# QUALIFICATION AND TEACHING EXPERIENCE AS DETERMINANTS OF TEST DEVELOPMENT SKILLS OF PHYSICS TEACHERS IN DELTA CENTRAL SENATORIAL DISTRICT OF DELTA STATE.

## <sup>1</sup>Queen E. Igabari q.e-igabari@delsu.edu.ng

<sup>2</sup>Freedom Okagbare

okagbare.freedom84@gmail.com Department of Guidance and Counselling, Delta State University, Abraka, Nigeria

## Abstract

This study investigated qualification and teaching experience as determinants of test development skills of physics teachers in Delta Central Senatorial District of Delta State. Four research questions guided the study. The study adopted descriptive survey research design. The population and sample of the study consisted of 570 and 57 respectively. Data was collected with a structured interview guide designed by the researcher. A reliability coefficient of 0.89 was obtained for the items on the interview guide. Teachers'' responses were recorded in line with response format in the interview guide. Quantitative data collected was subjected to data analysis and the research questions were answered using mean and standard deviation. The findings of the study revealed that qualification and teachers'' teaching experience determine the test development skills possessed by secondary school physics teachers in Delta Central Senatorial District while sex and location do not determine the test development skills possessed by secondary school physics teachers should provide mini workshop for less qualified colleagues to be able to apply the skills for reliable and valid test development, test items banks in physics should be encouraged by teachers, principals and school management where less experienced teachers in test development skills can draw for the purpose of learning.

Keyword: Qualification, Teaching Experience, Test Development Skill, Teachers

## Introduction

Education was informal before the advent of western education in Nigeria. This means that there was no form of testing process to determine the level of change in behaviour or the amount of contents that has been achieved in the educational activities. It can be concluded that western education in Nigeria formalized the reason for testing in Nigeria Educational system. Igabari and Okagbare (2023) stated that tests are quantitative measures of students' performance and some can be used to compare students with other students and measure improvement over time. The tests used could be made either by a teacher sometimes called classroom-made-test or by professional bodies called external test (standardized test). Test help a student understand himself in terms of his/her knowledge, attitude and ability. Test is an instrument for organized measure of a person's personality or academic traits with the aid of a numerical scale. It is the easiest instrument to measure the cognitive level of examinee (Igabari & Okagbare, 2023). Testing has become one of the most crucial method and parameters by which a society judges the product of her educational system. They further reiterated that test is a central part of the school system that make the deviant students, regular absentees, unserious learners sometime call G-boys to turn up in school and present themselves for testing on examination days for the purpose of promotion, certification and award. Despite these functions of test and the fact that measurement experts have adopted testing as the most objective means of decision making in education, various criticisms have been raised on issues concerning testing in recent times (Amajuoyi in Okagbare, Ossai & Osadebe, 2023). This test criticisms could be as a result of teachers' experience and qualification among other factors when developing test for use. Test

follows some stipulated rule for it to be reliable and valid. In other words, tests are made to appear valid and reliable when skills are applied. A good testing involves writing appropriate test items, good test instructions and good skill in putting the items together in different ways to achieve the expected format and purpose (Igabari & Okagbare, 2023). The test skills that should be possessed by teachers includes planning, item writing, item analysis, composition of item, reliability, printing and administration, marking, scoring and test manual. These skills assist teachers to construct good and acceptable test items for students of various ages, abilities, and gender to enable them finish within the time frame and do not become scared of tests. Deficiency of test development skills by teachers might result in students' performance falsification during assessment. Apata (2013) revealed that teachers qualification and experience have great influence on students performance because those taught by qualified and experienced teachers performed better than others taught by the less qualified and experienced teachers.

A major variable that can affect or influence test development skills is teachers' years of teaching experience. The relationship between teaching experience and internal efficiency of schools have been examined by many researchers. Ewetan and Ewetan (2015) found that teachers' experience and educational qualifications were the prime predictors of students' academic achievement in an item of a test. However, Rivkin et al. (2005) found that teachers' teaching experience and educational qualifications were not significantly related to teachers' test development skills.

