STUDENTS' APTITUDE-SCALED ABILITY SCORES AS PREDICTORS FOR ASSESSMENT FOR COLLEGE POTENTIAL ACHIEVEMENT TEST

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Abstract

College readiness is one of the concerns of both students and universities nowadays, and when it comes to readiness, we speak about aptitude. On the other hand, Academic achievement plays an important role in determining students' aptitude ability. It is a manifestation whether a student maximizes his aptitude ability in order for him to have an excellent academic achievement. This empirically-driven study aims to look on how aptitude subscales, namely, verbal reasoning, quantitative reasoning, abstract reasoning, and spatial reasoning affect academic performance of the students. Seven hundred sixty-one (761) first-year college students composed of 350 males and 411 females, who took the Assessment for College Potential, were involved in the study. The research design used descriptive-correlational. Data analysis utilized were Pearson Product Moment Correlation to look for the relationship of the variables, and Stepwise Linear Regression Analysis to determine which of the variables under Aptitude highly predicts Academic Achievement. The results revealed that (1) a significant correlation between Student' Aptitude Scaled Ability Score and Academic achievement *(r=.597)* and (2) the highest predictors for academic achievement for this group are Verbal Reasoning *(sig.=000)* and Quantitative Reasoning *(sig.=000)*.

Keywords: aptitude, achievement, assessment for college potential

Introduction

College readiness is one of the concerns of both students and universities nowadays (Mishra & Chincholikar, 2014, Meece, Anderman & Anderman, 2006), and when it comes to readiness, we speak about aptitude. *Aptitude* refers to the degree of readiness to learn and to perform well in a particular situation or domain (Corno, Cronbach, Kupermintz, Lohman, Mandinach, Porteus, & Talbert, 2002). Example situations that students may apply their aptitude includes the ability to comprehend instructions, to manage one's time, to use previously acquired knowledge appropriately, to make good inferences and generalizations, and to manage one's emotions (Lohman, 2005). All the more, aptitudes for learning thus go beyond cognitive abilities. Aspects of personality and motivation commonly function as aptitudes, as well (Meece, Anderman & Anderman, 2006).

Academic achievement, on the other hand, has traditionally placed great emphasis on the aptitude qualities and potentials of students (Caprara, Barbaranelli, Steca & Malone, 2006). Although academic achievement is not the only school-related outcome; it represents an important indicator of how one performs his/her cognitive ability.

A vast literature attests to the influence of academic achievement on students' course of life: socioeconomic status (Sirin, 2005); teachers and schools (Rivkin, Hanushck & Kain, 2005; Caprara, Barbaranelli, Steca & Malone, 2006; Meece, Anderman & Anderman, 2006); school performance or homework (Cooper, Robinson & Patall, 2006); personality and intelligence (Laidra, Pullman & Allik, 2006; Marquez, Martin & Brackett, 2006); goals and emotions (Pekrun, Maier & Elliot, 2009); as well as the perception of parent involvement (Deplanty, Kern & Duachare, 2007). These studies are the manifestations that academic achievement is one of the important topics in the educational system. But in this present research, the researchers want to focus on the impact of aptitude in the academic performance of the students (Mishra & Chincholikar, 2014).

Assessment for College Potential (ACP) is a standardized test administered by the Asian Psychological Services and Assessment, Inc. (APSA). It is a comprehensive test to assess the potential of high school seniors to do college work. The results give a view of how

prepared the student is for an academic work in the college level. Moreover, the items in the test calibrate what has been learned in high school and capture a reflection of the educational experiences plus the abilities that have been developed as a result of the experiences.

ACP is composed of three tests: achievement test, aptitude test, and affective-based test. In this study, the researchers looked into the relationship between the students' aptitude-scaled ability scores and the achievement test .

Achievement test measures proficiency in the subject areas of the high school curriculum particularly, English, Mathematics, and Science. The test encompasses measurement of facts, skills, concepts, and applications.

For English, this subscale assesses verbal proficiency in the English language. It covers the content areas of Language, Reading, and Literature. It also measures the study skills of students. Mathematics, on the other hand, measures the knowledge and application of mathematical rules and operations in the content areas of Numbers, Operations, Algebra, Trigonometry, Geometry, Statistics, and Measurement. Lastly, Science subscale measures knowledge and application of scientific facts and principles, specifically in the content areas of General Science, Biology, Chemistry, and Physics.

