

# Validity of Standard Four Attainment Scores in Predicting Agriculture Primary School Leaving Examination Results

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## Abstract

Establishing how current academic performance relates to future performance is key to helping educators fine tuning their assessment practice. At present high failure rate of Agriculture subject at Primary Leaving Examination (PSLE) has been of a great concern in Botswana. To determine the relationship between the standard four attainment scores and Primary Leaving Examination scores key in tracing the origin of failure observed at primary school leaving examination. The main focus of this study was to determine the validity of standard four attainment scores in predicting performance at standard seven Primary School Leaving Examination (PSLE). A quantitative study of correlational research design used secondary data scores obtained from Botswana Examination Council (BEC) to determine the correlation coefficient ( $r$ ) between the two sets of scores. The study indicated that there was strong correlation,  $r=.8$  at  $P=.00$ , between standard four attainment scores and PSLE scores, therefore the null hypothesis that states that there is no significant relationship between standard four attainment scores and PSLE scores was rejected. It was concluded that high failure rate obtaining at PSLE is related to poor foundation laid at lower levels. It is recommended that standard four attainment scores or performance should save as criterion for moving into upper primary (standard 5-7) and subsequently seating for PSLE.

**Keywords:** Primary school leaving examinations; Validity; Standard four attainment tests; Botswana examination council.



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## 1. Introduction

The Revised National Policy on Education (1994) identified the main objective of the ministry of education as raising educational standards at all levels and emphasizing science and technology in the educational system. The new policy also requires that English be used as the medium of instruction from standard two [1].

Education system in Botswana is using a 7-3-2 structure. This system allows learners to attend 7 years of primary school, three years of junior secondary and two years of senior secondary school. The primary school system is divided into two phases being lower primary which comprises of standard one to four and upper primary which is from standard five to seven. Students enter lower primary at the age of five to six [2]. As the primary school system is divided into two phases, The Revised National Policy on Education of April 1994 also recommended that primary school syllabus should also be divided according to the two phases. Agriculture is among the subjects taught in the upper primary and it should be taught to students doing standard 5-7.

Primary education is the most important level of education as it is the foundation upon which all other schooling will rest. It is critical that children go through the best possible schooling at this level. 100% of primary school leavers proceed to junior secondary schools nowadays compared to 35% in 1997 and before [3]. All students are guaranteed to ten years of basic education leading to junior certificate qualification.

It is a common practice to determine academic readiness and hence perform selection of learners for the next level of education based on results of their performance in previous related examinations. Conducting examination within and at the end of each and every school year is part of the school curriculum and in Botswana like in other countries, learners take public examination to determine their academic performance at each level of education. Learners in Botswana primary schools are expected to sit for public examination at the end of each phase (lower and upper standard). At the end of lower phase (end of standard four) learners sit for attainment test and at the end of upper phase (end of standard seven) learners sit for PSLE.

These assessments are the best way to find whether learning is taking place as information is obtained about the achievement or ability of an individuals. Assessment also enables teachers to gather information about children's progress and achievement which they use to enrich teaching and learning and report the information to all those concerned with children's education [4].

### 1.1. Standard Four Attainment Tests

Standard four attainment tests were started in 1995 to assess the achievement of the standard four learners in English, mathematics and Setswana in order to implement the Revised National Policy on Education (1994) which requires the assessment and monitoring of the progress of education. Passing attainment test is a prerequisite for learners to proceed to upper as it shows that the learner has achieved the basic learning concepts. The policy also

allows those who did not pass the attainment tests to repeat standard four. The repetition of 12.5% of the class is allowed. The attainment test also helps in collecting information required for Education for All (EFA) assessment which was aimed at establishing the percentage of pupils who had had four years or more of primary education who mastered a set of nationally defined basic learning competencies. (standard four assessment report on the monitoring of learning achievement, Vol 2, 2001).

These tests are conducted by the Botswana examination council by preparing the tests and distributing them to schools to administer, mark and grade. Schools then use the results as part of the evidence to decide whether a pupil should be retained in standard four or proceed to standard five. There is no standardization for the administration, scoring or grading of these tests and there is therefore no national picture of how pupils are performing on the tests. (Botswana Examination Council, 2014).

## 2. Primary School Leaving Examinations

Primary school leaving examination has been administered annually since 1967. These examinations certify completion of primary education. The purpose of this examination is to monitor education quality level and help in the planning of the education policy reforms. The test item consists of multiple choice questions except agriculture which is structured. (Botswana Examination council, 2008)

Among all the subject taught at upper primary Agriculture and Creative and Performing Arts (CAPA) were the only subjects which were not examined for during PSLE. The Ministry of Education Skills and Development (MOE) hence adopted a strategy for agriculture to be examined. The agricultural syllabus in primary schools was fully implemented in 2005 and the first group to be examined was in 2007.

