An Effect Of Intelligence On Academic Performance In School Going Students": A Comparative Study Between Age And Gender

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Abstract:
The influence of intelligence on academic performance in school-going children is a critical area of research in educational psychology. Intelligence, often measured through standardized IQ tests, has been traditionally viewed as a significant predictor of academic success. This study examines the relationship between intelligence and academic performance, considering various factors such as socio-economic background, learning environment, and emotional well-being. Through a review of existing literature and meta-analyses, it is evident that while intelligence has a strong correlation with academic achievement, it is not the sole determinant. Other factors, including motivation, teaching quality, parental involvement, and emotional intelligence, play crucial roles in shaping a child's academic outcomes. Children who met the inclusion criteria were recruited from a private school using a Probabilistic Technique using Stratified Random Sampling with the Age range of 11 to 16 years. Academic Performance is classified into high, average and low academics using past records of final academic assessments. Intelligence Quotient was assessed using the Raven's Standard Progressive Matrices (RSPM). In the research conducted Grade 6 students demonstrated a higher mean academic performance (M = 59, SD = 23) Compared to grade 10 students (M = 49, sd =29). The lower standard deviation in grade 6 suggests less variability in Academic performance compared to grade 10, indicating more consistency among younger students. When examining cognitive abilities using the standard progressive Matrices (SPM), Grade 10 students also showed a higher mean scores (M= 52, SD = 27) than grade 6 students (M=23, SD = 16). The substantial difference in Mean and the higher standard Deviation in grade 6 imply that cognitive abilities as measured by the SPM, improve with age but are variable in younger students.

Keywords: Academic Performance, Intelligence Quotient, Late Childhood.

INTRODUCTION

Intelligence has been defined in many ways: the capacity for abstraction, logic, understanding, self-awareness, learning, emotional knowledge, reasoning, planning, creativity, critical thinking and problem – solving. Intelligence significantly influences academic performance in school-going children, but the relationship is complex and mediated by various factors. *Raquel Lazano Blasco and Alberto Quilez – Robers (2010) studied* on types of Intelligence and Academic Performance argues that there is a significant, positive and moderate relationship between Intelligence and Academic Performance and concluded as intelligence is a strong predictor of academic performance.

Psychologist David Wechsler defined Intelligence as "the global capacity of a person to act purposefully, to think rationally and to deal effectively with his environment ". He viewed Intelligence as an effect rather than a cause, and asserted that non-intellective factors, such as personality, contribute to the development of each persona's intelligence. The direct influence of intelligence on academic success can be observed in several key areas. Firstly, individuals with higher intelligence often possess superior problem-solving skills, allowing them to understand and apply complex concepts more easily. This cognitive advantage enables them to process information more efficiently and perform better on exams and assignments. Additionally, intelligence is linked to better memory retention, which is crucial for learning and recalling information

during tests. Furthermore, those with higher intelligence typically exhibit enhanced critical thinking abilities, enabling them to analyze and synthesize information from various sources effectively. Consequently, their capacity to produce well-argued and coherent essays or research papers is significantly improved. Therefore, the direct influence of intelligence on academic performance is evident through its impact on problem-solving, memory retention, and critical thinking skills

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RATIONALE OF THE STUDY

This study aims to explore the influence of intelligence on academic performance to better understand how cognitive abilities impact students success in educational settings.

REVIEW OF LITERATURE

Uzoamaka Chinenye Akubuilo & Kenechukwu Kosisochukwu lloh (2020)Academic Performance and Intelligence Quotient of Primary School Children in Enugu . Being from upper social class , in private schools and family size less than 4 were the significant determinants of high IQ and good academic performance.

Deary, I. J., Strand, S., Smith, P., & Fernandes, C. (2007). Intelligence and educational achievement. States the association between cognitive ability and educational achievement and general intelligence contributed to success.

