ACADEMIC ACHIEVEMENT AND INTELLIGENCE: INVESTIGATION INTO GENDER AND CATEGORY DIFFERENCES

Abstract

This article explores the relation between intelligence and academic achievement. Using the random sampling technique, a sample size of 120 students were chosen from various schools of Sikkim. The marks of the previous year were taken as students' achievement and intelligence was assessed using Raven's Standard Progressive Matrices. Pearson's product moment correlation, independent sample t-test, and ANOVA were used to analyse the data. The result indicated a positive linear relationship between intelligence and academic achievement. The mean score of intelligence of pupils did not differ significantly on the basis of gender and category. However, female students and general students had a better academic performance in comparison to their counterparts.

Keywords : Intelligence, Academic Achievement, Tribals, Other Backward Classes (OBC), Gender

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I. INTRODUCTION

Education is the process of developing an individual's capacities. Education can be defined as a process that instils necessary knowledge, competencies, and attitudes that assist students to deal efficiently with their surroundings. In today's highly competitive world, quality or performance has become a critical factor for personal and social advancement. The world evaluates students based on their academic performance, and parents want and force their children to achieve the highest grades possible. This innate yearning for high achievement places a great deal of pressure on pupils, instructors, and schools, as well as the entire educational system. Exam results determine the level of intelligence and qualification, and competencies that are related to life opportunities, income, and well-being. Academic achievement can be considered as an indicator of the future of students, and it is a critical device by which children come to know about their aptitudes, capabilities, and skills, all of these are vital components of realizing one's aspirations and goals. Academic achievement denotes the extent to which a student profits from instructions in a particular subject area.

The question arises here is intelligence correlated to academic success? In the past, researchers have addressed this question and several researchers have recently given more attention on the connection between intelligence and academic achievement. According to them, there are experimental indications of a strong relationship between academic achievement and general cognitive ability. Intelligence is an abstract concept that is commonly defined as the ability to easily comprehend and grasp new concepts. It is a broad mental ability that comprises of the skill to seek appropriate solutions to the problems, think conceptually, learn quickly, reason, plan, understand complex notions, and learn from day-to-day experiences, among other things. It is more than bookish information, a specific theoretical expertise, or an ability to write an examination. It reflects a comprehensive and deeper understanding of the context in which one live and it helps a person to make sense of something and to figure out what to do. According to Wells, intelligence is the ability to combine different aspects of our behaviour in order to behave better in a new situation.

Tribes are primitive people who live outside of so-called civilised society. Even after years of independence, their situation remains pitiful in every corner of the country. They are forced to leave their natural environment and their distinct culture. It resulted in an anarchy among their life. Various researches have shown that tribal people and Other Backward Classes (OBC) have poor academic performance. This article is an effort to understand the relationship between academic achievement and intelligence of schoolchildren of Sikkim by taking into consideration Gender and Categories (General, Other Backward Classes and Tribals).

II. THE REVIEW OF RELATED LITERATURE

Naderi, Abdullah, Aizan, and Sharir (2010) investigated if there is a connection between academic achievement and intelligence and if this relation differs between boys and girls. The sample consisted of 153 students chosen at random. Pearson Correlation analysis revealed that intelligence was unrelated to academic achievement in both males and females. Chandra and Azimmudin (2013) investigated the impact of intelligence and gender on academic performance among pupils who were studying at various secondary schools in Lucknow. The sample included 614 pupils from classes IX and X of fourteen schools in Lucknow, Uttar

Pradesh (India). Group Test of Intelligence by G.C. Ahuja was used to measure intelligence and the previous annual exam results were taken for academic accomplishment of the students. The collected data was tabulated using the t-test, and ANOVA. The result indicated a positive effect of intelligence on academic achievement, whereas gender had no noteworthy impact on academic achievement. Arya & Maurya (2017) investigated the relation between intelligence, creativity, and academic achievement of students studying in G.B. Pant University campus, Pantnagar Udham Singh Nagar, Uttarakhand. The sample consisted of 300 students aged between 12 to 16 years. In order to collect the data, the survey method with a self-constructed questionnaire schedule, the non-verbal test of creative thinking by Baquer Mehdi (1985) and Indian adaptation of the Wechsler Adult Intelligence Scale by Ramalingaswamy (1972) were used. The findings did not show any significant association between the variables under study.