### 2.1. Statement of the Problem

The student performance in Agriculture PSLE examination has been poor since the introduction of the subject. The standard four attainment tests determine the student readiness for PSLE which now comprises of seven subjects being English, mathematics, Setswana, science, social studies, moral education and agriculture. This brings to question the validity of attainment tests in predicting performance in PSLE Agriculture examinations.

### 2.2. Objectives

- Determine the extent to which standard four English attainment scores of 2013 correlates with 2016 Agriculture PSLE scores
- Determine the extent to which standard four mathematics attainment scores of 2013 correlates with 2016 Agriculture PSLE scores
- Determine the extent to which standard four attainment average scores of 2013 correlates with 2016 Agriculture PSLE scores

### 2.3. Research Hypothesis

The following null hypothesis was formulated in the study and tested at 0.05 level of significance:

**HO:** There is no significant relationship between standard four attainment average scores of 2013 correlates with 2016 Agriculture PSLE scores

## 3. Literature Review

Prediction of student readiness for next level of learning is essential to educators as it guides suitable strategies to adopt for improved performance. In order to achieve this vital role teachers, have to be gauge students' readiness through some form of standardized examinations and standard four attainment examination is one such example.

Research that has been undertaken by various researchers about students' readiness to do well academically at the next level vary in their findings.

Kola and Adedo [5], conducted a correlational study at Kwara state college of education Lafiagi between continuous assessment and the students' performance in physics. It was a non-experimental descriptive survey study. The sampled population were ninety two students who were all physics student in the college. Research instrument used were end of semester electromagnetism examination scores and the continuous assessment marks which comprised of the average of the take home electromagnetism assignment and electromagnetism class tests. The results were analysed using frequency counts, and percentages and Pearson product moment correlation coefficient to determine the degree of relationship.

The results indicated that there was a strong correlation between continuous assessment and students' examination scores as a correlation score of 0.736 was yield. It was therefore recommended that compilation of students' final grades in physics should not be based on the final examination scores only but should be the addition of examination scores and students' continuous assessment scores.

This study relates to my study because they are both correlational studies basing on the prediction of students performance. The only difference is that the above study was conducted at Nigeria and it is comparing the continuous assessment marks and the final physics examination marks while my study will be conducted in Botswana using standard four attainment tests scores and the PSLE scores.

Belfield and Crosta [6], also conducted a correlational study in the United States of America to find the validity of placement tests and high school information in predicting courses grades and college performance. The population sample of study was all students in colleges who set for placement tests. Students who took a college placement test

were sampled and enrolled in the SWCCS between fall 2008 and summer 2010. Data on full college transcript through fall 2010 term in combination with some limited demographic information was used. The college transcripts data was matched with high school database that provided transcript and GPA. Two placement tests were used.

The results were analysed using frequency counts, and percentages and Pearson product moment correlation coefficient to determine the degree of relationship. The findings prevailed that placement tests do not yield strong predictions of how students will perform in the college. Placement tests were positive but weakly when associated with GPA. The tests do not have much explanatory power across a range of measures of performance including the college GPA. It was recommended that placement tests should not be considered during the admission of students in the colleges as there do not predict their performance in the college.

Also in Northwest University Kano – Nigeria, [Bichi and Musa \[7\]](#) conducted a study to investigate the relationship between continuous assessment and the scores of the educational courses. It was an exo-post- facto research design. Two hundred students (120 females and 80 males) were randomly sampled from the faculty of education and their scores from introduction to Psychology, sociology of education, history of education of 2012/2013 academic sessions were used.

The data used for this study was obtained from the faculty of education unit in the University of Northwest, Kano. The data was analysed using a descriptive research method that uses Pearson's product moment correlation coefficient and the null hypothesis were tested at the 0.05 level of significance.

The findings of this study revealed that there is a significant relationship between continuous assessment scores and examination scores of the three education courses. Basing on the study it was recommended that continuous assessment should be given serious consideration by teachers and school administrators to improve the quality of assessment methods and transparency should be ensured in continuous assessment since it explains and predict the future academic performance of students. Just like my study the above study is a correlational study dealing with learners' performance the difference is that the above study was conducted outside our country using continuous assessment scores of educational courses and their final examination scores.

