biase, Calabar Municipality, Calabar south, and Odukpani. The population of this study consisted to all the SS₂ Science students in the zone, numbering 4,212 in the 2015/2016 school year (Post Primary School Board, Calabar, 2016). Stratified random sampling technique was used to select, based on local government areas (LGAs), 421 from 4,212 SS₂ science students as the sample for the study.

A 30-item instrument titled: “Science Students’ Process Skills Acquisition Test (SSPSAT)” constructed by the researchers was used for data collection. The instrument was designed to respondents’ ability in computation, problem solving and inference making skills. The test was developed with the help of the table of specification shown in Table 1.

Table 1: Table of specification for science students’ process skills acquisition test

Content (skills)	Comprehension (30%)	Application (46.7%)	Analysis (23.3%)	Total (100%)
Computation skills (33.3%)	2	3	5	10
Problem solving skills (33.30%)	3	6	1	10
Inference making skills (33.3%)	4	5	1	10
Total (100%)	9	14	7	30

Ten (10) questions were developed to test respondents’ skills acquisition level in each of the three skills. The test was designed to ensure that respondents show clear working to reveal how well they acquire the respective skills. The instrument was both face and content validated. Using Cronbach Alpha method, the reliability estimates that ranged from .73 to .91 were established.

Out of the 421 copies of the instrument administered to the respondents, only 413 were correctly filled. The other eight copies were invalidated because they were either not correctly filled or not returned to the researchers. The 413 retrieved copies of the instrument were duly coded and collated for statistical analysis.

RESULTS

Hypothesis 1: The science process skills acquisition of SS₂ science students in computation is not significantly high.

The only one variable in this hypothesis is the science process skills acquisition of science in computation. To test this hypothesis, we need to compare sample mean with the population mean. Population t-test statistical analysis was employed to test this hypothesis as shown in Table 2.

Table 2: Population t-test analysis of the science process skills acquisition of science students in computation (N = 413)

Computation skills	N	Mean	SD	t-value	p-value
Sample mean	413	18.75	1.41	97.22*	.000
Population mean		10.00	0.00		

* Significant at .05; critical t = 1.960; df = 412

The results of the analysis presented in Table 2 shows that the calculated t-value of 97.22 is greater than the critical t-value of 1.96 at .05 level of significance with 412 degrees of freedom. With these results, the null hypothesis 1 was rejected and its alternative retained. This implies that the science process skills acquisition of science students in computation is significantly high in the research area.

Hypothesis 2: Science process skills acquisition in problem solving among science students is not significantly high.

The only one variable in this hypothesis is science process skills acquisition in problem solving. Population t-test statistical analysis was employed to test the null hypothesis 2 at .05 alpha level. The results are presented in Table 3.

Table 3: Population t-test analysis of the science process skills acquisition of science students in computation (N = 413)

Problem solving skills	N	Mean	SD	t-value	p-value
Sample mean	413	18.75	1.31	140.00*	.000
Population mean		10.00	0.00		

* Significant at .05; critical t = 1.96; df = 412

The results of the analysis presented in Table 3 shows that the calculated t-value of 140.00 is greater than the critical t-value of 1.96 at .05 alpha level with 412 degrees of freedom. With those results, the null hypothesis 2 was rejected, and its alternative retained. This implies that the science process skills acquisition of science in problem solving among science students is significantly high in the research area.

Hypothesis 3: The science process skills acquisition of science students in making inference is not significantly high.

There is only one variable in this hypothesis, which is the science process skills acquisition of science students in making inference. Population t-test analysis was employed to test this hypothesis at .05 level of significance. The results of the statistical analysis are as presented in Table 4.

Table 4: Population t-test analysis of the science process skills acquisition of science students in making inference (N = 413)

Problem solving skills	N	Mean	SD	t-value	p-value
Sample mean		16.53	2.17		
	413			59.27*	.000
Population mean		10.00	0.00		

* Significant at .05; critical t = 1.96; df = 412

The results of the analysis presented in Table 4 shows that the calculated t-value of 59.27 is greater than the critical t-value of 1.96 at .05 alpha level with 412 degrees of freedom. With this results, the null hypothesis 3 was rejected. This implies that the science process skills acquisition of science students in making inference is significantly high in the research area.

DISCUSSION OF FINDINGS

The result of the hypothesis 1 revealed that the learning science process skills acquisition of science students in computation is significantly high in the research area. The finding of this study is somewhat in consonant with the view of Galleto and Refugio (2011) who deduced that there is a significant variation in the students' skills in mathematical computation between the control group with the traditional method of teaching and the experimental group with the use of graphing calculator in teaching and learning mathematics. This means that students performed skilfully better during the post-test than during the pretest. They concluded that the treatment given to the science students by their teachers had significant effect on their computation skills. Computation skills remain an integral part of students' science education because they lay the foundation for success in future mathematical learning such as algebra, geometry, trigonometry, calculus, in particular, and science, generally. Hence, efforts at improving the skills by both the teachers and the science students should be encouraged.

