

Effect of Testwiseness Training on Mathematics Performance of Secondary School Students in Agege Local Government Area of Lagos State

¹Banjo Moshood LAWAL

lawal_banjo@yahoo.com

²Joseph Olusesan AFOLABI

olusesanafolabi@gmail.com

¹Department of Social Sciences Education,

Faculty of Education, University of Ilorin, Ilorin, Nigeria.

²Department of Educational Evaluation and Counseling Psychology,

Faculty of Education, University of Benin, Benin City, Edo State, Nigeria

Abstract

The study examined the effect of testwiseness training on Mathematics performance of secondary school students in Agege Local Government Area of Lagos State. Quasi-experimental design was used to execute the study. Two public secondary schools were randomly selected for the study. Eighty-seven (87) senior secondary school class two students were purposefully selected from the two randomly selected public secondary schools in the study area. The students selected from the two schools were assigned to two groups in which one group was assigned to experimental and the other to control. The students in the experimental group received training on testwiseness for six weeks by the researchers. Data were collected through Mathematics Performance Test (MPT) designed by the researchers with reliability coefficients of 0.75 and 0.76 for pre-test and post-test respectively. The data were analyzed using Analysis of Covariance (ANCOVA). The study showed that there was significant difference between the Mathematics performance of students exposed to testwiseness training and those not exposed to testwiseness training in favour of the group exposed to testwiseness training ($F_{(1,87)} = 69.61$; $p = 0.00$), and that there was no significant difference between the Mathematics performance of male and female students exposed to testwiseness training. This means that testwiseness training, if well executed, could necessitate improvement in students' performance especially in Mathematics. It was, therefore, recommended that testwiseness training should be introduced to students during and after teaching-learning process; and that teachers should also be encouraged to incorporate testwiseness instructions to their regular classes to further improve test taking skills of their students and reduce the rate at which students go into examination malpractice.

Keywords: Testwiseness training, mathematics, performance, students.

Introduction

The use of examination for various reasons including certification and promotion cannot be avoided even though some school of thought opined that examination is not the true test of knowledge. One of the ways through which the outcomes of a teaching and learning process could be ascertained is through examination because it constitutes the yardstick for determining the extent to which organizational goals and targets are met. The product qualities of an institution and parents expectations are mostly ascertained through examinations. Examination determines how much, and to what extent investments in the educational sector are yielding desired dividends (Mkpa, 2002). Examinations are also essential for maintenance of standards, certification, and motivation of students, control of curriculum and its delivery among other purposes.

Examination, in an educational system, is the primary measure for ascertaining candidates' knowledge, skills and ability after a given period of learning. In Nigeria and some other countries of the world, emphasis is laid on certificates. However, this has made every student desire to pass at all cost resulting in disagreement between what the students have actually imbibed as a result of teaching and learning experience and their performance in examinations. To pass examination at all cost, some students engage in all kinds of examination malpractices either before, during or after the examination exercise. This makes examination relatively failed to be the correct measure of cognitive abilities. It is worth knowing that students can still legitimately pass examination without engaging in dishonest activities. There are numerous means through which students can legitimately earned marks during examination among which is possession of testwiseness skills.

Testwiseness, as defined by Ebel and Frisbie cited in Gbore and Osakuade (2016), is the quality possessed by a test-taker at a particular period, which makes him/her to perform well in a given test immaterial of his/her level of knowledge in the content area which was tested. Testwiseness, as described by Phyllis (2011), is students' ability to utilize the characteristics and formats of the test and/or the test taking situation to receive high score. Testwiseness is capable of conferring significant advantage on experienced testees over those not experienced, because it is logically independent of the examinee's knowledge of the subject-matter for which the items supposedly measures. Testwiseness as a variable in test performance was firstly brought forth in the 1951 by Thorndike as a prominent source of score variance on cognitive tests.

Testwiseness comprised various aspects of examination which include time management skills, answering all questions, and making sure that one fully understands the directions of tests (Phyllis, 2011). According to Fakorede (2012), testees with testwiseness skills can outperform their counterparts of equal traits that lack testwiseness skills. High degree of content knowledge is vital but it is also essential for testees to be knowledgeable and experienced in different forms of test characteristics and the testing environment. It is good

to acquaint students with test-taking strategies necessary for better understanding of format and environment of different test. In the testwiseness literature, there are several variables that influence and highly correlated with testwiseness which include test-taking experience (Mustapha, 2001).