In another study, [Adeyemi \[8\]](#) also conducted a correlational study in Ondo and Ekiti states, Nigeria to determine the senior secondary certificate examination which best predicts students' performance in final year degree examination in universities. The research design adopted for this study was the exo-post facto research design. The study population comprised of all the four universities in Ondo and Ekiti states in 2010. Two universities were sampled for the study (Adekunle Ajasin University and Ado Ekiti). The sampling technique used was purposive. All the 1370 students who scored 3.5 and above cumulative grade point average in the final year 400 level bachelor of education degree examinations in 2010/2011 academic year in the two universities were purposively selected for the study.

The instrument used to collect data for the study was an inventory titled "Entry Qualification and Final Degree Examination Inventory" (EQFDEI). The instrument was in two parts, part 1 elicited demographic information about each student and part two consisted of data on the students' enrolment courses, entry qualifications and cumulative grade points. The content validity of the instrument determined by the experts in test and measurement who matched each items in the inventory with the research questions in order to determine whether or not the instrument actually measured what it was supposed to measure.

The findings of the study indicated that WAEC entry qualification was the best predictor for success in the final year bachelor of education degree for all the universities. Basing on the findings it was recommended that more emphasis should be placed on the WAEC examinations results as entry qualifications in admitting students into the bachelor of education degree programme as it is the best predictor of success in final year bachelor of education degree examination.

[Mareka \[9\]](#), conducted a research to find the predictive validity of Botswana 2012 and 2013 JCE results using 2009 and 2010 PSLE grades in mathematics. These study was conducted in Botswana and it was a quantitative research study because data was collected from the sample and the relationship between independent and dependent variable was determined using regression analyses. The study used a correlation research design. The population of the study was all students across the country who sat for PSLE mathematics examination in 2009 and 2010 and those who sat for JCE mathematics in 2012 and 2013 in all public secondary schools in both rural and urban areas. The population was for 207 government school Junior Secondary School. The study used simple random sampling.

The researcher used data from BEC and the validity of the marks was ensured by BEC. The data was entered into SPSS window, version 21 and this version was used to analyses the data. The data was analysed by finding the Pearson correlation coefficient and the regression coefficients. The hypothesis were tested at the .05 alpha level. The findings of the study were that PSLE mathematics scores significantly predicted performance in JCE mathematics results in Botswana.

Basing on the findings of the study, it was recommended that the Ministry of Basic Education should ensure that teachers and schools at large account for poor results in situations where JCE mathematics results are drastically lower than the PSLE mathematics grades. Supervision and monitoring of such schools should then be done by subject education offices to make sure that teachers operations in classrooms yield good results.

Furthermore [Bulala, et al. \[10\]](#) conducted another predictive study on location as a factor in the prediction of performance in Botswana Junior School Certificate Agriculture examination scores. The study was conducted in Botswana and the purpose for this study was to determine whether agriculture CA scores predict academic performance in junior school certificate examination and equally so for urban, peri- urban and rural schools. The population of the study comprises of all presented candidates for the 206 junior secondary schools which are spread across Botswana for the year 2009 JSC examination. The total population under study was 38101 students. A sample

of 1506 comprising of 614 rural students, 340 urban and 552 peri-urban was randomly selected using [11] sample size determination method. Secondary data was used for this study and it was retrieved with permission from BEC academic records.

The validity was ensured by BEC through carrying out intensive panel based content analyses and face validation. The collected data was coded and entered into the computer and analysis was done by carrying out regression analysis. The analysis were done by using SPSS version 16 for windows. The prediction model for CA scores was determined by fitting the values of the relevant parameters in the linear regression mode. Student's CA scores was the predictor variable and the JC examination scores was the criterion variable. The level of testing the hypothesis was set at .05 for all the statistical tests. The results indicated that school location has no significant influence on the ability of CA scores to predict performance in agriculture education JC examinations.

From the findings it was recommended that the government of Botswana should maintain the status quo between the rural and urban locations by providing the rural dwellers the social amenities which will enhance academic performance and reduce transfers of students from rural to urban schools as this lead to class congestion as well as lack of land for agricultural project in town schools.

Looking at the different research studies above, they all relates to the researcher's study because they are all correlational studies dealing with learners' performance. The only difference is that some studies were conducted outside Botswana. Those studies conducted locally were done at secondary level and nothing has being done on at primary level.

## 4. Methodology

The study used a quantitative research method because data was collected from the sampled population and then generalized. Quantitative research establishes association between variables therefore it was suitable for the study because the investigation of correlation between standard four attainment test scores and PSLE Agriculture performance was done to come up with accurate estimation of the relationship between the two variables. The study investigated the extent to which attainment test scores of the year 2013 correlates with the PSLE agriculture score therefore since the researcher measured the relationship between the independent variable and the dependent variable it was therefore necessary to use quantitative research design. Quantitative focuses more on comparing and expressing relationship between variables.