There have always been recruitment of qualified, under-qualified and inexperienced teachers into the teaching profession. To many, teaching became a means to an end, and served only as a stepping stone to greener pasture. The consequence of this was the presence of incompetent teachers in the school system thereby resulting in persistent student failure in public examinations (Hamafyelto, Hamman-Tukur, & Hamafyelto, 2015).

Inko-Tariah and Okon (2019) conducted a study to assess the knowledge of lecturers on test construction procedures. It involved a sample of 200 lecturers drawn from 440 teaching of staff of the university. The results revealed high knowledge of test construction procedures by the lecturers and that lecturers' knowledge of test construction procedures did not differ significantly based on gender, years of experience, professional training and educational qualification.

What the teacher does, influences the whole process of learning and qualified teachers produce better performing students through the application of test development skills (Akiri, 2013). Professional development of teachers can be effective and sustainable, if certain conditions are met. While hiring of qualified teachers is encouraged for improvement of academic performance, Firestone (2014) cautioned that policies should be made to retrain ineffective teachers. Ovat and Ofem (2017) carried out a to ascertain the level of teachers' rating in the implementation of testing skills. The study used a sample of 400 teachers, and showed that teachers' teaching experience and their qualifications have significant influence on testing skills when developing good, reliable and valid test that measures students' performance. Other works on development of testing shills among teachers include Osadebe (2015) and Ubi and Ibe (2020).

#### Statement of the Problem

Students' performance in physics have been poor in both internal and external examination over the years. It is not categorically known if the problem of low performance is due to lack of test development skills by teachers who prepare students for these examinations. It is equally not certain whether the test developed by classroom teachers are appropriate for the level of students in terms of quality like the standardized test administer by examination bodies. Inadequate test development skills of teachers might result in false assessment of students' performance. According to Igabari and Okagbare (2023), test development has been found to be a major source of anxiety among many teachers, especially the less experienced ones in secondary schools. Many reasons could be deduced for this deficiency. Therefore, the problem of this study is to investigate the extent to which qualification, experience, gender and location determine the test development skills among secondary school physics teachers in Delta Central Senatorial Districts?

### **Research Questions**

The following research questions guided the study:

- 1. Does qualification determine the test development skills of secondary school physics teachers in Delta Central Senatorial District?
- 2. Does the teaching experience determine the test development skills of secondary school physics teachers in Delta Central Senatorial District?
- 3. Does sex determine the test development skills of secondary school physics teachers in Delta Central Senatorial District?
- 4. Does location determine the test development skills of secondary school physics teachers in Delta Central Senatorial District?

### Purpose of the Study

This research is intended to investigate the extent to which qualification, teaching experience, sex and location determine the test development skills of secondary school physics teachers in Delta Central Senatorial District.

### Significance of the study

This study is significant because it will help to identify some salient factors that will improve test development skills among secondary school physics teachers in the study area, such as qualification and experience of the teachers. It will also be useful to educational administrators, policy makers and examination bodies in ensuring practices in test development.

## Methodology

This study employed descriptive survey research design. The population of this study consists of 570 physics teachers in government secondary schools in the study area. A sample of 57 physics teachers, representing 10% of the population, was drawn. Proportionate stratified sampling procedure was employed in selecting the sample for the study. The stratification was based on sex (male and female), school location (urban and rural) and qualification (qualified and unqualified). The instrument was validated by two experts in measurement and evaluation from Guidance and Counselling department. The experts' judgment was to ascertain and ensure that the instrument measure what it was designed for in the study.

To test for the reliability of the instrument, test-retest method was used on a set of 57 physics teachers selected from Delta North Senatorial District. The teachers were interviewed and re-interviewed after three weeks. The results of the two interviews were compared with the Pearson's Correlation Coefficient, and a reliability coefficient of 0.89 was obtained. The researcher personally visited the various sampled schools and interviewed the physics teachers using the structured interview guide designed for the study. Their responses were recorded in line with response format in the interview guide. Quantitative data collected through the structured interview were subjected to data analysis using Statistical Packages for Social Sciences (SPSS) software. The results obtained were used to answer the research questions mean. The decision rule was a benchmark of 2.50 and above for skills possessed by the teachers.