The result of the hypothesis 2 revealed that science process skills acquisition in problem solving among science students' is significantly high in the research area. The finding of this study agreed with Lester and Charles (2003) who noted that the problem-solving skills have value in many areas of life. Employers of labour value employees who can solve problems without the need to always find a supervisor or monitoring team. Entrepreneurs may need to think outside the box to create a business that thrives and stands out from other similar businesses. Similarly, a student who excels in problem-solving can earn higher grades in science related subjects like mathematics, chemistry and physics. This skill set for problem solving in all these areas have the same components.

In real life, students need to solve problems because that is a basic way to survive in our daily life and problem-solving is seen as the language for daily living. Many students struggled to accomplish mathematics and science in problem-solving. However, they still need to learn mathematics because of its importance in daily life. They must be able to solve problems because problem-solving is important for the development of human competencies.

The result of the hypothesis 3 revealed that science process skills acquisition of science students in making inference is significantly high in the research area. The finding of

this study seems to agree with Garderen (2006) who stated that deficiency in visual-spatial skill might cause difficulty in differentiating, relating and organising information meaningfully as well as drawing inferences. However, the lack of mathematics and indeed making inference skills among students vary. Incomplete mastery of number facts, weakness in computation, inability to connect conceptual aspects of mathematics, inefficiency to transfer knowledge, difficulty to make meaningful connection among information, incompetency to transform information mathematically, incomplete mastery of mathematical terms, incomplete understanding of mathematical language and difficulty to comprehend and visualise mathematical concept might result in science process skills acquisition in inference making.

The basis for understanding how meaningful learning can occur in terms of the importance of being able to infer and/or to link new knowledge on to the network of concepts, already exist in the learner's mind. The ability to link these network of concepts properly and appropriately will call for making of inference skills. Concepts developed as new ideas are linked together through making inference, and the learner, and indeed science student, who does not always correctly make such links would have misconceptions-where students possess knowledge without understanding. Therefore, correct inference making is a basis for proper understanding.

CONCLUSION

The findings of this study revealed that science students possessed or have acquired high science process skills in computation, problem-solving and making of inference. Therefore, if science students in the area of the study were found wanting in science process skills acquisition, then something other than computation skills, problem-solving skills, and making of inference skills, were responsible.

Recommendations

- Proper training and re-training of science teachers should be made to ensure that they are qualified and equipped with pedagogical skills and impact same to students.
- The government/proprietors of schools should give priority to equipping the science laboratories and improving the teaching and learning environment.
- Practical work should be emphasized for the proper acquisition of science process skills.

REFERENCES

- Aziz, Y. (2002). The perception of teachers and students on bullying among secondary school students in Batu Pahat area. *Journal of Technology*, 43(E), 63-86.
- Berch, B. J. & Mazzocco, M. M. (2007). Complexities in indentifying and defining mathematics learning disability in the primary school age years. *Annals of Dyslexia*, 53, 218-253.
- Edem, B. B. (2007). Assessment of arithmetic learning disability among junior secondary school one students in Calabar Town, Nigeria. Unpublished M.Ed thesis University of Calabar.
- Federal Republic of Nigeria (2004). *National Policy on Education*. Lagos: NERDC.
- Galleto, P. G., & Refugio, G. N. (2011). Students' skills in mathematical computation using graphing calculator. *Mathematics Teacher*, 103(4), 296-304.

- Garderen, D. V. (2006). Focus on inclusion reciprocal teaching as a comprehension: strategy for understating mathematical word problems. *Reading and Writing Quarterly*, 20(2), 225-229.
- Hallahan, D. P. & Mercer, C. D. (2007). Learning disabilities: Historical perspectives. In R. Bradley, L. Danielson, and D. P. Hallahan (Eds.). *Identification of science process skills acquisition: Research to practice* (pp.1-67). Mahwah, N. J.: Erlbaum.
- Hill, R. (2008). *Learning science in the schools*. New Jersey: Research Information Service.
- Lester, F. K., Jr. & Charles, R. I. (2003). *Teaching mathematics through problem-solving: pre-k-grade 6*. Reston, VA: National Councils of Teachers of Mathematics.
- Lyon, G. R. (2008). *Learning disabilities: From identification to intervention*. New York: Guilford.
- Meese, J. (2001). Age and sex differences in motor performance of 3 through 6 year old children. *Research Quarterly for Exercise and Sport*, 5(3), 214-221.
- Salau, M. O. (2006). The effect of class size on the achievement of different ability groups in mathematics. *Journal of Science Teachers Association of Nigeria*, 3(1& 2), 57-63.
- Sinha, A. (2003). *Basic education for all. The elusive quest for social justice in dynamic democracy*. New Delhi: Longman.
- Stock, P., Desoete, A., & Roeyers, H. (2006). Focusing on mathematical disabilities: a search for definition classification and assessment. In S. V. Randall (Ed). *Science process skills acquisition: New research*. (pp. 29-62). New York: NOVA Science
- Subahan, T. (2007). Connecting reading and writing instruction for struggling learners. In G. A. Troia (Ed.), *Instruction and assessment for struggling writers: Evidence based practices* (pp. 113-131). New York: The Guilford Press.
- Tarzimah, S. (2005). Relationship with dynamic balance function during standing and walking. *American Journal of Physical Medicine*, 8(2), 511-516.

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