According to Mustapha (2001) the nature and level of possession of test-taking skills is an important factor in the performance of students in Mathematics tests. This means that relatively little experience is necessary to learn and develop testwiseness skills. Testwiseness is that quality possessed by a student at a particular period which enhances performance in a test. The issue of possession of these skills has not been given considerable attention in Nigeria (Mustapha, 2009). Some students have good understanding of subject-matter, good reading ability but cannot manage their testing time wisely. Some students lack capability in interpreting test instructions while others generally cannot perform relatively well in a test (Mustapha, 2012). When such happens, it might have detrimental effect on performance especially in subject like Mathematics.

Mathematics is one of the compulsory subjects offering at both basic and secondary school level in Nigeria. It is an important discipline which any nation intending to develop in the area of science and technology cannot afford to neglect. This observation is buttressed by Attah and Guwan (2016) who opined that Mathematics is a science subject that plays a pivotal role in the science and technological development of every nation. It is an important subject that cuts across all aspects of human life. The place of Mathematics in other field of studies cannot be underrated as observed by Kolawole and Oginni (2011) that Mathematics is a subject that facilitates the teaching and learning of subjects like Physics, Chemistry, Economics, Accounting, and other subjects that have elements of Mathematics. It was further stated that Mathematics plays a critical role in shaping students' later stage of occupational options especially in the contemporary Nigeria, where greater emphasis is placed on industrial and technological development.

As important as the study of Mathematics is, Ajayi (2014) observed that high rate of low academic performance is being recorded on yearly basis in the subject especially among senior secondary school students in external examinations. This statement is evident in the trend of performance of students in the May/June examination results released by the West African Examination Council between the year 2016 and 2018 in which only 38.68%; 59.22%; and 49.98% of the candidates who sat for the examination passed at credit level for the years 2016, 2017, and 2018 respectively; which is an evidence of fluctuating performance in the subject. This, therefore, calls for urgent attention because Mathematics is needed in almost all sphere of human life.

Empirically, there exist studies relating to testwiseness and students' academic performance. Yien (2001) explored the relationship between Taiwanese EFL test-takers'

characteristics, test-taking strategies, and test performance and found among others that test-taking strategies play a significant role in test performance. Also, Fakorede (2012) studied the effects of test wiseness training on test anxiety and achievement in Mathematics among selected secondary school students in Ekiti State and found that test wiseness training was efficacious in improving the Mathematics performance of students; and that test wiseness training was equally effective in improving Mathematics performance of both male and female students. This means that there are test taking skills which students need to possess in order to improve their performance. There is need for testees to be conversant with those skills that will help them maximize their performances in examinations.

In Nigeria, the downward trend in students' performance in Mathematics among secondary school students has been a serious concern to educators and researchers. While some students performed excellently well, others performed woefully. Various reasons have been alluded and different recommendations made regarding the discouraging nature of students' performance but to no avail (Isichei&Ubangha, 2007). This situation needs to be urgently addressed owing to the fact that mathematics is one of the subjects required to qualify individuals seeking admission into courses in tertiary institutions. If the issue of poor performance in Mathematics is probably ascribed to lack of test wiseness skills, therefore, it appears that there is little understanding of how acquainted students were with test wiseness skills in current classroom environment.

Efforts aimed at improving students' performance especially in Mathematics have centered on mastery of facts, concepts and principles without any notable attempt to incorporate test wiseness training into the processes of Mathematics curriculum and lesson presentation. There is the need to teach students testwiseness skills because researches have it that test wiseness is an important variable for reducing test anxiety and consequently increase test performance. There is, therefore, need to validate or refute the above claims by means of empirical research. The purpose of the study was to examine the effect of testwiseness training on Mathematics performance of secondary school students in Agege Local Government Area of Lagos State with the intention to determine the:

1. difference between the performance of students exposed to testwiseness training and those not exposed to testwiseness training in Mathematics; and
2. difference between the performance of male and female students exposed to testwiseness training in Mathematics.

Research Hypotheses

The following hypotheses were formulated and tested.

1. There is no significant difference between the performance of students exposed to testwiseness training and those not exposed to testwiseness training in Mathematics.

2. There is no significant difference between the performance of male and female students exposed to testwiseness training in Mathematics.

