

# “A STUDY ON THE RELATIONSHIP BETWEEN COGNITIVE ABILITIES AND ACADEMIC ACHIEVEMENT OF HIGHER SECONDARY SCHOOL STUDENTS”

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## ABSTRACT

*Education has become highly competitive and commercial. In educational institutions, success is measured by academic performance, or how well a student meets standards set out by the local government and the institution itself. Academic achievement or academic performance is the outcome of education - the extent to which a student, teacher or institution has achieved their educational goals. As the emphasis on the measures of student academic achievement increases educational researchers and practitioners are interested in identifying factors that demonstrate effectiveness in supporting student achievement. Individual differences in academic performance have been linked to difference in intelligence. Students with higher mental ability tend to achieve highly in academic settings. If academic achievement and cognitive abilities are interdependent and if improving cognitive skills will increase the academic achievement of students, schools can be encouraged to provide cognitive training.*

**Keyword:** - Key word 1 – academic achievement, Key word 2 – cognitive ability

## 1. INTRODUCTION

The antecedents of academic achievement continue to be of interest for researchers and educators. Academic achievement has become a measure of self-worth and success. One of the central purposes of intelligence testing is to predict educational achievement (Binet & Simon, 1916). Research has consistently shown that a positive correlation exists between cognitive abilities, measured by various psychometric tests and academic achievement. Cognitive ability is the most important predictor of academic achievement in many subjects, including mathematics (Taub et al., 2008). As the emphasis on the measures of student academic achievement increases educational researchers and practitioners are interested in identifying factors that demonstrate effectiveness in supporting student achievement. This study will integrate two approaches: measuring the academic achievement and cognitive abilities of higher secondary students. The study will examine the differences in the cognitive abilities of students based on different variables.

## 2. REVIEW OF RELATED LITERATURE

Ackerman & Heggstad, 1997 [1] – “Individual differences in skill learning: An integration of psychometric and information processing perspectives”

Cognitive ability, personality and interests are three distinct topics of investigation in psychology. In the past two decades, however, there have been growing appeals for research and theories that address the overlap among these domains.

Bratko et al., 2006 [2] – “Personality and School Performance: Incremental Validity of Self- and Peer-Rating over Intelligence”

Several factors have been identified in relation to academic achievement, cognitive abilities and personality being among the most important.

Cattell, R. B., 1971 – “Abilities: Their structure, growth, and action. Boston: Houghton Mifflin”

Schools traditionally focus on teaching knowledge and skills in content areas, such as mathematics and language arts. Use of such knowledge can be referred to as crystallized intelligence. In contrast, fluid intelligence refers to the ability to solve novel problems independent of acquired knowledge; the cognitive measures are indices of fluid intelligence.

Hames. E and Baker. M., 2015 [4] – “A Study of the Relationship between Learning Styles and Cognitive Abilities in Engineering Students”

Learning preferences have been indirectly linked to student success in engineering programs, without a significant body of research to connect learning preferences with cognitive abilities. A better understanding of the relationship between learning styles and cognitive abilities will allow educators to optimize the classroom experience for students.

Schmidt, 2002 [8] – “The role of general cognitive ability and job performance: Why there cannot be a debate”

A century of scientific research has shown that general cognitive ability, or g, predicts a broad spectrum of important life outcomes, behaviors, and performances. These include academic achievement, health-related behaviors, social outcomes, job performance, and creativity, among many others. The strong relation between cognitive ability and academic performance suggests that schools that are particularly effective in improving academic performance may also improve domain-independent cognitive skills.

## 3. PURPOSE OF THE STUDY

The study will examine the differences in the cognitive abilities of students based on different variables. If improving cognitive skills increased the academic performance of students, schools can be encouraged to provide cognitive training.

## 4. OBJECTIVES OF THE STUDY

1. To find out the cognitive abilities of higher secondary students
2. To find out the academic achievement of higher secondary students
3. To determine their interdependence

## 5. RESEARCH DESIGN

The survey method was employed. The study included approximately 250 students from 8 schools belonging to matriculation and Government funded types of schools that are delimited to the district of Coimbatore. The stratification is done based on the gender, locality, and type of school, type of family, parental education, parent's occupation and family income. The cognitive skills of the students was tested by conducting a cognitive ability test. The multiple intelligences inventory (Howard Gardner) was used to test the cognitive skills of the students. Academic achievement was determined by the school grades in the half-yearly examination. The research data was analyzed by the researchers by applying statistical tools such as Frequencies and percentage counts, Mean, Standard deviation (SD), Cross tabulation, Chi-square etc.,

