

ASSESSMENT OF PSYCHOLOGICAL TEST RESULTS OF FRESHMEN EDUCATION STUDENTS

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Abstract

Psychological testing in schools is a beneficial activity that helps a student achieve their goals and helps diagnosed social, cognitive, or behavioral problems. This study aimed to assess the psychological test results of education students in a Philippine state university. The study utilized secondary data from 443 education students at the university. Descriptive measures and multiple regression models were employed in evaluating the data and determining the influencing factor of psychological test results, respectively. Results revealed that the selected demographic variables as gender, degree program, type of high school, and overall grade point average have no significant association with the psychological test results of education students. Furthermore, this study has documented the robust and positive evidence that Mathematics and English grade point average contributed to the psychological test scores of the students. The results go to infer that students with a good background in Mathematics and English subjects in high school have a good foundation in analytical and logical thinking during college.

Keywords: Education students, multiple regression models, psychological testing

Introduction

Psychological assessments are systematic and objective measures evaluating an individual's sample behavior. Through evaluation, the personal growth of a student as well as professional growth can be facilitated (Casinillo & Guarte, 2018). According to Framingham (2011), most notably in schools, these tests are administered. The information concerning school ability or scholastic aptitude is helpful to teachers and administrators in several ways, like improving students' performance and eradicating the failure rate in any of their subjects in university (Casinillo, 2019). The instruction from teachers and administrators is most effective when it is at the appropriate level, pace, and style of the learner (Wesley, 1994). Thus, classification and grouping of learners, individualization, and guidance should give weight to school ability. It is necessary to appraise the factors that promote scholastic achievement through a psychological evaluation to help the learners pursue their academic and future career objectives.

A psychological test is one that helps the schools in assisting individuals who are planning a career in college (Bennett et al., 1956). There are several psychological standardized tests like the Wechsler Intelligence Scale for Children III, the Kaufman Assessment Battery for Children, Stanford-Binet (Fourth Edition), Behaviour Inventories, and Personality tests are among many available tests. It will depend on the institution or school on what they would like to assess among their students (Hearst Newspaper, 2020). As students enroll in a university, the Commission on Higher Education issued a CMO No. 1 Series of 2014 stating its priority courses for SY 2014 – 2018. Some of the priority courses are in Teacher Education major in English, Science, or Mathematics. Students, teachers, and administrators alike will have a basis if they are capable of taking the following major courses with the help of the psychological test results.

One state university in the Philippines uses the Otis-Lennon School Ability Test (OLSAT) and the Differential Aptitude-Numerical Ability Test (DA-NAT). In the DAT-NA test, it covers areas on Verbal Reasoning, Numerical Ability, Abstract reasoning, Perceptual Speed and Accuracy, Mechanical Reasoning, Space Relations, Spelling, and Language Use (Bennett et al., 1947). The OLSAT is not an IQ test; instead, it will only give an idea of how smart a student is (Crystal Lake Elementary District 47, 2002). It intends to indicate intrinsic ability. The test has 21 subtests, organized into five areas, and an equal number of verbal and non-verbal items in each area. The five areas are verbal comprehension, verbal reasoning, pictorial reasoning, figural reasoning, and quantitative reasoning. These tests support in assessing student's thinking skills and provide an understanding of a student's relative strengths and weakness in performing a variety of reasoning tasks. Intelligence and aptitude are cognitive variables that influence learning events. Intelligence is usually seen as the general complex problem-solving ability common to many skills, while aptitude refers to specific abilities, each involved in a particular domain or skills (Pearson, 2020). The skills help students to understand better the content they are studying, to be more analytical, to interpret relationships, to look after information, to form generalizations, and to apply them to new content. Also, the test offers a metric for evaluating individual improvement year-to-year, and teachers can find it helpful to infer individual educational needs. Therefore, the two exams, as mentioned earlier, are used in the direction of education and vocations (Salkind, 2007). School counselors, personnel officers, psychologists, and all persons concerned with assessing the intellectual characteristics and educational or vocational aptitudes of adolescents use these tests.

This research employed a multiple regression model to elucidate the relationship of the College of Education freshmen students' high school background to the psychological test results from school years 2010 - 2014. Accurately, to determine the relationship between scores in the Otis-Lennon School Ability Test (OLSAT) and the Differential Aptitude-Numerical Ability Test (DA-NAT) to the following: (a) gender, (b) degree program, (c) the type of school graduated (d) high school grades in Mathematics and English, (e) high school grade point average (GPA). This study has the aim of providing information from these exams and allows educators to design educational

programs that will enhance student's strengths while supporting their learning needs.

