**Intelligence and Academic Achievement: A study of Gender and Category Differences**

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**Abstract:** The present study investigated the relation between intelligence and academic achievement. Using 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 the Raven’s Standard Progressive Matrices. Pearson’s product moment correlation, independent sample t-test, and analysis of variance were used to analyse the data. The result indicated a positive linear relationship between intelligence and academic achievement. The mean score of intelligence of students did not differ significantly on the basis of gender and category. However, the female students and general students were found to have better academic achievement in comparison to their counterparts.

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

**Introduction**

Education is the process of developing an individual's capacities. Education can be defined as a process that instils knowledge, skills, and attitudes that enable individuals to cope effectively with their surroundings. In today's highly competitive world, the 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 has become an indicator of a child's future, and it is a critical mechanism by which children learn about their talents, abilities, and competencies, all of which are important components of developing career goals (Lent et al., 2000). Academic achievement is defined by Crow and Crow (1969) as the extent to which a learner benefits from instructions in a given area of learning.

The question arises here is intelligence correlated to academic success? In the past, researchers have addressed this question and several researchers have recently expressed greater interest in the relationship between intelligence and academic achievement. According to them, there are empirical evidences for 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 solve problems, think abstractly, reason, plan, understand complex ideas, learn quickly, and learn from experience, among other things. It is more than bookish knowledge, a specific academic skill, or test-taking ability. It reflects a broader and deeper understanding of our surroundings and help a person to make sense of something and to figure out what to do. Wells defines intelligence as the property of recombining our behaviour pattern so as to act better in a novel 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 tribals and Other Backward Classes (OBC) have poor academic performance. This study is an attempt to understand the relationship between academic achievement and intelligence of students of Sikkim by taking into consideration Gender and Categories (General, Other Backward Classes and Tribals).

**Review of the Related Literature**

Naderi, Abdullah, Aizan, and Sharir (2010) investigated whether there is a relationship between intelligence and academic achievement and whether the relationship 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 achievement among secondary school students in Lucknow. The sample included 614 pupils from classes IX and X of fourteen schools in Lucknow, Uttar Pradesh (India). Dr. G.C. Ahuja's Group Test of Intelligence was used to measure intelligence and the previous annual exam results were used for academic achievement. The data was analysed using the t-test, and ANOVA. The result indicated that intelligence has a significant influence on academic achievement, whereas gender has no significant influence on academic achievement. Arya & Maurya (2017)studied the relation between creativity, intelligence 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. The data was collected using a survey method with a self-constructed questionnaire schedule, Baquer Mehdi's (1985) non-verbal test of creative thinking and Ramalingaswamy's (1972) Indian adaptation of the Wechsler Adult Intelligence Scale. This study revealed that there is no significant relationship between creativity, intelligence, and academic achievement.

Dandagal & Yarriswami (2017) evaluated the academic achievement of high school students in relation to their intelligence and found that there is a significant relationship between the two. This study also indicated there is no difference in the intelligence level of students when the gender, location, medium of instruction and types of schools were taken into consideration. Susheela, Anjana, & Khajuria (2017) investigated the relationship between intelligence and academic achievement of secondary school students. The sample consisted of 100 students 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. According to the findings of the study, there is a positive relationship between intelligence and academic achievement. Saikia (2020) investigated secondary students' 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 revealed a significant positive relationship between students' intelligence and academic achievement. Ilo & Onyejesi (2021) demonstrated how academic motivation and intelligence quotient contribute uniquely to differences in student academic achievement. This study had 405 pupils from private and public secondary schools in Enugu-East Local Government Area. The Raven Standard Progressive Matrices, previous academic performance from school data, and the Academic Motivation Scale was modified for use with secondary school students were the tools employed to collect the data. According to this study, IQ and academic motivation significantly predicted academic performance, accounting for 29.9% of the variance in academic performance. They reported that academic motivation influences students’ academic performance.

**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 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 students from OBCs and STs in Sikkim. As a result, the current study was undertaken to determine the relationship between academic achievement and intelligence of the students of Sikkim with respect to their gender and category.

**Objectives**

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

**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

**Population and Sample**

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

**Tools Used**

Marks of the previous year final examination of each class were taken for academic achievement and Raven´s Standard Progressive Matrices was used to measure the intelligence of students.

**Statistical Techniques Used**

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

**Results and Interpretation**

The first objective was to study the correlation between intelligence and academic achievement of students. For testing the hypothesis, Product moment correlation was used and the data was analyzed using statistical package for the social sciences (SPSS). 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 evident 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 students 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 study the correlation between intelligence and academic achievement of male and female students separately. The data were analyzed with the help of product moment correlation and the results are shown in the tables below.