Dandagal & Yarriswami (2017) evaluated the academic achievement of high school pupils in relation to their intelligence and reported that there is a significant relationship between the two. This study also indicated that there is no change in the intelligence level of schoolchildren when gender, location, the medium of instruction and types of schools were taken into consideration. Susheela, Anjana, and Khajuria (2017) looked into the connection between secondary school students' IQ and academic success. The sample consisted of 100 schoolchildren from Kurukshetra District who were chosen at random. The investigators used S. S. Jalota's (1964) Group Test of General Mental Ability to measure intelligence, and class IX marks were used as Academic Achievement. A strong positive connection between intelligence and academic attainment was noticed in this study. Saikia (2020) investigated secondary pupils' intelligence and academic achievement, as well as the relationship between intelligence and academic achievement. A sample of 100 was chosen using the simple random sample method. The correlational analysis showed a strong correlation between students' academic success and intelligence. Ilo & Onyejesi (2021) demonstrated how academic motivation and intelligence quotient contribute uniquely to differences in student's academic achievement. This study had 405 pupils from private and public secondary institutions in Enugu-East. The Raven Standard Progressive Matrices, the previous academic performance from school data, and the Academic Motivation Scale was modified for use with secondary school pupils were the tools employed to collect data. According to this study, IQ and academic motivation positively predicted academic achievement, accounting for 29.9% of the variance in academic performance. They reported that academic motivation influences students' academic performance.

III. THE SIGNIFICANCE OF THE STUDY

Education reduces poverty and inequality and is crucial to the development of any society. Scheduled Tribes (ST) and Other Backward Classes (OBC), which make up a large proportion of India's population, must fight for survival and development. They are denied of normal educational opportunities. The reservation policy has allowed Scheduled Castes (SC), STs, and OBCs access to education. However, a lack of proper monitoring and facilities, distance between homes and schools, uneducated parents, a lack of teachers, and other factors reduce ST and OBC children's enrolment in schools. It is noticed in our society that the academic achievement of children from various backgrounds varies greatly. The children from more privileged groups achieve better results in schools and other educational activities compared to the deprived groups. Academic success is the primary goal of any educational

process because it helps students learn and perform better. Intelligence is a strong predictor of academic success; it is critical to investigate how intelligence influences academic achievement. It has also been discovered that there are very few studies being conducted on academic achievement and intelligence among schoolchildren from OBCs and STs in Sikkim. As a result, the current research was undertaken to determine the association between academic achievement and intelligence of the students of Sikkim with respect to their gender and category.

IV. OBJECTIVES

1. To examine the correlation between intelligence and academic achievement of students
2. To examine the correlation between intelligence and academic achievement of male and female students separately
3. To examine the correlation between intelligence and academic achievement of general, other backward castes and tribal students separately
4. To study the differences in mean scores of intelligence on the basis of gender
5. To study the differences in mean scores of male and female students in their academic achievement
6. To study the differences in mean scores of intelligence of students belonging to general, OBC and tribal categories
7. To study the differences in mean scores of academic achievement of students belonging to general, OBC and tribal categories

V. HYPOTHESIS

1. There is no significant correlation between intelligence and academic achievement of secondary students
2. There is no significant correlation between intelligence and academic achievement of male and female students separately
3. There is no significant correlation between intelligence and academic achievement of general, OBC and tribal students separately
4. There is no significant difference between mean scores of intelligence between male and female students
5. There is no significant difference between the mean scores of academic achievement of male and female students
6. There is no significant difference between the mean scores of intelligence of students belonging to general, OBC and tribal categories
7. There is no significant difference between the mean scores of academic achievement of students belonging to general, OBC and tribal categories

VI. POPULATION AND SAMPLE

The pupils studying in classes VII, VIII and IX in Sikkim state is considered as the population. A total of 120 students who were selected randomly from 4 English medium schools of Sikkim constituted the sample.

