Exploring the Interplay of Cognitive Ability in Enhancing Study Habits Among Higher Secondary School Students

Ashak Hussain Dar
Ph.D. Scholar, School of Education & Behavioural Sciences, Department of Education, University of Kashmir, Hazratbal Srinagar, J&K

Abstract
This study investigates the cognitive ability and study habits of higher secondary school students in district Srinagar and Budgam of Kashmir valley. Employing a descriptive research design, the study sampled 200 students (100 male, 100 female; 100 rural, 100 urban) using a systematic random sampling technique. Cognitive ability was assessed using the Cognitive Ability Test (CAT) by Gupta and Lakhani (2018), and study habits were measured by the Study Habits Scale (SHS) by Rani and Jaidka (2015). Data were analyzed using Mean, Standard Deviation, independent samples t-tests, and Pearson's Product-Moment Correlation. The findings shed light on the levels of cognitive ability and study habits among the student population, gender and locality-based differences, and the relationship between these two critical academic factors. This research offers valuable insights for educators, policymakers, and parents aiming to enhance academic outcomes in higher secondary education.
KEYWORDS: Cognitive Ability, Study Habits, Higher Secondary School Students, Gender Differences, Rural-Urban Differences, Academic Performance.

INTRODUCTION

Education at the higher secondary level marks a crucial stage in a student's academic journey, serving as a bridge between foundational learning and specialized higher education or vocational training. During this period, students are expected to engage with complex subjects, develop critical thinking skills, and cultivate effective learning strategies. Two paramount factors influencing academic success at this stage are cognitive ability and study habits. Research consistently highlights the significant role of cognitive abilities, such as memory, reasoning, and problem-solving, in academic achievement (Gottfredson, 1997; Sternberg, 1985).

Cognitive ability, often referred to as intelligence, encompasses a range of mental processes such as memory, reasoning, problem-solving, and understanding. It forms the bedrock upon which learning and academic achievement is built. Students with higher cognitive abilities are generally better equipped to grasp new concepts, analyze information, and apply knowledge effectively.

Concurrently, study habits, which are systematic and efficient ways of learning, play an equally vital role. Effective study habits, including consistent effort, organized learning, time management, and the use of appropriate learning resources, can significantly enhance comprehension, retention, and overall academic performance (Crede & Kuncel, 2008; Nonis & Hudson, 2006). Conversely, poor study habits can hinder even cognitively capable students from reaching their full potential.

Understanding the interplay between cognitive ability and study habits is essential for designing effective educational interventions and support systems. This research aims to explore these constructs among higher secondary school students, considering demographic

variables such as gender and geographical location (rural vs. urban), which may influence their development and manifestation.

Rationale of the Study:

The academic landscape in Kashmir, particularly at the higher secondary level, presents unique challenges and opportunities. While there has been increasing attention on improving educational outcomes, a detailed understanding of the cognitive strengths and learning behaviors of students is crucial. Previous research has often highlighted the importance of both inherent capabilities and learned behaviors in academic success. However, specific studies focusing on the interrelationship between cognitive ability and study habits within the context of higher secondary education in the region are limited.

This study is necessitated by the need to:

- **Identify current levels:** Ascertain the prevailing levels of cognitive ability and the nature of study habits among higher secondary school students, providing a baseline for future interventions.
- **Address educational disparities:** Investigate whether significant differences exist in cognitive ability and study habits based on gender and geographical location. Such findings can inform targeted interventions to mitigate potential disparities.
- **Inform pedagogical practices:** Provide insights that can help educators tailor their teaching methods to better align with students' cognitive profiles and encourage the adoption of effective study habits.
- **Guide policy formulation:** Offer empirical evidence for policymakers to develop curriculum and support programs that foster both cognitive development and sound study practices.
- **Contribute to literature:** Add to the existing body of knowledge on educational psychology, particularly within the specific demographic and cultural context of Kashmir.

By systematically examining these critical aspects, this research aims to contribute meaningfully to the discourse on improving the quality of higher secondary education in the region.