On the other hand, aptitude test is designed to measure fundamental intellectual abilities. It consists of the following subtests: Verbal Reasoning, Quantitative Reasoning, Abstract Reasoning, and Spatial Ability (Hegarty, Montello, Richardson, Ishikawa & Love-lace, 2006; Lohman, 2006). *Verbal reasoning* measures the ability to determine relationships between words. It also includes items that measure the ability to understand how different parts of a sentence fit together as well as the ability to read and think carefully about different passages. Next is *quantitative reasoning*, which covers problem-solving and mathematical operations in the areas of Algebra and Geometry. Another is *abstract reasoning* which measures the ability to recognize and perceive relationships in abstract figure patterns as well as generalization and deduction of principles from non-verbal designs. Lastly, spatial ability which measures the ability to recognize changes in visual information. A feature inherent in these items is that they require mental manipulation of objects in a

3-dimensional space.

These four subscales are classified into two groups. Verbal reasoning and quantitative reasoning are called *general aptitudes* while abstract reasoning and spatial ability are called *specific aptitudes* (Brown, Le & Schmidt, 2006). Specific aptitudes are assessed by individual tests, such as paragraph comprehension, mathematics knowledge, or spatial comprehension. Such tests are often correlated and can be combined to measure general aptitudes, such as verbal or quantitative ability (Brown, Le & Schmidt, 2006). At the broadest level, academic achievement represents the shared variance among all of these variables (Lubinski, 2000).

With these facts in mind, the researchers proposed to undertake a study on how aptitude subscales, namely, verbal reasoning, quantitative reasoning, abstract reasoning, and spatial ability affect the academic performance of the students. This present study will help students gain understanding of their needs most especially in the context of aptitude and achievement by identifying their own weaknesses in terms of their academic performance. Moreover, the results of this study will provide evidence-based information necessary for the faculty and administration in understanding students' potentials, particularly in the aspects of achievement and aptitude. Finally, it is hoped that the end product of this study will benefit the students, the faculty, and the administration of Baliuag University.

Theoretical Framework

This study is anchored on Specific Aptitude Theory by Hull (1928) and revisited by Thurstone (1938).

Specific Aptitude Theory suggests that regression-weighted combination of specific and general aptitudes are better predictors of course-related outcomes (Brown, Le, & Schmidt, 2006). For example, in a course that includes numerous math-related tasks such as accounting and engineering, it was hypothesized that the regression weight on quantitative aptitude would be larger than the weight for other aptitudes. In addition, Brown, Le & Schmidt (2006) claim that as a special case of the theory that matching predictor and criterion constructs would lead to higher validity.

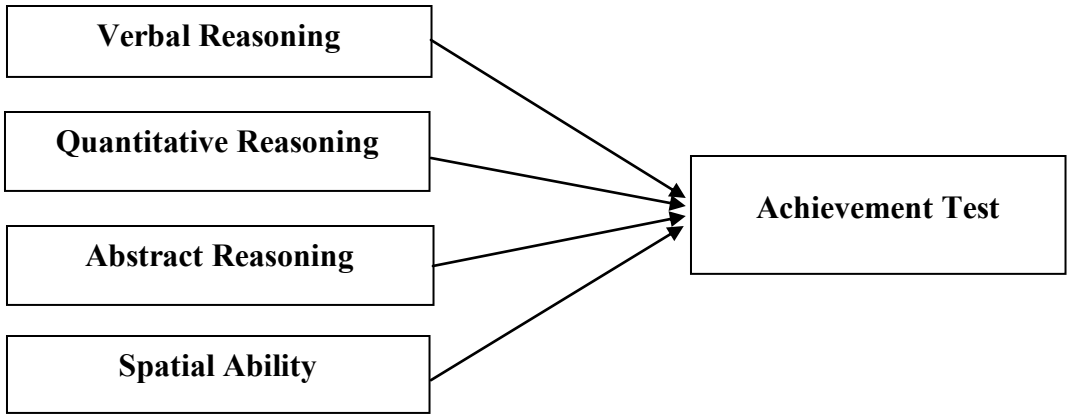

Figure 1. The model shows the independent and dependent variables in the study.

The theory serves as the foundation for understanding the Students' Aptitude-Scaled Ability Scores as predictors for Assessment for College Potential Achievement Test.

In this study, the researchers examined the highest aptitude that predicted the academic achievement of the students. They explored the aptitude ability that matched the criterion constructs in each course. In this sense, students, as well as the faculty and the administration, would have an idea if a student's aptitude ability suits his/her chosen course.

Research Questions

This study looked into the Students' Aptitude-Scaled Ability Scores as predictors for Assessment for College Potential Achievement Test. Specifically, it sought answers to the following questions:

1. What are the levels of the students' performance in terms of:
    1.1 Achievement Test
    1.2 Aptitude-Scaled Ability Scores
2. Is there a significant relationship between Aptitude-Scaled Ability Scores and ACP Achievement Test?
3. Which, among the variables such as verbal reasoning, quantitative reasoning, abstract reasoning, and spatial ability, highly predicts Assessment for College Potential Achievement Test based on:

3.1 Global score

3.2 Scores per college

Research Design

This study utilized the descriptive correlational design which predicts the relationship between two or more variables (Jackson, 2006). It determines whether two naturally occurring variables are related to each other and it assesses the strengths of the relationships existing between measured variables (Graziano, Raulin, 2007). The researchers looked into the relationship between the aptitude-scaled ability score and the achievement test of the students.