**Table (2): Gender-wise correlation 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 student is 0.292 which is significant at 0.05 level. It indicates that there is a significant 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 male students 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 achievement of male students were found to have low correlation. From the table (2), it is also evident that the correlation coefficient of in case of female student is 0.385 which is significant at 0.01 level. It indicates that there is a significant correlation between intelligence and academic achievement of female students. Thus, the null hypothesis that there is no significant correlation between intelligence and academic achievement of male 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 female students were found to have moderate correlation.

The third objective was to study the correlation between intelligence and academic achievement of general, OBC and ST separately. The data were analyzed with the help of product moment correlation 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

From the table (3), it is seen that the correlation coefficient in case of general student 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. It may, therefore, be said that correlation between intelligence and academic achievement of general students were found to have very low correlation.

From the table (3), it is evident that the correlation coefficient of in case of OBC students is 0.501 Which is significant at 0.01 level. It indicates that there is a significant and positive correlation 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 found 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 tribal students. 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 correlation between intelligence and academic achievement of tribal students were found to have very low correlation.

The fourth objective was to compare mean scores of intelligence between male and female students. The data were analyzed with the of independent sample t-test and the results are given in table (4).

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

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

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 male and female students did not differ significantly. As a result, the null hypothesis that there is no significant difference in the mean intelligence scores of male and female students is not rejected. It may, therefore, be said that male and female students were found to have the same level of intelligence.

The fifth objective was to compare mean scores of academic achievement between male and female students. The data were analyzed with the of independent sample t-test and the results are given in table

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

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

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 male and female students differ significantly. As a result, the null hypothesis that there is no significant difference in the mean academic achievement scores of male and female students is rejected. Furthermore, the mean academic achievement score of female students is 60.05, which is significantly higher than the mean academic achievement score of male students, which is 51.92. So, we can state that female students were found to have higher academic achievement than their male counterparts.

The sixth objective was to compare the 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 analyzed with the help of One Way ANOVA and the results are given in the table.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **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 is evident the f-value is 1.824 which is not significant at 0.05 level with df=117. It shows 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 General, OBC and tribal categories is not rejected. It may, therefore, be said that the intelligence of students belonging to three different categories found to be same extent.

The seventh objective was to compare the mean scores of academic achievement 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 analyzed with the help of One Way ANOVA and the results are given in the table.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **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 |  |  |  |

From the table (7), it is evident that the F-value is 9.846 which is significant at 0.05 level with df= 117. It shows that the mean scores of academic achievement of students belonging to General, OBC and tribal categories differ significantly. Thus, the null hypothesis that there is no significant difference between the mean scores of academic achievement of students belonging to General, OBC and tribal categories is rejected. In order to know which category of students had significantly higher score of academic achievement, the data were further analyzed with the help of Duncan Multiple Range Test and the results are given 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  OBC  ST | 68.91  51.15  51.69 | 32  52  36 | \* | \*  Not significant |

\*significant at 0.05 level

From the table, it can be seen that the mean scores of academic achievement of students of general and OBC category differ significantly. The mean score of academic achievement of general students is 68.91 which significantly higher than those of students OBC category whose mean score is 51.15. It may, therefore, be said that general students were found to have higher academic achievement in comparison to students belonging to OBC category. The mean scores of academic achievement of students of general category and tribal category differ significantly. The mean score of academic achievement of general students is 68.91 which significantly higher than those of 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 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.

**Findings and Discussion**

The following are the findings of the present study.

1. Intelligence and academic achievement are moderately correlated.
2. Intelligence and academic achievement of male students have very low correlation and female students have moderate correlation.
3. There is no significant correlation between intelligence and academic achievement of general and tribal students. On the other hand, the correlation between intelligence and academic achievement of OBC students were moderate.
4. The mean score of intelligence of male and female students do not differ significantly.
5. Female students have better academic achievement in comparison to their counterparts.
6. The intelligence of students belonging to three different categories are found to be same extent.
7. The students belonging to general category are superior in their academic achievement in comparison to students belonging to OBC and tribal categories.

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 thatthere wasno 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) who reported a significant difference between boys and girls of secondary school in terms of intelligence. Panigrahi (2005), and Pandey et al. (2008) reported that there was no significant difference between boys and girls with respect to academic achievement. However, the present investigation revealed that girls performed better than the boys when their academic achievement is taken into consideration. This finding is in line with Dhall et al. (2009) who reported a significant difference between boys and girls of secondary school in terms of academic achievement.

**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 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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