Methodology

Pre-test and post-test quasi-experimental design was adopted for the study. The pretest was used to test the previous knowledge of the students involved in the study and post test to measure their level of achievement after the test wiseness training. Two groups were involved in the study in which one group was assigned to experimental (45 students) and the other to control (42 students). The experimental group was give training on test wiseness while the control group was given placebo. The two groups responded to pre-test before the experiment took place. The treatment which lasted for six weeks was implemented by the researchers.

During the experiment, the researchers systematically took the students through the components of testwiseness training. After the training for the experimental group, the posttest was administered on the two groups to test the effectiveness of the training.

The population for the study was all senior secondary school class two students in Agege Local Government Area of Lagos State while the sample was 87 senior secondary school class 2 students selected from two public schools which were selected through simple random sampling approach while 87 students were from two intact classes (45 from the first school and 42 from the second school).The instrument for the study was a self-designed achievement test titled “Mathematics Performance Test (PMT)”. It was made up of 40 multiple-choice items based on current Mathematics curriculum. The instrument was validated by Mathematics teachers and Test and Measurement experts. The reliability of the test was done using split half method in which the test was administered once to 25 students in 2 schools that were not part of the study. The reliability coefficient of the test stood at 0.76. Analysis of Covariance (ANCOVA) was used for analyses of the data collected. The formulated hypotheses were tested at 0.05 level of significance.

Results

H_{01} : There is no significant difference between the performance of students exposed to testwiseness training and those not exposed to testwiseness training in Mathematics.

Table 1: Difference between the performance of students exposed to testwiseness training and those not exposed to testwiseness training in mathematics

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	3445.784 ^a	2	1722.892	53.176	.000	.559
Intercept	2688.676	1	2688.676	82.984	.000	.497
Performance						
Pre-Test	1127.553	1	1127.553	34.801	.000	.293
Groups	2255.355	1	2255.355	69.610	.000	.453
Error	2721.596	84	32.400			
Total	276318.000	87				
Corrected Total	6167.379	86				

Table 1 shows the calculated $F_{(1,87)} = 69.61$; $p = 0.00$ which is less than 0.05 level of significance ($0.00 < 0.05$). Since the p-value of 0.00 is less than the significance value of 0.05, the null hypothesis is not accepted. This means that there was significant difference between the performance of students exposed to testwiseness training and those not exposed to testwiseness training in Mathematics. The partial eta square of 0.453 implies that testwiseness training and the placebo accounted for 45.3% of the observed variance in posttest scores of the students. To determine where the difference lies, descriptive analysis of the scores obtained from the two groups was performed. The differences can be seen in the descriptive table presented in Table 2.

Table 2:

Descriptive Analysis of the difference in the mathematics performance of students exposed to testwiseness training and those not exposed to testwiseness training

Groups	No.	Mean	Standard Deviation
Experimental	45	60.71	6.75
Controlled	42	50.38	6.69

Results in Table 2 shows that the average mean score of the experimental group is greater than that of the control group. This means that the experimental group (those exposed to testwiseness training) outperformed their counterparts (those not exposed to testwiseness training). Since the experimental group outperformed their counterparts, it means that the training was effective for improving academic performance in Mathematics.

H₀₂: There is no significant difference between the performance of male and female students exposed to testwiseness training in Mathematics.

In order to test the hypothesis, academic performance of students exposed to testwiseness training based on gender were coded and analysed using independent t-test. The output of the analysis is shown in Table 3.

Table 3:

Independent t-test on difference between the performance of male and female students exposed to testwiseness training in mathematics

Gender	No	Mean	Std.	t-value	Df	p-value	Remark
Male	24	60.92	7.62	0.22	43	0.83	NS
Female	21	60.48	5.79				

Results in Table 3 shows a t-value of 0.22 and p-value of 0.83 which is greater than 0.05 ($0.83 > 0.05$). Since 0.83 is greater than 0.05 alpha level of significance, the null hypothesis is not rejected. This implies that there was no significant difference between the Mathematics performance of male and female students exposed to testwiseness training.