### Results

**Research Question One:** Does qualification determine the test development skills possessed by secondary school physics teachers in Delta Central Senatorial District?

To answer research question 1, the responses were rated on the skills covered in the study on the basis of teacher qualification (qualified and unqualified). The mean rating of responses is presented in Table 2a and Table 2b

8 1		,		
S/N. Test Development Skills	N	Mean	Std. Deviation	Decision
A. Items Writing Skills	50	2.72	0.77	Skilled
B. Item Analysis	50	2.81	0.80	Skilled
C. Items Composition Skills	50	2.89	0.73	Skilled
D. Validity and Reliability Skills	50	2.66	0.65	Skilled
E. Marking and Scoring Skills	50	2.89	0.79	Skilled
F. Printing and Administration Skills	50	3.07	0.72	Skilled
Cluster Mean	50	2.85	0.76	Skilled

**Table 2a:** Mean ratings on Test Development Skills of Qualified Physics Teachers

Table 2a shows the mean scores of the test development skills on the basis of teacher's qualification. Printing and administration skills ranked highest among the skills possessed by physics teachers, followed by planning, item composition, marking and scoring skills, item analysis, item writing, validity and reliability skills. Each variable has mean higher than the benchmark of 2.50. This implies that qualified secondary school teachers possess test development skills.

## Table 2b: Mean ratings on Test Development Skills of Unqualified Physics Teachers

S/N	. Test Development Skills	Ν	Mean	Std. Deviation	Decision
A.	Planning Skills	7	2.11	0.53	Not Skilled
B.	Items Writing Skills	7	2.07	0.61	Not Skilled
C.	Item Analysis	7	2.14	0.71	Not Skilled
D.	Items Composition Skills	7	2.33	0.79	Not Skilled
E.	Validity and Reliability Skills	7	2.24	0.53	Not Skilled
F.	Marking and Scoring Skills	7	2.24	0.41	Not Skilled
G.	Printing and Administration Skills	7	2.19	0.58	Not Skilled
Gran	d Mean	7	2.19	0.60	Not Skilled

Table 2b shows the mean of the test development skills for under-qualified teachers. Each item in Table 2b has mean lower than the benchmark of 2.50. This implies that unqualified secondary school physics teachers do not adequately possess test development skills.

Tables 2a and 2b showed that grand mean value for qualified secondary school teachers is greater than the benchmark mean of 2.50 while that of unqualified teacher are below the benchmark mean of 2.50. This implies that teaching qualification determine the test development skills of secondary school physics teachers in the area of study.

**Research Question Two:** Does teacher's teaching experience determine the test development skills possessed by secondary school physics teachers in Delta Central Senatorial District?

To answer research question 2, the physics teachers interview responses were rated on the skills covered in the study on the basis of teacher's experience (experienced and less experienced). The mean rating of responses is presented in Table 3a and Table 3b

S/N	. Test Development Skills	Ν	Mean	Std. Deviation	Decision
A.	Planning Skills	40	3.01	0.87	Skilled
В.	Items Writing Skills	40	2.84	0.78	Skilled
C.	Item Analysis	40	2.96	0.80	Skilled
D.	Items Composition Skills	40	2.92	0.72	Skilled
E.	Validity and Reliability Skills	40	2.72	0.67	Skilled
F.	Marking and Scoring Skills	40	2.97	0.81	Skilled
G.	Printing and Administration Skill	40	3.19	0.71	Skilled
Gra	nd Mean	40	2.94	0.77	Skilled

### Table 3a: Mean ratings on Test Development Skills for experienced physics Teachers.

Benchmark Mean: 2.50

Table 3a shows the mean score of test development skills on the basis of experience. Printing and administration skills ranked highest among the skills possessed by physics teachers followed by planning, marking and scoring, item analysis, item composition item writing, validity and reliability skills. Each variable has means greater than the benchmark of 2.50. This implies that printing and administration, item composition, marking and scoring, planning, item analysis, item writing, validity and reliability skills are the test development skills possessed by experienced secondary school physics teachers in Delta Central Senatorial District.