Neisser, U., Boodoo, G., Bouchard, T. J., Boykin, A. W., Brody, N., Ceci, S. J., ... & Urbina, S. (1996). Intelligence: Knowns and unknowns. American Psychologist, 51(2), 77-10

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David R. Tooper , Susan P. Keane , Terri Shelton Parent Involvement and student academic Performance : A Multiple Mediational Analysis Treena Eileena Rohde, Lee Anne Thompson (2007) Predicting Academic Achievement with Cognitive ability

Komal Iqbal , Sana Rasheed Chaudhry (2021) on Relationship between IQ and Academic Performance of medical students'. Hard work of the students with average or low IQ could be the reason that there was no difference in the academic achievement when they were compared with the students having higher IQ.

Ayesha Parveen , Suvarna Sharma and Sumit Sharma (2024) on Assessment on relationship between Intelligence Quotient and Academic Performance of Medical Students. The study focuses on evaluating the IQ levels and finding its association with the academic performance of medical students. Only 20 students had an IQ to qualify for Average category, whereas majority of the students were in the category of below average IQ.

Habibollah Naderi and Tengku Aizan Hamid (2010) on topic "Intelligence and Academic Achievements: An Investigation of gender Differences. States that "Pearson Correlation analysis indicated that aspects of intelligence were not related to academic achievement for both males and females

RESEARCH GAP

Intelligence is often linked to academic success; much of the research is cross- sectional, providing only a snapshot of the relationship between intelligence and academic performance at a single point in time. The potential using longitudinal data, such as annual report cards over several years, to observe changes and trends in academic performance in relation. To intelligence has not been fully explored. This could provide insights into how intelligence influences academic outcomes overtime.

RESEARCH METHODOLOGY

Research methodology refers to the systematic process or set of principles and procedures used to conduct research. The methodology section of a research study typically explains the research design (such as qualitative, quantitative, or mixed methods), sampling techniques, data collection methods (like surveys, interviews, or experiments), and data analysis procedures

The study was carried out on 100 students from both private and public schools, participants aged 12 through 15 years which is within the eligible areas for the Raven Standard Progressive Matrices. Academic Scores of previous year were obtained from the school. Intelligence was measured using Raven Standard Progressive Matrices.

OBJECTIVES OF THE STUDY

1. To analyze the variation in academic performance among students with different levels of intelligence within the same grade (Grade 10^{th}).
2. To understand the variation in academic performance among students with different levels of intelligence within the same grade (Grade 6^{th})
3. To investigate the role of gender on intelligence and academic performance in grade 10 and 6. (Boys)
4 To investigate the role of gender as a moderating factor in the relationship between intelligence and academic performance of grade 10 and 6 (girls).

HYPOTHESES OF THE STUDY

- Null Hypothesis (H_0): There will be no significant relationship between intelligence quotient (IQ) and academic performance among 10 Grade student with different Intelligence.
- Alternative Hypothesis (H_1): There is a significant variation in academic performance among Grade 10 students with different levels of intelligence.
- Null Hypothesis (H_0): There will be no significant relationship between intelligence quotient (IQ) and academic performance among 6 Grade student with different Intelligence.
- Alternative Hypothesis (H_1): There is a significant variation in academic performance among Grade 6 students with different levels of intelligence.
- Null Hypothesis (H_0): There will be no significant relationship between intelligence quotient (IQ) and academic performance among Gender (boys) of Grade 10 and 6.
- Alternative Hypothesis (H_1): There is a significant variation in academic performance among gender (girls) moderates the relationship between intelligence and academic performance among students in Grades 6 and 10.

SAMPLING

A Sample of 100 adolescent was gathered in which 50 sample (25 boys and 25 girls) of grade 10 and (25 boys and 25 girls) of grade 6^{th} were taken using the method of Stratifies Random Sampling technique as this method ensures that each grade level is proportionately represented in the overall sample . This Technique enhances the representativeness of the sample and allows for more accurate comparisons between the two grade levels.