Discussion

This study examined the effect of testwiseness training on Mathematics performance of secondary school students in Agege Local Government Area of Lagos State. The finding of the study revealed that there was significant difference between the Mathematics performance of students exposed to testwiseness training and those not exposed to testwiseness training in favour of the group exposed to testwiseness training. This means that the testwiseness training was effective for improving Mathematics performance of students at the secondary school level. This result supported the work of Fakorede (2012) who found that testwiseness training was efficacious in improving the Mathematics performance of students in Ekiti State. The result of the study also supported the work of Gbore and Osakuade (2016) who found that students without testwiseness training in Mathematics are more test anxious than the adolescent students with testwiseness training in mathematics. The observed similarity in the result of this study and that of Fakorede (2012) and Gbore and Osakuade (2016) might be due to the fact that the three studies examined testwiseness training with respect to Mathematics.

The result of the study also showed that there was no significant difference between the Mathematics performance of male and female students exposed to testwiseness training. This means that the effectiveness of testwiseness training in bringing about improved

academic performance does not depend on the gender of the students. The result is in line with that of Fakorede (2012) who found that testwiseness training was equally effective in improving Mathematics performance of both male and female students. This result is possible where both male and female students exposed to the training benefited equally from the training.

Conclusion

This study examined the effect of testwiseness training on Mathematics performance of secondary school students in Agege Local Government Area of Lagos State. Based on the outcome of the study, it was concluded that testwiseness training, if well executed, could necessitate improvement in students' performance especially in Mathematics. This is premised on the outcome of the study which showed that the students exposed to testwiseness training outperformed their counterparts that were not exposed to testwiseness training in Mathematics.

Recommendations

Based on the findings and conclusion of the study, it is therefore, recommended that testwiseness training should be introduced to students during and after teaching-learning process. Teachers should also be encouraged to incorporate testwiseness instructions to their regular classes to further improve test taking skills and the consequent performance in Mathematics.

References

- Ajayi, O. S. (2014). Academic incongruence and attribution as predictors of mathematics self-concept of Osun State secondary school students. Unpublished Master Dissertation, Obafemi Awolowo University, Ile-Ife, Nigeria.
- Attah, B.G. &Guwan, B. (2016). Relationship between locus of control, home attainment of Nigeria's vision 20:20. *TJMAN*, 39(1), 47-55.
- Fakorede, J. O. (2012). *Effects of testwiseness training on test anxiety and achievement in Mathematics among selected secondary school students in Ekiti State*. Ph.D Thesis, University of Lagos.
- Gbore, L. O. & Osakuade, J. O. (2016). Effects of testwiseness training in mathematics on adolescent secondary school students' test anxiety in Ondo State, Nigeria. *Journal of Education and Practice*, 7(10), 34-39.
- Isichei, F. M. & Ubangha, M. B. (2007). Teacher effectiveness and students' performance in conventional schools and coaching centres in Lagos State. *LWATI Journal of Contemporary Research*, 4(2), 45-54.

- Kolawole, E. B. & Oginni, O. I. (2011). Effect of mother tongue and mathematical language on primary school pupils' performance and mathematics. *TJMAN*, 38(1), 56-63.
- Mkpa, M. A. (2002). Quality control in the conduct of examination in our institutions. Paper Presented at a Workshop Organized by Federal College of Education (Technical) Umunze for her academic staff, May 28.
- Mustapha, A. Y. (2001). *Teaching testwiseness as an integral part of a classroom instruction in Nigeria schools. The role of teacher.* In P. N. Lassa, J.A. Aghenta (Eds). Proceeding of the 6 th Annual Congress of the Nigerian Academy of Education. (pp. 148-156). Jos.
- Mustapha, A. Y. (2009). A survey of secondary school teachers' level of possession of test-taking skills in Jos Metropolis of Plateau State. *Journal of Educational Technology and Instruction (JETI)*, 67-70.
- Mustapha, A.Y. (2012). *Analysis of psychometric properties of junior secondary school certificate mathematics examinations in Plateau State.* Unpublished Ph.D. Thesis, University of Jos, Nigeria
- Phyllis, L. H. (2011). *The effect of testwiseness on self-efficacy and mathematic performance of middle school students with learning disabilities.* B.S., Virginia State University.
- Thorndike, R. L. (1951). *Reliability.* In E. F. Lindquist (Ed.), *Educational measurement* (pp. 560-620). Washington, DC: American Council on Education.
- Yien, L. (2001). Effective test-taking strategies on English tests: Implications for Taiwanese students. *Hong Kong Journal of Applied Linguistics*, 6(2), 44-57.