1 at	Table 50: Mean ratings on Test Development Skins for mexperienced physics Teachers.								
S/N	J. Test Development Skills	Ν	Mean	Std. Deviation	Decision				
А.	Planning Skills	17	2.28	0.77	Not Skilled				
В.	Items Writing Skills	17	2.18	0.55	Not Skilled				
C.	Item Analysis	17	2.20	0.56	Not Skilled				
D.	Items Composition Skills	17	2.57	0.74	Skilled				
E.	Validity and Reliability Skills	17	2.35	0.51	Not Skilled				
F.	Marking and Scoring Skills	17	2.43	0.53	Not Skilled				
G.	Printing and Administration Skill	17	2.41	0.64	Not Skilled				
Gra	and Mean	17	2.34	0.62	Not Skilled				

## Table 3b: Mean ratings on Test Development Skills for inexperienced physics Teachers.

Benchmark Mean: 2.50

Table 3b showed the mean scores of test development skills covered by the study. Item composition skill is ranked highest among the skills possess by physics teachers, followed by marking and scoring, printing and administration, validity and reliability skills, planning, item writing and item analysis skills. Each skill except item composition, has a mean score lower than the bench mark of 2.50. This implies that inexperienced physics secondary school teachers do not possess test development skills in reasonable level.

Tables 3a and 3b revealed that grand mean value for experienced physics teachers is greater than benchmark, while that of inexperienced physics teachers is below the benchmark. This implies that teaching experience contributes to test development skills possessed by physics teachers in Delta Central Senatorial District.

**Research Question Three:** Does sex determine the test development skills possessed by physics secondary school teachers in Delta Central Senatorial District?

To answer research question 3, the physics teachers interview responses were rated on the skills covered in the study on the basis of teacher's sex (male and female). The mean rating of responses is presented in Tables 4a and 4b

S/N. Test Development Skills	N	Mean	Std. Deviation	Decision
A. Planning Skills	29	3.21	0.83	Skilled
B. Items Writing Skills	29	2.86	0.95	Skilled
C. Item Analysis	29	2.83	0.97	Skilled
D. Items Composition Skills	29	2.92	0.95	Skilled
E. Validity and Reliability Skills	29	2.72	1.09	Skilled
F. Marking and Scoring Skills	29	3.11	0.93	Skilled
G. Printing and Administration Skill	29	2.96	0.81	Skilled
Grand Mean	29	2.94	0.93	Skilled

# Table 4a: Mean ratings on Test Development Skills for Male physics Teachers

Benchmark Mean: 2.50

## Table 4b: Mean ratings on Test Development Skills for Female physics Teachers

S/N. Test Development Skills	Ν	Mean	Std. Deviation	Decision
A. Planning Skills	28	2.88	0.82	Skilled
B. Items Writing Skills	28	2.87	0.89	Skilled
C. Item Analysis	28	2.99	1.15	Skilled
D. Items Composition Skills	28	2.73	1.02	Skilled
E. Validity and Reliability Skills	28	2.49	1.17	Not Skilled
F. Marking and Scoring Skills	28	2.88	1.03	Skilled
G. Printing and Administration Skill	28	3.09	0.75	Skilled
Grand Mean	28	2.85	0.96	Skilled

KWASU International Journal of Education Vol. 6 Number 1, December 2023. Website: https://www.kije.com.ng

90

Benchmark Mean: 2.50

Tables 4a and 4b show the mean scores of test development skills for male and female physics teachers. The mean score for planning skill of male physics teachers is 3.21 while that of female physics teachers is 2.88. Items writing skills of male and female physics teachers is 2.86 and 2.87, item analysis score is 2.83 and 2.99, item composition score is 2.92 and 2.73, validity and reliability skills score is 2.72 and 2.49, marking and scoring skills is 3.11 and 2.88, while printing and administration skills score is 2.96 and 3.09 for male and female physics teachers, respectively. The cluster mean score for male and female physics teachers is 2.94 and 3.09, respectively. The cluster mean scores for both male and female physics teachers are above the bench mark. This indicates that sex does not determine the test development skills possessed by secondary school physics teachers in Delta Central Senatorial District.