To answer the research questions, the researcher used correlational research design. Correlation measures two or more factors to determine the extent to which the values of the factors are related [12]. The research design also allows for the use of existing data records therefore it was suitable as the researcher used the existing data of 2013 attainment test scores and 2016 agriculture PSLE scores. The data for this study was obtained from Botswana Examination council and Boitumelo primary school.

The data used was from BEC which is responsible for setting and administering of the two examination. It was the one that ensured that the setting, administration and marking of the examinations were done following the set standards for guarantying the validity. Therefore the scores obtained from Botswana Examination Council were assumed to be valid.

Attainment scores for the year 2013 were retrieved from Boitumelo Primary school and the raw scores for agriculture scores of students who wrote PSLE in 2016 were retrieved from Botswana Examination Council database through a CD-ROM.

Data was analyzed using Statistical Package for Social Sciences (SPSS) version 22 program. Pearson correlation coefficient was used to establish the relationship between year 2013 attainment scores and year 2016 Agriculture PSLE scores.

## 5. Results and Discussions

The results were presented based on the objectives of the study whereby each variable in the objective formed a sub-heading.

**Table-1.** Relationship between standard four English attainment scores of year 2013 and 2016 Agriculture PSLE scores

Primary school leaving examination agriculture scores		English attainment scores
primary school leaving examination agriculture scores	Pearson Correlation	.823**
	1	
	Sig. (2-tailed)	.002
English attainment scores	N	11
	11	1
	Pearson Correlation	
	.823**	
	Sig. (2-tailed)	
	.002	
	N	11
	11	

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

The Pearson correlation analysis presented in table 1 shows a high significant correlation of .823. Basing on this findings, the null hypothesis was rejected. The rejection of the null hypothesis implies that there is a strong correlation between standard four English attainment scores of 2013 and the 2016 agriculture PSLE scores.

This is so because having performed better in English, learners will not have problems in understanding agriculture which is taught in English. The findings concur with those by Kola and Adedo [5], which showed that continuous assessment strongly correlate with physics final results. This therefore proved that a test or an examination taken can be used to predict the final examination results.

**Table-2.** Relationship between standard four mathematics attainment scores of year 2013 and 2016 Agriculture PSLE scores

Primary school leaving examination agriculture scores		Mathematics attainment scores
primary school leaving examination agriculture scores	Pearson Correlation	.810**
	1	
	Sig. (2-tailed)	.003
mathematics attainment scores	N	11
	11	1
	Pearson Correlation	.810**
	Sig. (2-tailed)	.003
	N	11

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

The results showed a strong correlation of .810 which leads to the rejection of the null hypothesis. The rejection implies that there is a significant positive relationship between standard four Mathematics attainment scores of 2013 and the 2016 agriculture PSLE scores. This relationship can be explained away by fact the agriculture is science based subject borrow tremendously some mathematically calculations.

**Table-3.** Relationship between overall standard four attainment scores of year 2013 and 2016 Agriculture PSLE scores

primary school leaving examination agriculture scores		total average attainment scores
primary school leaving examination agriculture scores	Pearson Correlation	.892**
	1	
	Sig. (2-tailed)	.000
total average attainment scores	N	11
	11	1
	Pearson Correlation	.892**
	Sig. (2-tailed)	.000
	N 11	11

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

These results also yield a strong significant correlation value of .892. Therefore, the null hypothesis was also rejected. This implies that indeed there is a strong correlation between standard four attainment test scores of 2013 and the agriculture PSLE scores of 2016.

Therefore, having passed the foundation subjects make it easier for the learners to excel in other subjects, agriculture included. This is so because having performed better in English and Mathematics, learners will not have problems in understanding agriculture which is taught in English and it is also a mathematics and science related subject.

This resonates well with studies of Bichi and Musa [7] which proved that there is a significant correlation on tests and examination given during the learning process. Their findings showed a significant relationship between the continuous assessment scores of the education courses offered in the college and their final examination scores. The findings of a research study conducted by Mareka [9] also proved that indeed in education, tests and examination do relate as the study showed a significant relationship between PSLE Mathematics results and the JCE Mathematics results.

## 6. Conclusions and Recommendations

- For the learners to perform better in PSLE Agriculture they should have passed the attainment tests
- Standard four Attainment scores are a good predictor and valid measure of performance in PSLE
- BEC should see to it that just like agriculture PSLE, attainment test should be marked and graded at national level so as to ensure that teachers put more effort in in preparing students.

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