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Study on verbal and numerical aptitudes as predictors of secondary school students' performance in academics

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ABSTRACT

Present study explores the aptitude among higher secondary students. It was aimed to examine the verbal and numerical aptitude abilities on academic performance of secondary school students. A sample of 40 students was selected from government senior secondary schools of West Godavari, Andhra Pradesh. Data were collected by administering Tamanna aptitude test developed by NCERT. Results showed that the verbal and numerical aptitudes significantly predicted the academic performance of secondary school students.

Keywords: Aptitude; school students; academic performance; predictors

INTRODUCTION

The essence of schooling is to provide learners the opportunity for acquiring requisite education and training that will enable them to adjust meaningfully in the society and contribute to the development of the nation. Education is a means for national transformation. Academic achievement is an important factor in national education because it can be seen as an indicator of whether the education in a country is successful or not. Dambudzo (2009) stated that over the past couple of decades society has placed infinitely more emphasis on the academic achievement of its citizens.

In fact academic excellence remains the major index used to evaluate the quality of education offered in schools. The academic achievement of senior secondary school students is an important factor that determines their future academic pursuit. Academic achievement is defined by two terms. Academic pertains to school subjects or to fields of liberal arts or to the sphere of ideas and abstraction while achievement is denoted by knowledge attained or skills developed by pupils usually in the schools, measured by test scores or by marks assigned by teachers (Chaudhary 2004). In other words, an academic achievement is defined as knowledge acquired and skills developed in school subjects, generally indicated by marks obtained in tests in an annual examination. Achievement is the glittering crown which reflects a sense of sincerity, candidness and perseverance on the part of achievers and also parents, teachers and all those helping to achieve it and thus a result of bidirectional results. Achievement behaviour may be defined as any action directed of gaining approval where public standards of excellence are applicable. Crow and Crow (1969) defined academic achievement as the extent to which a learner is profiting from instructions in a given area of learning ie achievement is reflected by the extent to which skill or knowledge have been imparted to him.

Aptitude is a special or cluster of abilities. Since aptitude is a special ability required to study or to do a job, it indicates the probability of performing well in a particular course of study or occupation/vocation and also indicates the extent to which the person would derive benefit by training in a particular vocational area. Different occupations need different sets of abilities. For example, to be a successful architect one requires a set of abilities such as keen sense of observation, a sense of visual memory, ability to sketch free hand etc. A student having these set of abilities is at an

advantage and is likely to perform well in his/her occupation.

Verbal reasoning (VR) is the ability to solve problems by understanding the meaning and ideas framed in words. Verbal reasoning measures how well an individual can apply reasoning related to words and draw correct meaning from the written information. In VR sub-test, the individual is expected to understand the relationship between paired words and apply it to other relationships.

Numerical aptitude (NA) is the ability to perform mathematical performance operations quickly and correctly. Numerical aptitude includes numerical relationships and problem solving related to numbers. NA sub-test involves primary arithmetic operations (like addition, subtraction, multiplication and division) and other mathematical operations (like ratio, percentage, square and square root).

Puchert et al (2017) revealed statistically and practically significant relationships between type of secondary education (incorporating subject choice), verbal reasoning, non-verbal reasoning and visual perceptual speed. Broad performance levels in the three aptitude sub-tests employed in this study were significantly associated with the type of matriculation certificate held by applicants. The findings specifically indicated that the secondary education types that included the subject's mathematics or both mathematics and science were associated with higher levels of performance in the three aptitudes. This had consequences for these applicants' success in the screening process which could lead to enhanced chances of employability.

Vadivu et al (2016) reported that the scientific aptitude test was useful for secondary students to ignite their scientific temper and also useful in preparing them for future competitive examinations. Pyari et al (2016) found significant effect of aptitude in the stream selection process of the students and for mathematics. Numerical reasoning, clerical speed and accuracy and mechanical and verbal reasoning constituted the significant role for mathematics as careers option at higher secondary level.

Corengia et al (2013) carried out a study to analyze whether educational aptitudes could predict academic performance and attrition among undergraduate students. The results showed that verbal reasoning and numerical ability were among the independent variables that related significantly to academic performance of the students in business (accounting and business economics). They reported that the reason why verbal reasoning was one of the best predictors of academic performance could be that it evaluated the basic reasoning issues of learning process.

Usman (2012) studied the factors influencing students' academic performance at higher secondary level and found that good study environment, regularity in class, teachers' good behavior and proper methodology enhanced students' achievement.

Present study was primarily concerned with verbal reasoning, numerical aptitude and academic performance of the high school students. The purpose of this study was to find out the significant predict of verbal and numerical aptitude on academic performance of secondary school students.

METHODOLOGY

The present study was carried out using purposive sampling as the research method. Tamanna aptitude test developed by NCERT was administered. The study consisted of 40 secondary class students belonging to government secondary Schools of Koppaka, West Godavari district, Andhra Pradesh.

RESULTS and DISCUSSION

Data given in Table 1 show an F-value of 6.651 and p-value of 0.003. It indicates that the combined effect of verbal and numerical aptitudes significantly predicted the academic performance of secondary school students. The R^2 value was 0.264 which indicates that 26.4 per cent of the variance in the achievement of secondary school students in academic performance was accounted for by the combined effect of the two variables. Thus the verbal and numerical aptitude performance was most significant determinant to improve the academic achievement of secondary school students.

Table 2 shows that students' numerical ability accounted for 14.6 per cent of the total variance in verbal reasoning performance (R^2 0.168, p <005*). This percentage proved significant factor for academic achievement of secondary school students. This shows that verbal reasoning was significant factor to improve the academic performance of secondary school students.

Table 1. Verbal and numerical abilities as predictors of students' academic performance

Regression statistics

Multiple R	0.514
R square	0.264
Adjusted R square	0.224
Standard error	1.888
Observations	40

ANOVA

	df	SS	MS	F	Sig
Regression	2	47.438	23.719	6.651	0.003
Residual	37	131.936	3.565		
Total	39	179.375			

Table 2. Verbal ability as a predictor of student performance in academics

Regression statistics

Multiple R	0.410
R square	0.168
Adjusted R	0.146
Standard Error	2.019
Observations	40

ANOVA

	df	SS	MS	F	Sig
Regression	1	31.463	31.463	7.718	0.008
Residual	38	154.911	4.076		
Total	39	186.375			

Table 3. Numerical ability as a predictor of students' performance in the academics

Regression statistics

Multiple R	0.513
R square	0.264
Adjusted R	0.244
Standard Error	1.835
Observations	40

ANOVA

	df	SS	MS	F	Sig
Regression	2	47.438	23.719	6.651	0.003
Residual	37	131.936	3.565		
Total	39	179.375			

The students' numerical ability accounted for 26.4 per cent of the total variance in numerical aptitude performance. (R^2 0.264, p <005) (Table 3). This percentage is significant factor for academic achievement of secondary school students. The study revealed that numerical aptitude was significant factor to improve the academic performance of secondary school students.

CONCLUSION

Findings showed that verbal reasoning and numerical aptitudes predicted performance of secondary students in academic performance. Thus the verbal and numerical aptitude performance was most significant determinant to improve the academic achievement of secondary school students. It was also found that verbal reasoning and numerical aptitude were significant factors to improve the academic performance of secondary school students.

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