**Research Question Four:** Does location determine the test development skills possessed by secondary school physics teachers in Delta Central Senatorial District?

To answer research question 4, the physics teachers interview responses were rated on the skills covered in the study on the basis of location (urban and rural). The mean rating of responses is presented in Table 5a and Table 5b

Table 5a: Mean ratings on Test Development Skills for Urban Physics Teachers						
S/N	I. Test Development Skills	Ν	Mean	Std. Deviation	Decision	
A.	Planning Skills	35	3.08	0.86	Skilled	
В.	Items Writing Skills	35	2.75	0.91	Skilled	
C.	Item Analysis	35	2.76	1.05	Skilled	
D.	Items Composition Skills	35	2.77	0.98	Skilled	
E.	Validity and Reliability Skills	35	2.55	1.08	Skilled	
F.	Marking and Scoring Skills	35	3.07	0.91	Skilled	
G.	Printing and Administration Skill	35	2.98	0.82	Skilled	
Clus	ster Mean	35	2.85		Skilled	

Benchmark mean: 2.50

## Table 5b: Mean ratings on Test Development Skills for Rural Physics Teachers

	ě i				
S/N	I. Test Development Skills	Ν	Mean	Std. Deviation	Decision
A.	Items Writing Skills	22	3.01	0.83	Skilled
В.	Item Analysis	22	3.14	1.04	Skilled
C.	Items Composition Skills	22	2.91	0.99	Skilled
D.	Validity and Reliability Skills	22	2.71	1.19	Skilled
E.	Marking and Scoring Skills	22	2.89	1.09	Skilled
F.	Printing and Administration Skill	22	3.11	0.71	Skilled
Clus	ster Mean	22	2.96	0.95	Skilled
D	1 1 2 50				

Benchmark mean: 2.50

Table 5a shows the seven test development skills possessed by urban physics teachers. The mean of their responses ranged from 2.76 to 3.08 with cluster mean of 2.85, which was above the bench mark (2.50). Also, Table 5b shows the seven test development skills possessed by rural physics teachers. The mean of their responses ranged from 2.71 to 3.11 with cluster mean of 2.96, which was above the benchmark mean (2.50). This indicated that urban and rural physics teachers equally possessed skills of planning, items writing, item analysis, items composition, validity and reliability, marking and scoring, printing and administration.

Since the cluster mean values for both urban and rural secondary school physics teachers are greater than the benchmark mean of 2.50, we infer that teachers' location does not determine the test development skills possessed by secondary school teachers in Delta Central Senatorial District.

KWASU International Journal of Education Vol. 6 Number 1, December 2023. Website: https://www.kije.com.ng

91

### **Discussion of Findings**

## Qualification as a Determinant of Test Development Skills of Secondary School Physics Teachers.

Analysis of data relating to research question one shows that qualification determine the test development skills possessed by secondary school physics teachers. The reason for this finding is that trained physics teachers prepared tests that were more valid and reliable. The finding disagrees with Inko-Tariah and Okon (2019) who asserted that lecturers' knowledge of test construction procedures did not differ significantly based on professional training and educational qualification. This finding also disagreed with Ovat and Ofem (2017) who found that professional training and qualification does not determine teachers' test development skills.

## Teachers' Teaching Experience as a Determinant of Test Development Skills of Secondary School Physics.

Analysis of data relating to research question two shows that teachers' teaching experience determines the test development skills possessed by secondary school physics teachers in Delta Central Senatorial District. The teachers with more experience in teaching and test development prepared tests which were more valid and reliable. This finding disagreed with Ravkin et al (2015) who found that teachers' teaching experience were not significantly related to teachers' test development skills. It also agrees with Ewetan and Ewetan (2015) who found that teachers' experience and educational qualifications were the prime predictors of students' academic achievement in an item of a test developed by teachers.