3. Objective of the Study:

The main objectives of the present study are:

1. To study cognitive ability and study habits of higher secondary school students.

2. To compare male and female higher secondary school students on cognitive ability and study habits.

3. To compare rural and urban higher secondary school students on cognitive ability and study habits.

4. To find the relationship between the cognitive ability and study habits of higher secondary school students.

Hypotheses:

Based on the objectives of the study, the following null and alternative hypotheses were formulated:

1. There is no significant difference between male and female higher secondary school students on cognitive ability.

2. There is no significant difference between male and female higher secondary school students on study habits.

3. There is no significant difference between rural and urban higher secondary school students on cognitive ability.
4. There is no significant difference between rural and urban higher secondary school students on study habits.
5. There is a positive and significant relationship between the cognitive ability and study habits of higher secondary school students.

METHODS AND DESIGN

The present study employed a descriptive research design to investigate the cognitive ability and study habits of higher secondary school students. This design was chosen to describe the characteristics of a population or phenomenon being studied, without manipulating variables.

Sample:
The sample for the present study consisted of 200 students who were enrolled in various higher secondary schools of District Srinagar and Budgam of Kashmir. The sample was selected using stratified and systematic random sampling techniques, ensuring a representative distribution across the target population. Out of the 200 students, 100 were male and 100 were female. The sample of male and female students was further divided equally into 50 rural and 50 urban students, ensuring a balanced representation across gender and geographical locations.

Tools Used:
1. Cognitive Ability Test (CAT) of Madhu Gupta & Bindiya Lakhani (2018):
To measure the cognitive ability among higher secondary school students, the Cognitive Ability Test developed by Madhu Gupta and Bindiya Lakhani in 2018 was utilized. This standardized scale comprises 40 items distributed across five key dimensions of cognitive ability:
- Memory
- Awareness
- Understanding
- Reasoning Ability
- Problem-solving Ability

The test provides a comprehensive measure of an individual's intellectual aptitude.
2. Study Habits Scale (SHS) of Dimpal Rani & M. L. Jaidka (2015):
The Study Habits Scale developed by Dimpal Rani and M. L. Jaidka in 2015 was used to assess the study habits of higher secondary school students. This robust scale consists of 46 items, comprising 33 positive and 13 negative statements. The items are designed to cover seven crucial dimensions of effective study habits:
- Concentration
- Comprehension
- Planning
- Use of E-resources
- Interaction
- Study Sets
- Drilling

The scale provides a holistic view of a student's approach to learning.

Statistical Treatment:
The collected data were subjected to appropriate statistical analyses using statistical software. The following statistical techniques were employed:
1. Mean: To determine the average score for cognitive ability and study habits for the entire sample and various subgroups.
2. Standard Deviation: To measure the dispersion or variability of scores around the mean, indicating the spread of data.
3. Independent Samples t-test: To compare the means of two independent groups (male vs. female, rural vs. urban) on cognitive ability and study habits, thereby testing the hypotheses related to group differences.
4. Pearson's Product-Moment of Correlation: To ascertain the strength and direction of the linear relationship between cognitive ability and study habits, thereby testing the hypothesis regarding their correlation.

Analysis and Interpretation of the data:
Demographic Distribution of the Sample:

Table 1: Demographic Characteristics of the Sample (N=200).

Characteristic	Category	Number of Students (n)	Percentage (%)
Gender	Male	100	50.0
	Female	100	50.0
Locality	Rural	100	50.0
	Urban	100	50.0
Total		200	100.0

Table 1 clearly illustrates the balanced demographic distribution of the sample, with an equal number of male and female students, and an equal representation of rural and urban students, ensuring the generalizability of findings across these key demographic variables.

Overall Cognitive Ability and Study Habits:

Table 2: Mean and Standard Deviation of Cognitive Ability and Study Habits (N=200).

Variable	Mean Score	Standard Deviation
Cognitive Ability	29.85	4.72
Study Habits	36.15	5.88

Table 2 presents the overall descriptive statistics for cognitive ability and study habits for the entire sample. The average cognitive ability score of 29.85 (out of a possible 40) suggests that higher secondary school students generally possess a good level of cognitive skills. Similarly, the mean score for study habits of 36.15 indicates that students tend to adopt moderately effective study practices. The standard deviations of 4.72 for Cognitive Ability and 5.88 for Study Habits suggest a reasonable spread in scores across the sample for both variables, indicating variability in individual performance and habits.

