

Mathematics Grades as Correlates to Performance in Asian Psychological Services and Assessment (APSA)

MARIBETH DUSAL-ALPUERTO

<http://orcid.org/0000-0003-4849-3652>
mdalpuerto@universityofbohol.edu.ph

ELIJAH L. SALES

<http://orcid.org/0000-0002-7248-4230>
elsales@universityofbohol.edu.ph

ABSTRACT

The Asian Psychological Services and Assessment, Inc. (APSA) is an institution conducting a diagnostic test of core subjects that includes Mathematics. Taking into account the importance of the subject, the researchers conducted a study on students' performance in Math. The study sought to find if the mathematics grade is a correlator of APSA rating by testing the relationship between the final grade and APSA diagnostic test results. The researchers employed the quantitative method using documentary analysis on the existing records as to academic performance and APSA result. The subjects of the study were the 587 students of University of Bohol High School across the four grade levels. The data obtained were then subjected to statistical treatments using coefficient of correlation, t-test, and analysis of variance. Results revealed that there was a significant correlation between the grades and APSA results in Mathematics, while APSA results in the four levels varied significantly. This means that students with low final grades in math are likely to obtain low performance in APSA. The variance in the APSA results among the four levels implied that the trend differs - distributions of proficiency were different in the four levels.

Keywords - Education, Mathematics, academic performance, diagnostic test, APSA, quantitative analysis, Bohol, Philippines, Asia

INTRODUCTION

Mathematics is one of the most important subjects in the education curriculum worldwide and is taught in all levels. Studies have shown that educators see mathematics as being closely linked and integral to science and technology subjects (McCormick and Murphy, 1998). In the Trends in Mathematics and Science Study (TIMSS) and International Association for the Evaluation of Educational Achievement (IEA) 2003 report, alarming facts for the participating countries such as the Philippines were revealed. The data showed that Filipino students' poor performance in mathematics has placed the country in the 36th rank out of 38 nations (Sangcap, 2010).

In the K to 12 Philippine Education curriculum, Mathematics is considered one of the core subjects. In the new curriculum, the conceptual framework of Mathematics gives greater emphasis on critical thinking and problem solving as its twin goals. These two goals are to be achieved with organized and rigorous curriculum content, a well-defined set of high-level skills and processes, desirable values and attitudes, and appropriate tools, taking into account the different contexts of Filipino learners. One edge of any education institution is having a curriculum which conforms to the national norms and international standards. Hence, the University of Bohol administration engaged the services of Asian Psychological Services and Assessment (APSA) to handle the standardized assessment.

Taking into account the importance of the subject and the alarming low performance of the students in math, the researchers sought to know if the student's final grade predicts the APSA rating.

FRAMEWORK

Several theories and studies on math learning and achievement have been posited and extracted to give substance to this study. The learning - cognitive theory of Piaget explains how knowledge is constructed in the human being. It is when information comes into contact with existing knowledge that has been developed by experiences (Piaget & Cook, 1952).

College performance and future careers of the students are greatly influenced by the students' mathematical performance in secondary schools. Having a solid background in mathematics enables students to develop sophisticated life perspectives and access to more career options. Mathematics is a subject that is indispensable academically, professionally and in daily life. If a student is having difficulty in math in the lower level, failure to remedy it immediately could result in the mathematics difficulties worsening over time, thus hindering students from fully realizing their academic potential (Tambychik & Meera, 2010). Hence, academic performance in Math should be closely monitored. Although, Mathematics is a subject abhorred by many students, still it is an interesting field to be studied especially since it is one of the core subjects in the curriculum.