TOOLS USED

Standard Progressive Matrices (SPM)
Previous Academic Year Report Cards
Administration of Tools/ Procedure

STATISTICAL ANALYSIS

Statistical Analysis often involves the use of techniques like Mean and Standard Deviation to summarize data. In Stratifies random sampling, the population is divided into distinct subgroups (strata), and samples are taken from each group proportionally, ensuring representation across key characteristics. Cross – sectional design involves collecting data at a single point.

RESULTS AND DATA INTERPRETATION

A Cross – Sectional Observation study was conducted between grade 10 and 6 where its proven that intelligence has a moderate effect, as there was a correlation more than 0.5 between intelligence scores and academic performance. Given the moderate effect , there is a positive correlation between two variables, but not very strong one, indicating that while intelligence does contribute to academic success, other factors (such as socio-economic background, motivation and study habits)also play a significant roles.

Table1: Showing Mean and Standard Deviation of Grade 10 and 6

S.no	Test Scores	Class	Gender	N	Mean	SD
1	SPM	10	(Boys &Girls)	43	52	27
2	AP	10	(Boys &Girls)	43	49	29
3	SPM	6	Boys &Girls)	57	23	16
4	AP	6	Boys &Girls)	57	49	29
5	SPM	10	Boys	26	52	27
6	AP	10	Boys	26	52	27
7	SPM	6	Boys	30	21	15
8	AP	6	Boys	30	59	23
9	SPM	10	Girls	17	51	27
10	AP	10	Girls	17	53	27
11	SPM	6	Girls	27	25	17
12	AP	6	Girls	27	52	27

Table2: Showing Mean and Standard Deviation of Grade 10

S.no	Test Scores	Class	Gender	N	Mean	SD
1	SPM	10	(Boys &Girls)	43	52	27
2	AP	10	(Boys &Girls)	43	49	29

Figure 1: Mean of Performance on IQ and Academic Performance in Grade 10 with +/- 1 SD