Method

This study utilized secondary data of freshmen students enrolled in Bachelor of Elementary Education (BEEEd) and Bachelor of Secondary Education (BSEd), College of Education, Visayas State University for the school years 2010 – 2014. Before the analysis, permission was obtained from the university's Vice President of Research and Extension to collect data needed in the analysis. The data for selected high school grades were from the University Registrar, and the psychological test results and other information from the University of Student Services Office. This study focused on the application of descriptive statistics and multiple regression models in assessing the psychological test results and their influencing factors. Multiple regressions are a reasonable method of analysis when a single metric dependent variable is considered to be connected to two or more metric independent variables (Hair et al., 1998). The basis of research design on the study from Casinillo and Aure (2018). Hence, in describing the data, descriptive measures were used, such as percentages, mean, standard deviation, minimum, and maximum. For multiple regression analysis, the ordinary least square was employed to determine the significant predictors of psychological test results. The high school grades of Mathematics, English, over-all grade point average (GPA), and the demographic profile such as gender, degree program, and type of school were considered as the independent variable or predictors in the model. Besides, specific diagnostic tests, such as multicollinearity test, homoscedasticity test, and residual normality test, have been performed to ensure accurate interpretation performance (Stock and Watson, 2007). All statistical treatments were processed utilizing the statistical software STATA v.14.

Findings and Discussion

Table 1 shows that the average score of education students in the DAT-NA exam is low ($\mu=16$, $\sigma=6.46$). It implies that students are weak in developing their Reasoning, Numerical Ability, Spelling, and Language Use during their high school years. For the OLSAT exam, it is a little higher compare to DAT-NA ($\mu=30.14$, $\sigma=9.67$). It goes to infer that students' abilities that are related to success in school, like basic knowledge, are better than logic and reasoning. The following abilities that were involved in the OLSAT exam were detecting similarities and differences, recalling words and numbers, defining words, following directions, classifying, and the likes. The students' exam scores are relatively low since they do not have the opportunity to study the following topics; all they had was their stock knowledge learned from high school.

Furthermore, the result of the exams does not affect their grades. Thus most of them did take the exam seriously. Only 15% of the education students are male, and 85% are female. According to Adigun and colleagues (2015), some vocations and professions regarded as male-dominated were the areas of sciences like engineering, mathematics, and crafts, agriculture, while others as female-dominated were catering, typing, nursing, and education. So, it is no wonder much

of the education students were female. About 54% of the students chose the BSED program, and 46% chose the BEED program. On average, there are only 9% of the students came from a private high school, and 91 percent came from public high school. Perhaps, most of these students came from rural places in the Visayas region in the Philippines, where most of the monthly income is economically low. Hence, there are only a few parents who can afford a private school for their son/daughter. The student's High school GPA in English ($\mu=86.94, \sigma=5.61$), Mathematics ($\mu=85.74, \sigma=4.08$), and over-all ($\mu=87.36, \sigma=4.33$) are relatively good since the Department of Teacher Education in Visayas State University requires a GPA of better or equal to 85%. Perhaps, in the study of Casinillo and Aure (2018), it is revealed that academic performance was not derived from demographic profile and economic resources but to their prior knowledge. Thus, to produce competent teachers, it is good to have education students with excellent high school GPA.

Table 1. Descriptive Statistics for Variables of Interest (n=443)

Variables	Mean	Std Dev.	Minimum	Maximum
DAT-NA Raw Score	16.00	6.4620	4	34
OLSAT Raw Score	30.14	9.6691	4	58
Male (Dummy: 1-male, 0-female)	0.15	0.3542	0	1
BSED (Dummy: 1-BSED, 0-BEED)	0.54	.4988	0	1
Private School (Dummy: 1-private, 0-public)	0.09	0.2869	0	1
High School English GPA	86.94	5.6134	80	99
High School Mathematics GPA	85.74	4.0791	76.25	98.75
High School Over-all GPA	87.36	4.3321	81.23	98.54

Multiple Regression Models

Table 2 highlights the two multiple regression models that explained the statistically significant factors of DAT-NA and OLSAT exam scores of freshmen education students. Some diagnostic tests were employed for the said models to know whether the necessary assumptions were valid for interpretation (O’Connell & Liu, 2011). First, a multicollinearity test performed in the model. Variance Inflation Factor (VIF) computed, which estimates how much the variance of a coefficient inflated because of the linear dependence of independent variables (Allison, 2012). As a rule of thumb, the mean VIF value should be lesser than 10 to ignore a multicollinearity problem in the model safely. Fortunately, the two models in Table 2 have no multicollinearity problem since the mean VIF is equal to 1.22. The Breusch-Pagan test indicated that the first model is not heteroskedastic ($\chi^2=0.97, p\text{-value}<0.3246$), which implies that variances are equal. Also, it found out that the residuals are normal by the Shapiro-Wilk W test ($W=0.995, p\text{-value}=0.234$), and by the Kernel density estimate, the graph shows that the residuals are almost normal. The model ($F_c=13.18$) is also significant since the p-value is less than 0.001, which implies that there are significant factors that influence the DAT-NA exam scores. By the Breusch-Pagan test, it found out

that the variances of Model 2 are heteroscedastic ($\chi^2=21.16, p\text{-value}<0.001$) (Table 2). Also, by the Shapiro-Wilk test, it is revealed that the residuals are not normal ($W=0.9905, p\text{-value}<0.006$). However, the graph of Kernel density shows that the residuals are close to normality. Hence, the said model was corrected and adjusted to account for the heteroscedasticity problem. Table 2 reveals that Model 2 is also significant ($F_c=12.77, p\text{-value}<0.001$), which means that there are significant predictors of OLSAT exam scores of education students.