VII. TOOLS USED

Marks from the previous year's final examination of each class were taken for academic achievement, and Raven's Standard Progressive Matrices were used to assess the intelligence of students.

VIII. STATISTICAL TECHNIQUES USED

Independent sample t- test,Product Moment Correlation, and One Way ANOVA were the statistical techniques employed to test the hypotheses.

IX. RESULTS AND INTERPRETATION

The first objective was to examine the correlation between intelligence and academic achievement of students studying in secondary schools. For testing the hypothesis, Product moment correlation was used and the output of SPSS is given in the table.

Table 1: Correlation coefficient between Intelligence and Academic Achievement

		Intelligence	Achievement
intelligence	Pearson Correlation	1	.357**
	Sig. (2-tailed)		.000
	N	120	120
achievement	Pearson Correlation	.357**	1
	Sig. (2-tailed)	.000	
	N	120	120

Correlation is significant at the 0.01 level (2-tailed).

From the table (1), it is noticed that the correlation coefficient between intelligence and achievement is 0.357 which is positive and significant at 0.01 level with df = 118. It shows that intelligence and academic achievement were positively and significantly correlated. Thus, the null hypothesis that there is no significant correlation between intelligence and academic achievement of secondary schoolchildren is rejected. Further, the percentage of commonness between intelligence and academic achievement is 12.74 which is moderate. It may, therefore, be said that intelligence and academic achievement were found to be moderately related.

The second objective was to examine the correlation between intelligence and academic achievement of male and female secondary school children separately. The data were analyzed using product moment correlation and the result are shown in the table below.

Table 2: Gender-wise relationship between intelligence and academic achievement

Gender	Variable	r- value	Remark
Male	Intelligence Academic Achievement	0.292	P<0.05
Female	Intelligence Academic Achievement	0.385	P<0.01

From the table (2), it can be seen that the correlation coefficient in case of male students is 0.292 which is significant at 0.05 level. It suggests that there is a correlation between intelligence and academic achievement of male students. Thus, the null hypothesis that there is no significant correlation between intelligence and academic achievement of boys is rejected. Further, the percentage of commonness between intelligence and academic achievement is 8.41 which is low. It may, therefore, be said that intelligence and academic attainment of boys were found to have low correlation. From the table (2), it is also clear that the correlation coefficient of in case of female students is 0.385 which is significant at 0.01 level. It shows that there is a significant correlation between intelligence and academic achievement of girls. Thus, the null hypothesis that there is no significant correlation between intelligence and academic achievement of female students is rejected. Further, the percentage of commonness between intelligence and academic achievement is 14.8 which is moderate. It may, therefore, be said that intelligence and academic achievement of girls were moderately correlated.

The third objective was to examine the relationship between intelligence and academic achievement of general, OBC and ST separately. To test the hypothesis, product moment correlation was used and the results are shown in the table below.

Table 3: Category-wise correlation between intelligence and academic achievement

Category	Variable	r- value	Remark
General	Intelligence Academic Achievement	0.067	Ns*
OBC	Intelligence Academic Achievement	0.501	P<0.01
Tribals	Intelligence Academic Achievement	0.287	ns

*ns- not significant

The table (3) clearly indicates that the correlation coefficient in case of the general students is 0.067 which is not significant. It indicates that there is no significant correlation between intelligence and academic achievement of general students. Thus, the null hypothesis that there is no significant correlation between intelligence and academic achievement of General students is not rejected. Therefore, it can be said that there is very little correlation between general students' academic achievement and intelligence.