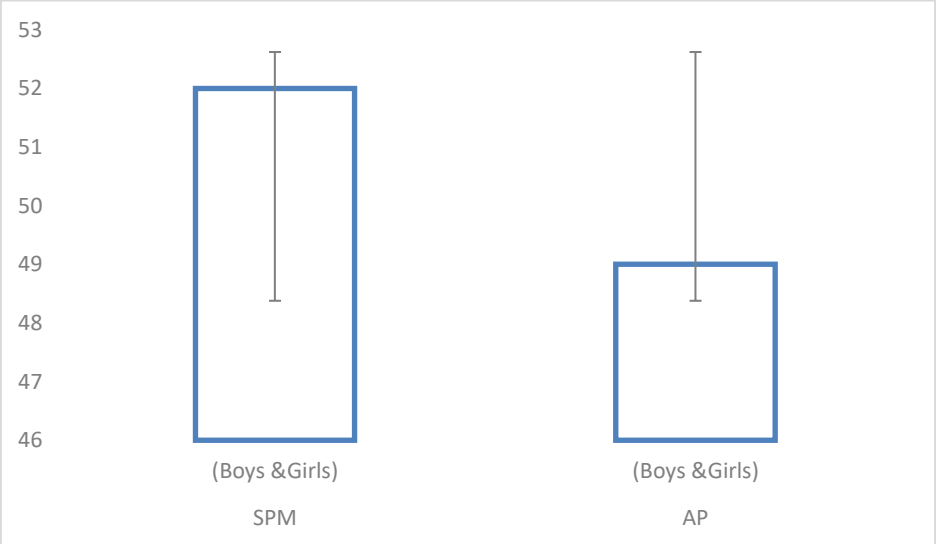


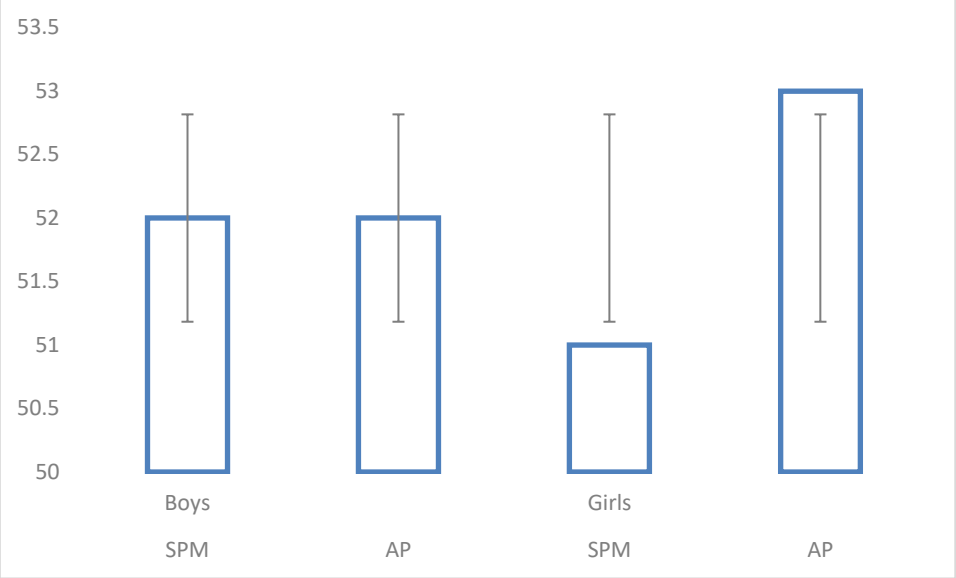
Table 3: Showing Mean and Standard Deviation of Grade 10

S.no	Test Scores	Class	Gender	N	Mean	SD
1	SPM	6	Boys &Girls)	57	23	16
2	AP	6	Boys &Girls)	57	49	29

Table 4: Showing Mean and Standard Deviation of Grade 10 Boys and Girls

S.no	Test Scores	Class	Gender	N	Mean	SD
1	SPM	10	Boys	26	52	27
2	AP	10	Boys	26	52	27
3	SPM	10	Girls	17	51	27
4	AP	10	Girls	17	53	27

Figure 2: Mean of performance on IQ and Academic performance in Grade 10, boys and girls with +/- 1 SD



The mean academic performance score for girls (56.7) is higher than that of boys (43.9), suggesting that, on average, girls perform better academically than boys in this sample. The difference in mean scores is 12.8 points. However, the t-value of 1.42 indicates that this difference is not statistically significant at the typical significance level (e.g., $p < 0.05$). Girls performed better than boys in academics due to a combination of factors.

KEY FINDINGS

- The difference indicates that SPM is a standardized test to assess intellectual whereas Academic Performance is not a standardized test.
- The difference also indicates that SPM is sensitive to age and cognitive level, whereas Academic performance is sensitive and specifically in measures academics.
- Academic Performance is based upon age appropriate than standardized SPM Test.
- No change in stimulus in SPM between 10 and 6 and there is a change in stimulus in Academic Performance.
- There is no significant difference in IQ levels and academic performance between genders in both 10 and 6 grade students accepting null hypotheses.
- The performance seems to be moderately correlated between IQ and Academics in boys of grade 10.
- The performance seems to be high correlated between IQ and Academics in girls of grade 10.

DISCUSSION

The key findings reveal that the Standard Progressive Matrices (SPM) is a standardized test used to assess intellectual ability, while Academic Performance is not standardized in the same way and focuses on specific subject knowledge. SPM is sensitive to age and cognitive level, whereas academic performance is tied more to the curriculum and grade level.

SUGGESTION FOR FURTHER STUDY

Based on the findings, further research could explore how intellectual abilities and academic performance change as students grow older, and how factors like study habits, motivation and emotional intelligence influence this relationship. It would also be helpful to study why girls seems to show a stronger link between IQ and academic success compared to boys and whether this holds true in different cultures or education systems . Further research could look at how cognitive test like SPM might evolve with more complex material and how this affects academic outcomes.

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