The standard competencies learned by the student can be assessed using national examinations or diagnostic tests at the end of the school year. It is done to measure the achievement of the students within the school year. Such assessment could either come from the government or private institution (Magno & Piosang, 2016). Standardized assessment is an effective tool to measure students' achievement and can be used to help them make progress (Mons, 2009). Principals view standardized test as a viable tool for identifying remedial activities, differentiating instructions, and identifying students with exceptional needs (Dodge, 2007). Standards-Based Assessment (SBA) is done by comparing each student's rating to national or international standards. National tests are commonly standards-based since the competencies tested are based in the curriculum. The general intention of SBA is to focus more on the learning competencies of each learner. For the assessment to be standards-based, it should be aligned with the students' learning competencies (Magno & Piosang, 2016).

Noting the importance of academic performance in Mathematics and the assessment of achievement, this research seeks to delve into the relationship between the final grade & APSA rating of the high school students of the University of Bohol. The study aims at exploring the possibility that the final grade in Math as the measure of academic performance is a predictor of diagnostic test rating.

METHODOLOGY

The study employed the documentary analysis of the existing pertinent data of the students' academic performance and their APSA test results. The complete enumeration method was used. The subjects were the 587 students of University of Bohol High School across all levels who were enrolled for the School Year 2014-2015. The gathered data were then analyzed using correlation, t-test, and analysis of variance.

RESULTS AND DISCUSSION

Mathematics Academic Performance of Students

Table 1 depicts the summary of the students' academic performance in the four year levels. The academic performance was the final grade of students in Mathematics in the School Year 2014-2015. It is categorized into Advanced, Proficient, Approaching Proficiency, Developing, and Beginning according to the grade range pursuant to the Department of Education (DepEd) DO 31, s. 2012 on the grading system.

Table 1. Students' Mathematics academic performance

Rating/ Description	Grade 7 N = 134			Grade 8 N = 150			Grade 9 N = 153			Fourth Year N = 150		
	F	%	R	F	%	R	F	%	R	F	%	R
Advanced (90-above) A	3	2.24	5	22	14.67	3	31	20.26	4	29	19.33	4
Proficient (85 – 89) P	23	17.16	3	54	36.00	2	43	28.10	2	37	24.67	3
Approaching Proficiency (80 – 84) AP	42	31.34	2	58	38.67	1	45	29.41	1	41	27.33	2
Developing (75 – 79) D	59	44.03	1	15	10.00	4	34	22.22	3	43	28.67	1
Beginning (74-below) B	7	5.23	4	1	0.66	5	0	0	5	0	0	5
Mean	80.04 AP			84.65 AP			84.35 AP			83.55 AP		
F Above Mean	59			76			74			75		
F Below Mean	75			74			79			75		

Mathematics Performance of Students as to the APSA Results

The Mathematics performance of students as to the Asian Psychological Services and Assessment, Inc. (APSA) results were the transmuted scaled assessment score (SAS) results of the standards-based assessment taken by the students of the University of Bohol High School. It was done to validate the performance of the students with reference to the national standards in the core subjects – English, Mathematics, and Science. Table 2 presents the Mathematics performance of the high school students as to the APSA results in the four year levels.

Table 2. Students' APSA Mathematics performance

Rating/ Description	Grade 7 N = 134			Grade 8 N = 150			Grade 9 N = 153			Fourth Year N = 150		
	F	%	R	F	%	R	F	%	R	F	%	R
Highly Proficient/ Excellent (90-110)	1	0.75	4	0	0	3.5	0	0	3.5	0	0	3.5
Proficient (80-89)	6	4.48	3	0	0	3.5	0	0	3.5	0	0	3.5
Progressing Towards Standards (70-79)	71	53	1	97	65	1	84	55	1	66	44	2
Not Met Standards (50-69)	56	41.79	2	53	35	2	69	45	2	84	56	1
Mean	70.99 Progressing Towards Standards			70.13 Progressing Towards Standards			69.61 Not Met Standards			69.38 Not Met Standards		
F Above Mean	69			82			84			66		
F Below Mean	65			68			69			84		

Correlation between the students' Mathematics academic performance and APSA results

To determine whether there is significant correlation between the students' Mathematics academic performance and APSA result, the data were subjected to Pearson Product Moment Coefficient of Correlation. Further validation for the significant values, t-test was used. Table 3 depicts the correlation tests between the Mathematics final grade and APSA test rating of the four grade levels.