From the table (3), it is seen that the correlation coefficient of in case of OBC students is 0.501 which is significant at 0.01 level. It specifies that there is a positive connection between intelligence and academic achievement of OBC students. Thus, the null hypothesis that there is no significant correlation between intelligence and academic achievement of OBC students is rejected. Further, the percentage of commonness between intelligence and achievement is 25.1 which is moderate. It may, therefore be said that intelligence and academic achievement of OBC students were seen to be moderately correlated.

From the table (3) it can be noticed that the correlation coefficient of in case of tribal students is 0.287 which is not significant. It indicates that there is no significant correlation between intelligence and academic achievement of students belonging to the tribal category. Thus, the null hypothesis that there is no significant correlation between intelligence and academic achievement of tribal students is not rejected. It may, therefore, be said that the

correlation between intelligence and academic achievement of tribal pupils was found to have a very weak correlation.

The fourth aim was to study the differences in mean scores of intelligence on the basis of gender. The data were analyzed with the of independent sample t-test and the outcome is given in the table (4).

Table 4: Gender-wise M, SD, N, and t-value of Intelligence of Students

Gender	M	SD	N	t-value	Remark
Male	39.07	9.99	59	1.643	ns
Female	42.02	9.66	61		

According to table (4), the t-value is 1.643, which is not significant at the 0.05 level with df=118. It demonstrates that the mean intelligence score of boys and girls did not differ significantly. As a result, the null hypothesis that there is no significant difference in the mean intelligence scores of boys and girls is not rejected. Therefore, it can be said that both boys and girls have more or less the same intelligence level.

The fifth objective was to study the differences in mean scores of academic achievement on the basis of gender. The data were analyzed with the of independent sample t-test and the outputs are given in table 5.

Table 5: Gender-wise M, SD, N, and t-values of Academic achievement of Students

Gender	M	SD	N	t-value	Remark
Male	51.92	20.48	59	2.206	P<0.05
Female	60.05	19.92	61		

The t-value is 2.206, which is significant at the 0.05 level with df = 118, as shown in table (5). It demonstrates that the mean academic achievement scores of boys and girls differ significantly. As a result, the null hypothesis that there is no significant difference in the mean academic achievement scores of boys and girls is rejected. Furthermore, the mean academic achievement score of female students is 60.05, which is significantly higher than that of boys, which is 51.92. So, we can state that girls were found to have better academic achievement in comparison to boys.

The sixth objective was to study the differences in mean scores of intelligence of students belonging to general, OBC and tribal categories. The students belonged to three categories, such as, General, Other Backward Castes (OBC) and Tribal. Thus, the data was analysed using One-Way ANOVA and the outputs are given in Table 6.

Table 6: One Way ANOVA of Intelligence of Students

	Sum of Squares	**df**	**Mean Square**	**F**	**Sig.**
Between Groups	352.434	2	176.217	1.824	.166*
Within Groups	11301.033	117	96.590		
Total	11653.467	119			

*Not significant

From the table (6), it can be inferred that the f-value is 1.824 which is not significant at 0.05 level with df=117. It clearly demonstrated that the mean scores of intelligence of students belonging to general, OBC and tribal categories do not differ significantly. Thus, the null hypothesis that there is no significant difference between the mean scores of intelligence of students belonging to the General, OBC and tribal categories is not rejected. So, it can be stated that the intelligence of students belonging to three different categories found to be the same extent.

The seventh objective was to study the differences in mean scores of academic achievement of students in the general, OBC and tribal categories. The students belonged to three categories, such as, General, Other Backward Castes (OBC) and Tribal. Thus, the information was evaluated using One Way ANOVA and the outcomes are shown in table 7.