## Sex as a Determinant of Test Development Skills of Secondary School Physics Teachers.

Analysis of data relating to research question three shows that sex does not determine the test development skills of secondary school physics teachers in the area of study. This finding agreed with Okon (2014) who stated that knowledge of test construction is not determined by sex. The finding also agreed with Dubem (2014) that lecturers' competence in test construction depends on the personality and training rather than gender of the teacher as skills in constructing good tests are acquired through training. Location as a Determinant of Test Development Skills of Secondary School Physics Teachers' in

### **Delta Central Senatorial District.**

Analysis of data relating to research question four shows that location does not determine the test development skills possessed by secondary school teachers in Delta Central Senatorial District. This is also in line with Osadebe (2014) which states that there was no significant difference between rural and urban teachers on the implementation of continuous assessment in secondary schools.

### Conclusion

In line with the findings of this study, it was concluded that qualification and teaching experience affect test development skills of physics teachers in the study area. Physics teachers who are trained on test construction and analysis prepared test that were more valid and reliable unlike their colleagues who are less qualified and experience. Also, sex (male and female) as well as location (urban and rural)of schools do not determine the extent of test development skills among physics teachers in Delta Central Senatorial District. it is the teachers' competence and training acquired that determines test development skills.

#### Recommendations

- 1. .Qualified and experienced physics teachers should provide mini workshop and training for less qualified colleagues to be able to apply the skills for reliable and valid test development.
- 2. Test items banks in physics should be encourage by teachers, principal and school management where less skilled teachers in test development can draw test items.
- 3. Teachers, no matter the location of school or sex should avail themselves of any good opportunity for training on test development skills.

#### References

Akiri, A. A. (2013). Effect of teachers' effectiveness on students' academic performance in public secondary schools, Delta state, Nig. Journal of Educational and social Research. 3(3): 105-112

Apata, F. S. (2013). Influence of teachers' qualification and experience on practical skills of students in solving physics problems. Journal of the Nig. Academic of Education (JONAED), 8(1), 111-125

- Ewetan, T. O. & Ewetan, O. O. (2015). Teachers' teaching experience and academic performance in Mathematics and English Languages in Public Secondary Schools in Ogun State, Nigeria Int. Journal of Humanities Social Sciences and Education (IJHSSE).2(2): 123 – 134.
- Firestone, W. A (2014). Teacher evaluation policy and conflicting theories of motivation. *Educational Researcher*. 43(2): 100-107
- Hamafyelto, R. S., Hamman-Tukur, A., & Hamafyelto, S. S. (2015). Assessing Teacher Competence in Test Construction and Content Validity of Teacher Made Examination Questions in Commerce in Borno State, Nigeria. *Education*, 5(5), 123-128, DOI: 10.5923/j.edu.20150505.01
- Igabari, Q. & Okagbare, F. (2023). Assessment of Test Development Skills of Secondary School Physics Teachers in Delta Central Senatorial District. Inovations 73 (6) wwww.journal-innovations.com
- Inko-Tariah, D. C. & Okon, E. J. (2019). Knowledge of test construction procedures among lecturers in Ignatius Ajuru University of education, Port Harcourt, Nigeria Academic Research International, 10(1), 130-138
- Okagbare, F., Ossai, P. A. U. & Osadebe, P. U. (2023). Assessment of differential item functioning of physics multiple choice used by WAEC in 2020 in relation to sex, location and school ownership in Delta State. 2. International Journal of Advance Research and Innovative Ideas in Education (IJARIIE),9(2), 734-745.
- Osadebe, P. U. (2015). Comparative Analysis of Senior Secondary School Students' Performance with School-based Assessment Scores of Continuous Assessment and Promotion Examination in Delta State. International Journal Of Education. 7(1): 154 164.
- Ovat, S. & Ofem, U. J. (2017). Teachers Variables and Application of test blueprints learners Assessment in Secondary Schools in Cross River State. *International Journal of Scientific Research in Education*, 10(1), 112-118.
- Rivkin, S. G, Hanushek, E. A. & Kain, J. F. (2005). Teachers, Schools and Academic Achievement. Econometrica. 73(2): 417 – 458.
- Ubi, I. O. & Ibe, I. O. (2020). An Assessment of the Application of Testing Skills among Secondary School Teachers in Calabar Education Zone of Cross River State, Nigeria. Nigeria Journal of Educational Research and Evaluation. July: 145 - 149