The Pearson Product Moment Correlation method was used to determine the correlation between Students' Aptitude-Scaled Ability Scores and Assessment for College Potential Achievement Test. Moreover, the Stepwise Linear Regression method was also employed to find out which, among the subscales of aptitude-scaled ability, predicts the Assessment for College Potential Achievement Test.

Sampling

This study involved 761 first-year college students who took the Assessment for College Potential on August 28, 2014, School Year 2014-2015. It was composed of 350 male (38%) and 411 female (62%). The official count were obtained from the Office of the Registrar to ensure validity of figures.

Measures

The Assessment College Potential (ACP) was conceived to address the need to draw up cognitive and non-cognitive measures considered determinants of curricular or college potential (APSA Manual). The ACP is a combination of three tests to identify the strengths and weaknesses of students accepted in the college. The three tests are the achievement test, the aptitude test, and interest-and-study-habits test. It can also provide feedback as to whether the students are meeting the necessary standards in college education.

The achievement test assesses school-based learning abilities tapping the knowledge and skills learned in high school particularly in the subject areas of English, Mathematics, and Science.

The aptitude test, on the other hand, measures the innate-based learned abilities that consist of Verbal Reasoning, Quantitative Reasoning, and a segment on non-verbal cognitive skills, specifically, abstract and spatial abilities.

The third and last test is affective components consisting of an interest inventory, as well as study/work habits scale, that can assist guidance counselors facilitate a more reasoned career path among the students.

Procedure

All these three tests altogether help identify the strengths and weaknesses of students feedback as to whether the students meet the college standard. The researchers requested permission from the Registrar's office to have the official enrollees of the said school year. This ensured the authenticity of the number of students enrolled in School Year 2014 to 2015. Then the researchers gathered the data from the Assessment for College Potential Individual Test Result Form (ACP-ITR) from the School Year 2014 to 2015 for the conduct of this study. The data gathered were treated and analyzed using Statistical Package for Social Sciences (SPSS v. 18).

Results and Discussion

Table 1 presents the students' performance in terms of achievement test.

Table 1

Students' Performance in Terms of Achievement Test

Areas	*Mean*	*SD*	Level
English	76.32	6.20	Progressing towards standards
Math	70.23	6.67	Progressing towards standards
Science	71.52	5.95	Progressing towards standards
Global Score	72.68	4.72	Progressing towards standards

The table shows that all of the subject areas, namely, English *(M*=76.32*, SD*=6.20*)*, Science *(M*=71.52*, SD*=5.95*)*, and Math *(M*=70.23*, SD*=6.67*)* are in the "progressing towards standards" level, which means that majority of the students were able to meet the necessary performance when it comes to the achievement variable.

The results also reflected the educational experiences of this group of students during their high school performance. Among the areas, English got the highest mean (76.32) and the global score of the achievement test is *M*=72.68*, SD*=4.72.

Descriptive statistics of students' level of aptitude are presented in Table 2.

Table 2

Students' Level of Aptitude-Scaled Ability Score

Aptitude SAS	*Mean*	*SD*	Level
Verbal Reasoning	77.62	6.20	Progressing towards standards
Quantitative Reasoning	70.11	6.67	Progressing towards standards
Abstract Reasoning	78.51	5.95	Progressing towards standards
Spatial Ability	72.35	8.90	Progressing towards standards
Global Score	72.63	4.68	Progressing towards standards

The table shows that all of the aptitude-scaled ability, namely, abstract reasoning *(M*=78.51*, SD*=5.95*)*, verbal reasoning *(M*=77.62*, SD*=6.20*)*, spatial ability *(M*=72.68*, SD*=8.90*)*, and quantitative reasoning *(M*=70.11*, SD*=6.67*)* are progressing towards standard level. This indicates that the profile of the students when it comes to their aptitude, is acceptable and they are ready to face the demands of the academic requirements in college.

Among the aptitude-scaled ability score, abstract reasoning got the highest mean (78.51). It means that the students have high ability to recognize and perceive relationships in abstract figure patterns, as well as generalization and deduction of principles from non-verbal designs. Moreover, the global score for aptitude-scaled ability is *M*=72.63*, SD*=4.68.

Relationship between aptitude-scaled ability score and achievement test are presented in Table 3.