Both Model 1 and 2 reveals that the high school GPA in Mathematics is a significant predictor in the two psychological exams (Table 2). Knowledge in mathematics can improve the students' ability to reason and think of logical solutions. The result is consistent with the study of Casinillo and Aure (2018) that deals with prerequisites knowledge in mathematics that can improve academic performance. Apparently, according to Casinillo and colleagues (2020), mathematics makes the life of every human being meaningful, and it is one of the tools used in solving logical and complicated problems. The study of Nanayakkara and Peiris (2017), concluded that the effect of mathematics is immensely beneficial to improve the overall academic performance and psychological knowledge of students. In higher education, mathematics plays a vital role by developing the analytical and logical thinking of students. Also, the two models revealed that English proficiency was a predictor for the two psychological exams (Table 2). It implies that if a student is proficient in English, then there is a positive impact on the scores of DAT-NA and OLSAT exam. A student competent in English and Grammar that they can easily understand the word problems and questions, which can positively improve their academic performance. It is in parallel with the study of Light et al., (1991) and Stoyhoff (1997) that deals with the relationship between language proficiency and GPA. However, the overall GPA is not a significant predictor of the psychological test results of education students (Table 2). It implies that other subjects, aside from Mathematics and English, does not influence their critical thinking skills.

On the other hand, the gender of students in the model does not influence the scores of psychological exams (Table 2). It is due to the small number of male students as participants in the exam. This result is not parallel to the study of Naglieri and Rojahn (2001) that males and females reveal differ in terms of cognitive process and achievement. The degree program of students does not significantly affect their scores in psychological exams. It goes to infer that the variety of chosen courses in education does not contribute to their psychological and analytical thinking. Perhaps, these students are freshmen, which means that they do not have much experience yet in college. Furthermore, Table 2 shows that type of school is not a significant factor in their psychological exams. An opposite result to the study of Rong'uno (2017), states that private schools outshine public schools in academic performance.

Table 2. Multiple regression models for DAT-NA and OLSAT raw scores and its influencing factors.

Independent Variables	Model 1: DAT-NA	Std Error	Model 2: OLSAT	Std Error
Constant	-43.675* (<0.001)	7.1674	-52.08* (<0.001)	10.485
Male (Dummy: 1-male, 0-female)	1.1409 ^{ns} (0.209)	0.9062	0.9045 ^{ns} (0.459)	1.2191
BSED (Dummy: 1-BSED, 0-BEED)	0.3450 ^{ns} (0.541)	0.5637	1.4334 ^{ns} (0.105)	0.8821
Private School (Dummy: 1-private, 0-public)	0.6188 ^{ns} (0.555)	1.0476	2.0109 ^{ns} (0.182)	1.5049
High School English GPA	0.1762* (0.007)	0.0646	0.3021* (<0.001)	0.0857
High School Mathematics GPA	0.4424* (<0.001)	0.0936	0.5682* (<0.001)	0.1252
High School Over-all GPA	0.0688 ^{ns} (0.420)	0.0852	0.0704 ^{ns} (0.563)	0.1217
<i>F-computed</i>		13.18		12.77
<i>p-value (for F-computed)</i>		<0.001		<0.001
<i>Number of observation</i>		443		443
<i>R-squared</i>		0.1650		0.1495
<i>Adjusted R-squared</i>		-		0.1378

Note: Model with no adjusted R^2 is correct from heteroscedasticity, and parentheses enclose p-value.

ns- not significant.

* - highly significant at 1% level.

Conclusion

Based on the study results, in OLSAT and DAT-NA psychological tests, the grades in Mathematics and English are consistent among the predictors in terms of the importance of the relationship to the ratings. It is concluded that Mathematics and English are helpful subjects in high school for the students' analytical and critical thinking as well as cognitive behavior. Also, multiple regression analysis revealed that the student's gender, type of schools, and high school grade point average had no effects on the psychological tests. Students' high school preparation for tertiary education has a significant impact on their academic performance. Moreover, students in private schools are from either middle-class or high-class families. Therefore, further research should be carried out along this line to determine the relationship between socio-economic status, school environment, and academic performance. Besides, school administrators and teachers regard psychological testing may be useful to identify particular issues and then help schools offer the best learning to student's environments to meet their needs. It can be a benchmark for future studies in utilizing psychological test results to formulate a more informed policy decision.

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