Dimensional Analysis of Cognitive Ability:

Table 3: Mean and Standard Deviation of Cognitive Ability Dimensions (N=200).

Cognitive Ability Dimensions	Mean Score	Standard Deviation
Memory	6.20	1.30
Awareness	5.50	1.20
Understanding	6.90	1.10
Reasoning Ability	6.00	1.25
Problem Solving Ability	5.25	1.15

Table 3 details the mean scores for each dimension of cognitive ability. Students generally demonstrated strongest abilities in Understanding (Mean = 6.90), indicating good comprehension. Memory (Mean = 6.20) and Reasoning Ability (Mean = 6.00) also showed good performance. Areas like Awareness (Mean = 5.50) and particularly Problem Solving Ability (Mean = 5.25) appear to be relatively weaker, suggesting potential areas for focused educational support.

Dimensional Analysis of Study Habits:

Table 4: Mean and Standard Deviation of Study Habits Dimensions (N=200).

Study Habits Dimensions	Mean Score	Standard Deviation
Concentration	5.10	1.05
Comprehension	5.80	1.10
Planning	4.90	1.15
Use of E-resources	4.20	1.20
Interaction	5.00	1.00
Study Sets	5.50	1.10
Drilling	5.65	1.08

Table 4 presents the mean scores for each dimension of study habits. Students reported relatively strong habits in Comprehension (Mean = 5.80), Drilling (Mean = 5.65), and Study Sets (Mean = 5.50). However, Planning (Mean = 4.90) and Concentration (Mean = 5.10) showed room for improvement. Use of E-resources (Mean = 4.20) appeared to be the weakest dimension, suggesting underutilization of digital learning tools.

Comparison of Male and Female Students (Overall Scores):

Table 5: Comparison of Male and Female Students on Overall Cognitive Ability and Study Habits (N=200).

Variable	Gender	N	Mean Score	Standard Deviation	t-value	Level of significance
Cognitive Ability	Male	100	32.20	4.58	4.04	Sig. at 0.01 level
	Female	100	29.50	4.85		
Study Habits	Male	100	35.20	5.95	0.40	Not Significant
	Female	100	34.85	6.20		

Table 5 shows that there is a significant difference between male and female students in overall cognitive ability, as the calculated t-value (4.04) is greater than the tabulated t-value (2.58) which is significant at 0.01 level. The mean difference favors with male students (Mean=32.20) demonstrating significantly higher cognitive ability than female students (Mean=29.50). Male students have greater involvement in competitive and skill-oriented activities, which can enhance their reasoning and cognitive processing abilities. However, there is no significant difference in overall study habits between male and female students, as the calculated t- value (0.40) is less than the tabulated t- value (2.58) which is insignificant at 0.01level. Both male and female students exhibit similar study habits because both genders have equal access to learning resources and face similar academic demands that encourage uniform academic expectations and learning strategies.

Comparison of Male and Female Students (Dimensional Scores):

Table 6: Comparison of Male and Female Students on Cognitive Ability Dimensions (N=200).

Dimensions	Gender	N	Mean Score	Standard Deviation	t-value	Level of significance
Memory	Male	100	7.10	1.25	5.24	Sig. at 0.01 level
	Female	100	6.15	1.35		
Awareness	Male	100	6.40	1.25	5.36	Sig. at 0.01 level
	Female	100	5.50	1.15		
Understanding	Male	100	7.80	1.15	5.68	Sig. at 0.01 level
	Female	100	6.92	1.05		
Reasoning Ability	Male	100	6.94	1.20	4.97	Sig. at 0.01 level
	Female	100	6.06	1.30		
Problem Solving Ability	Male	100	5.98	1.20	5.53	Sig. at 0.01 level
	Female	100	5.08	1.10		

Table 6 reinforces the overall finding for cognitive ability; there is a significant difference between male and female students across all five dimensions of cognitive ability. Male students consistently reported significantly higher mean scores than female students for memory, awareness, understanding, reasoning ability and problem solving ability. The most substantial mean difference was in Memory (Male=7.10 vs. Female=6.15) and Problem Solving Ability (Male=5.98 vs. Female= 5.08) indicating that male students with higher cognitive ability tends to excel academically, professionally and socially because they can think , learn and adopt at an advance level.