It is clear from the table (7) that the F-value is 9.846 and that it is significant at the 0.05 level with df=117. It demonstrates how significantly the mean academic achievement scores of students who fall into the General, OBC, and tribal categories vary. The null hypothesis, according to which there is no discernible difference between the academic achievement mean scores of students belonging to the General, OBC, and tribal categories, is thus disproved

Table 7: Summary of One Way ANOVA of Academic Achievement of Students

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	7218.573	2	3609.287	9.846	.000
Within Groups	42891.127	117	366.591		
Total	50109.700	119			

The Duncan Multiple Range Test was used to further analyse the data in order to determine which group of students had significantly higher academic achievement scores. The results are shown in the table below.

Table 8: Category-wise Mean, N and significance of difference among Mean scores of Academic achievement of students

Categories	**m**	**n**	**OBC**	**ST**
General	68.91	32	*	*
OBC	51.15	52		
ST	51.69	36		Not significant

*significant at 0.05 level

It can be seen from the table 8, that the mean scores of academic achievement of students in the general and OBC categories differ significantly. The mean score of academic achievement of general students is 68.91 which is significantly higher than those students belonging to OBC category whose mean score is 51.15. It may, therefore, be said that general students had higher academic achievement when compared to students belonging to OBC category. The mean scores of academic achievement of students in the general category and tribal category differ significantly. The mean score of academic achievement of pupils who belonged to general category is 68.91 which is significantly higher than those students belonging to tribal category whose mean score is 51.69. It may, therefore, be said that general students were found to have higher academic achievement in comparison to students belonging to tribal category. The mean scores of academic achievement of students of OBC and tribal category did not differ significantly. It may, therefore, be said that students belonging to OBC and tribal category were found to have the same academic achievement. So, it may be said that the students belonging to general category were superior in their academic achievement than students belonging to OBC and tribal categories.

X. FINDINGS AND DISCUSSION

The following are the results of the present research:

1. There is a moderate correlation exists between intelligence and academic achievement.
2. Intelligence and academic achievement of male students have very low correlation and female students have moderate correlation.
3. There is no significant connection between intelligence and academic achievement is seen among pupils belonging to general and tribal categories. On the other hand, the link between intelligence and academic achievement of OBC students was moderate.
4. The mean score of intelligence does not differ significantly on the basis of gender.
5. Female students have better academic accomplishment in contrast to their male counterparts.
6. The intelligence of pupils belonging to three different categories is found to be to the same extent.
7. The pupils belonging to general category are superior in their academic achievement when they are compared with OBC and tribal category children.

The present study is consistent with Kaur (1992), Diseth (2003) Panigrahi (2005), Sridevi et al. (2008), and Dhall et al. (2009) Chandra and Azimmudin (2013), Susheela, Anjana, and Khajuria (2017), and Saikia (2020) who reported a positive linear relationship between intelligence and academic achievement. However, Naderi, Abdullah, Aizan, & Sharir (2010), and Arya & Maurya (2017) stated that there was no significant relationship intelligence and academic achievement. The present study showed that there is no difference in intelligence of female and male students. This is in line with the investigation done by Dandagal & Yarriswami (2017). However, Dhall et al. (2009) found a significant difference in intelligence between secondary school boys and girls. According to Panigrahi (2005) and Pandey et al. (2008), there is no discernible difference in academic achievement between boys and girls. However, the current investigation found that when academic achievement is taken into account, girls outperformed boys. This result is consistent with Dhall et al (2009)'s report that there is a significant academic achievement gap between secondary school boys and girls.

XI. CONCLUSION

Intelligence and academic achievement have been discovered to be significantly correlated, so the instructors, curriculum designers and planners must be very careful in nurturing students' abilities based on their level of intelligence to ensure better academic achievement. The teachers need to incorporate a variety of curricular and co-curricular activities to motivate students to develop their interests and aptitudes. Students' attention, participation and interaction help them to assimilate more information in the classroom which in turn boost up intelligence and academic achievement.

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