## 6. ANALYSIS AND INTERPRETATION OF DATA

**Table 1: Respondents demographic profile**

S. NO	VARIABLES	CATEGORY	NUMBER	%	TOTAL SIZE
1.	Gender	Male	132	53	250
		Female	118	47	
2.	Locality	Rural	84	34	250
		Urban	166	66	
3.	Type Of School	Government	85	34	250
		Government aided	34	14	
		Matric	131	52	
4.	Type Of Family	Nuclear	194	78	250
		Joint	56	22	
5.	Parents Education	Graduate	83	33	250
		Non-graduate	167	67	
6.	Parental Occupation	Government	34	13	250
		Private	102	41	
		Self	114	46	
7.	Family Income	< 100, 000	150	60	250
		> 100, 000	100	40	

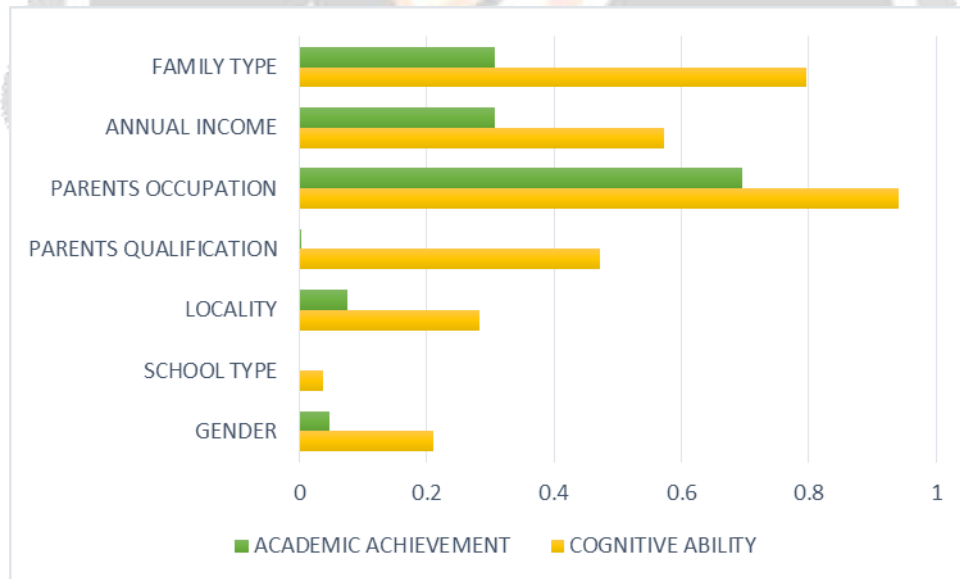
**Table 2: Chi-square analysis**

VARIBLES		PEARSONS CHI SQUARE VALUE	DF	SIGNIFICANCE
DEPENDENT	INDEPENDENT			
ACADEMIC ACHIEVEMENT	GENDER	6.077	2	0.048
	SCHOOL TYPE	34.211	4	0.000
	LOCALITY	5.155	2	0.076
	PARENTS QUALIFICATION	14.305	2	0.001
	PARENTS OCCUPATION	2.221	4	0.695
	ANNUAL INCOME	3.156	2	0.306
	FAMILY TYPE	4.479	2	0.306
ACADEMIC ACHIEVEMENT	GENDER	52.305	45	0.211
	SCHOOL TYPE	115.448	90	.037
	LOCALITY	49.962	45	0.283

	<b>PARENTS QUALIFICATION</b>	45.016	45	0.471
	<b>PARENTS OCCUPATION</b>	70.185	90	0.940
	<b>ANNUAL INCOME</b>	42.624	45	0.573
	<b>FAMILY TYPE</b>	37.042	45	0.795

Table 2 shows the chi-square analysis academic achievement and cognitive abilities across the different variables.

**Chart 1: significance values of chi-square tests showing the influence of the independent variables on academic achievement and cognitive ability**



**Table 3: Coefficient of correlation between academic achievement and cognitive intelligence of higher secondary students**

VARIABLES	N	PEARSON CORRELATION COEFFICIENT	LEVEL OF SIGNIFICANCE
ACADEMIC ACHIEVEMENT	250	-0.050	0.429
COGNITIVE INTELLIGENCE	250	-0.050	0.429

Table 3 shows the correlation between academic achievement and cognitive abilities of the students.

## 7. DISCUSSION

The cognitive ability or the cognitive skills possessed by a student has a strong influence on the academic performance. Socio-economic factors like gender, locality, type of schools, parent's educational and occupational status, annual income and family type influence both cognitive ability and academic achievement.

## 8. CONCLUSION

Research has shown strong positive relationship between cognitive ability academic achievements. Although cognitive skills are seldom taught explicitly in schools, research indicates that schooling can promote cognitive skills. Thus attendance might improve cognitive abilities. Traditional schooling emphasize on academic scores. Since, cognitive skills are a predictor of academic performance, schools that improve cognitive skills indirectly will improve academic performance also. On the other hand, parental influence plays an important role in the development of cognitive skills an academic performance of children. So, our rural and uneducated parents can be trained about all round development of children.

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