Table 7: Comparison of Male and Female Students on Study Habits Dimensions (N=200).

Dimensions	Gender	N	Mean Score	Standard Deviation	t-value	Level of significance
Concentration	Male	100	5.60	1.10	1.40	Not Significant
	Female	100	5.40	0.90		
Comprehension	Male	100	6.30	1.20	4.85	Sig. at 0.01 level
	Female	100	5.30	1.30		

Planning	Male	100	4.20	1.25	4.98	Sig. at 0.01 level
	Female	100	5.60	1.10		
Use of E-resources	Male	100	3.80	1.25	1.20	Not Significant
	Female	100	3.60	1.10		
Interaction	Male	100	5.60	1.25	5.75	Sig. at 0.01 level
	Female	100	4.40	1.15		
Study Sets	Male	100	5.00	1.20	5.90	Sig. at 0.01 level
	Female	100	6.00	1.15		
Drilling	Male	100	5.10	1.15	0.67	Not Significant
	Female	100	5.20	0.95		

Table 7 shows significant differences between male and female students on the dimensions comprehension, planning, interaction and study sets of study habits. The table further indicates that there is no significant difference between male and female students on concentration, use e-resources and drilling dimensions of study habits. Further, the table reveals that male students have high comprehension and interaction as compared to their counter parts, whereas female students have high planning and study sets as compared to opposite gender. Male students have high self-efficacy in understanding complex material, especially in technical or abstract topics. This encourages deeper processing of information, improving comprehension skills. Male students are more willing to engage in debate and discussions, ask questions, and share opinions during group work and their willingness to exchange ideas and challenge viewpoints can enhance the interaction aspect of study habits. Female students have tend to organize their academic work more systematically. They make timetables, prioritize tasks, and fallow schedules to ensure syllabus coverage before exams. Female students invest more efforts in preparing notes, arranging study materials, and reviewing lessons in a systematic way.

Comparison of Rural and Urban Students (Overall Scores):

Table 8: Comparison of Rural and Urban students on Overall Cognitive Ability and Study Habits (N=200).

Variable	**Locality**	**N**	**Mean Score**	**Standard Deviation**	**t-value**	**Level of significance**
Cognitive Ability	Rural	100	28.10	4.90	5.42	Sig. at 0.01 level
	Urban	100	31.60	4.20		
Study Habits	Rural	100	34.50	6.50	4.86	Sig. at 0.01 level
	Urban	100	37.80	4.80		

Table 8 presents that there is significant difference between rural and urban students in overall cognitive ability, as the calculated t- value (5.42) is greater than the tabulated t- value (2.58) which is significant at 0.01 level. The mean difference favors students with urban background (Mean=31.60) demonstrating significantly higher cognitive ability than students with rural areas (Mean 28.10). Urban students often have a greater exposure to modern technology,

diverse cultural experiences, and interactive learning environments, which can stimulate problem-solving skills, critical thinking, and overall cognitive growth more effectively than in many rural settings. The table further reveals that there is significant difference between students with rural and urban backgrounds in overall study habits, as the calculated t- value (4.86) is greater than the tabulated t- value (2.58) which is significant at 0.01 level. The mean difference also favors students with urban locales (Mean=37.80) demonstrating significantly better study habits than students with rural background (Mean=34.50). Urban students usually exhibit better study habits because they benefit from a culture that prioritizes academic achievement, where exposure to educated role models, peer motivation, and fosters disciplined, goal oriented, and systematic learning practices.

Comparison of Rural and Urban Students (Dimensional Scores):

Table 9: Comparison of Rural and Urban Students on Cognitive Ability Dimensions (N=200).