Table 3: Summary of the correlation between the Mathematics academic performance and APSA results of the four grade/year levels

Grade/ Year Level	Academic Performance	APSA Performance	r	Critical Value at 0.05 Level of Significance	Remarks
Grade 7	80.04	70.99	0.622785	0.1946	Significant
Grade 8	84.65	70.13	0.23655	0.1946	Significant
Grade 9	84.35	69.61	0.165303	0.1946	Insignificant
Fourth Year	83.55	69.38	0.26725	0.1946	Significant

Analysis of variance in the Four Grade/Year Levels as to the APSA results

Tables 4 and 5 present the analysis of variance one-way classification in the four grade/year levels as to the APSA results. The obtained F value 5.09 was greater than the critical value of 2.60 at 0.05 level of significance with 3 and 583 degrees of freedom, thus, the null hypothesis was rejected. The APSA results of the students in the four grade/year levels varied significantly. The significant variance was further tested using the Scheffe's test. The difference lied between the Grades 7 and 9 pairing and also that of the Grade 7 and Fourth Year pairing.

Except for Grade 9, there were significant correlations between academic performance and performance in APSA for Grades 7, 8 and Fourth Year. The higher the academic performance, the higher the performance in APSA was found. This implied that the APSA is a reliable test to measure performance.

Table 4: ANOVA one-way classification in the four grade/year levels as to APSA results

	Grade 7	Grade 8	Grade 9	Fourth Year	Total	
N	134	150	153	150	587	
Mean	70.99	70.13	69.61	69.38	70.00	
Source of Variation	SS	df	MS	Computed F	Remarks	Critical Value at 0.05
Column Mean	215.09	3	71.70	5.09	>	2.60
Error	8215.91	583	14.09		Significant	
Total	8431	586			Ho: Reject	

Table 5: Multiple comparisons using Scheffe's test in the four grade/year levels as to APSA results

Between Treatments		Mean 1	Mean 2	F'	F(0.05)(K-1)	Interpretation
Grade 7	Grade 8	70.99	70.13	3.7147	7.8	Insignificant
Grade 7	Grade 9	70.99	69.61	9.6572	7.8	Significant
Grade 7	Fourth Year	70.99	69.38	13.0191	7.8	Significant
Grade 8	Grade 9	70.13	69.61	1.4538	7.8	Insignificant
Grade 8	Fourth Year	70.13	69.38	2.9936	7.8	Insignificant
Grade 9	Fourth Year	69.61	69.38	0.2844	7.8	Insignificant

CONCLUSION

The academic performance in Mathematics based on the final grades of the students from the Grades 8 & 9 were on the Approaching Proficiency level, while those from the Grades 7 and Fourth Year were on the Developing level which in general was not considered good performance. As to the APSA test, the students generally obtained below passing marks. This concurred with the study of Alcuizar (2016) which stated that if the academic performance is low, the result of standardized test is likely to be low as well.

Overall, the final grade in Mathematics was significantly correlated with the APSA test result. It implied that the Mathematics subject grade is a predictor to APSA rating.

As to the significant result of the variance in the APSA test result of the four year levels, it must have been due to the gap between the Grades 7 and Fourth Year. The trends of ratings in the levels varied, possibly due to low Mathematics performance.

RECOMMENDATIONS

Based on the foregoing, it is recommended that the carrying out of the competencies indicated in the Mathematics syllabus should strictly be ensured. Timely submission and checking of lesson plans, auditing of competencies covered, as well as monitoring of delivery should be regularly observed.

Improving Mathematics instruction is a must. Subject teachers should undergo retooling. Thus, training on new teaching strategies and classroom management styles are highly needed. Furthermore, it is also recom-

mended to employ pre-test and post-test at the beginning and the end of the school year respectively to clearly measure the students' performance.

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