Table 3

Correlation Between Aptitude-Scaled Ability Score and Achievement Test

Variables	*r*	*Sig.*
Aptitude and Achievement	.597	.000*

** Correlation is significant at 0.05 level (2-tailed).*

Based on the results, there is moderate correlation between aptitude-scaled ability score and achievement test *(r*=.597*)*. It means that students from this group could actually have better test results because they have sensible aptitude ability (Kersting, 2007). It is worth mentioning that aptitude is the foundation on how students enhance their academic achievement (Heyder, Kessels, & Steinmayr, 2017) and a strong predictor of general academic achievement (Deary, Strand, Smith, & Fernandes, 2007).

Table 4 shows the results of regression analysis of aptitude-scaled ability test and achievement test.

Table 4

Regression Analysis of Aptitude-Scaled Ability Test and Achievement Test

Aptitude	*B*	*R*	R^2	*t*	*F*	*Sig*
Verbal Reasoning	.307	.538	17.3%	11.74	.369	.000**
Quantitative Reasoning	.379	.512	11.6%	9.89	.331	.000**
Abstract Reasoning	.130	.372	9.8%	4.01	.324	.006**
Spatial Ability	.064	.248	8.4%	2.04	.256	.010**

***. Significant at 0.05 level*

Based on the results, the regression is highly significant particularly in verbal reasoning *(sig*=.000*)* and quantitative reasoning *(sig*-.000*)*. It may be concluded that for this group of students, verbal reasoning and quantitative reasoning can significantly predict achievement test.

When it comes to Beta coefficient and variation, for every unit of increase of verbal reasoning, achievement test increases or improves by .307; thus, 17.3% of the variation in the achievement test can be accounted for by verbal reasoning. Likewise, for every unit of increase of quantitative reasoning, achievement test increases or improves by .379; thus, 11.6% of the variation in the achievement test can be accounted for by quantitative reasoning.

The results of regression analysis of aptitude-scaled ability score and achievement test per college are shown in Table 5.

Table 5

Regression Analysis of Aptitude-Scaled Ability Score and Achievement Test (Per College)

College / Department	Aptitude SAS	*r*	*Sig.*
CAS	Verbal Reasoning	535	.001**
CAS	Quantitative Reasoning	.561	.000**
CBAA	Verbal Reasoning	.525	.004**
CBAA	Quantitative Reasoning	.573	.000**
CEDE	Quantitative Reasoning	.655	.012**
CEDE	Spatial Ability	.489	.006**
CHMT	Verbal Reasoning	.421	.005**
CHMT	Quantitative Reasoning	.389	.007**
CITE	Abstract Reasoning	.511	.000**
CITE	Quantitative Reasoning	.352	.010**
COE	Spatial Ability	.550	.018**
COE	Verbal Reasoning	.645	.000**
CON	Abstract Reasoning	.384	.011**
CON	Quantitative Reasoning	.396	.004**

**. *Significant at 0.05 level*

Based on the findings, there are aptitude-scaled ability scores that could predict the achievement test of a particular department for this group. The results give a hint, mostly for the faculty of each department, on what strategies and instructional plan they can execute

and construct or even formulate an intervention program for the improvement of the students. Moreover, the results basically show what particular aptitude ability would match the criterion constructs in each course, respectively (Brown, Le, & Schmidt, 2006).

Conclusions and Recommendations

The present study provides an overview of the determinants of achievement test such as verbal reasoning, quantitative reasoning, abstract reasoning, and spatial ability. The subject that obtained the highest score is English, and the highest aptitude-scaled ability score is Abstract Reasoning.

The results also revealed that these variables, achievement and aptitude-scaled ability score, are related and with moderate correlation, although some aptitude-scaled ability scores do not show any significant relationship. Furthermore, it can be concluded that verbal reasoning and quantitative reasoning are essential predictors of achievement test as far as this group of students are concerned. With these results, the researchers recommend that teachers should look into the strengths and weaknesses of this particular group of students to be able to enhance their academic achievements. The results were disseminated to the department heads concerned for them to review and map intervention program.

This study only discussed the relationship between achievement test and aptitude-scaled ability score of Assessment for College potential (ACP) and not on how it could affect the career of the students in the future. Moreover, the gathered data from this study is the result of the ACP exam during the S.Y. 2014-2015. Career inventory and study habits skills were not examined in this study. Hence, it is recommended that further research be done in order to determine how these factors affect the students' academic performance.

Finally, the main point of this study is on the achievement test and aptitude-scaled ability test of the first-year college students of Baliuag University who were enrolled for S.Y. 2014-2015. The results of this study are limited only to the said group of students. It is recommended that this study be conducted among Grade 11 Senior High School students and do a follow up in the course they have chosen.

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