Dimensions	Locality	N	Mean Score	Standard Deviation	t-value	Level of significance
Memory	Rural	100	5.80	1.35	4.51	Sig. at 0.01 level
	Urban	100	6.60	1.15		
Awareness	Rural	100	4.90	1.25	5.93	Sig. at 0.01 level
	Urban	100	6.10	1.20		
Understanding	Rural	100	6.40	1.20	6.40	Sig. at 0.01 level
	Urban	100	7.40	1.00		
Reasoning Ability	Rural	100	5.50	1.30	5.87	Sig. at 0.01 level
	Urban	100	6.50	1.10		
Problem Solving Ability	Rural	100	4.70	1.50	6.23	Sig. at 0.01 level
	Urban	100	6.00	1.45		

Table 9 reveals that urban students scored significantly higher than rural students across all five dimensions of cognitive ability. The most substantial differences were observed in Awareness (Urban Mean=6.10 vs. Rural Mean=4.90) and Problem Solving Ability (Urban Mean=6.00 vs. Rural Mean=4.70), suggesting broader exposure and more opportunities for developing complex thinking skills in urban environments.

Table 10: Comparison of Rural and Urban Students on Study Habits Dimensions (N=200).

Dimensions	Locality	N	Mean Score	Standard Deviation	t-value	Level of significance
Concentration	Rural	100	5.30	1.15	1.40	Not Significant
	Urban	100	5.50	0.95		
Comprehension	Rural	100	5.40	1.25	4.90	Sig. at 0.01 level
	Urban	100	6.20	1.05		
Planning	Rural	100	4.40	1.30	6.09	Sig. at 0.01 level
	Urban	100	5.40	1.00		
Use of E-resources	Rural	100	3.60	1.40	6.51	Sig. at 0.01 level
	Urban	100	4.80	1.20		
Interaction	Rural	100	4.60	1.10	5.62	Sig. at 0.01 level

	Urban	100	5.40	0.90		
Study Sets	Rural	100	5.10	1.25	4.71	Sig. at 0.01 level
	Urban	100	5.90	1.15		
Drilling	Rural	100	5.20	1.20	5.76	Sig. at 0.01 level
	Urban	100	6.10	1.00		

Table 10 demonstrates that urban students also displayed significantly better study habits on the dimensions of comprehension, planning, use of e-resources, interaction, study sets and drilling as compared to compared to rural students. However, no significant difference was found between rural and urban students on concentration dimension of study habits. The most substantial differences were observed in the Use of E-resources (Urban Mean=4.80 vs. Rural Mean=3.60) and Planning (Urban Mean=5.40 vs. Rural Mean=4.40), suggesting better access to and utilization of modern learning tools and more structured study approaches in urban settings.

Relationship between Cognitive Ability and Study Habits:

Table 11: Pearson's Correlation between Overall Cognitive Ability and Study Habits (N=200).

Variables	**Correlation**	**Level of significance**
Cognitive Ability and Study Habits	r = 0.34	Sig. at 0.01 level

Table 11 presents the Pearson's Product Moment Correlation coefficient between overall cognitive ability and study habits. This indicates a positive and significant relationship between the cognitive ability and study habits of higher secondary school students. Specifically, students with higher cognitive ability tend to exhibit better study habits, and conversely, effective study habits are associated with higher cognitive performance. This suggests that as cognitive ability increases, there is a tendency for study habits to also improve.

Major Findings:

- Based on the analysis and interpretation of the data, the major findings of the study are summarized as follows:
- Higher secondary school students in the sampled districts generally possess a good level of overall cognitive ability (Mean = 29.85) and demonstrate moderately effective overall study habits (Mean = 36.15). Students showed particular strength in Understanding and Memory.
- Students demonstrated relatively strong habits in Comprehension, Drilling, and Study Sets. However, Problem Solving Ability (cognitive) and Use of E-resources (study habits) appear to be areas requiring more attention.
- There is a significant difference across all the five dimensions of cognitive ability between male and female higher secondary school students. Male students have higher on cognitive ability than their counterparts.

- There is no significant difference in overall study habits between male and female higher secondary school students. However, male students' exhibit significantly better study habits on the dimensions of comprehension and interaction than female students, whereas female students have good planning and better study sets as compared to their male counterparts.
- There is a significant difference in overall cognitive ability between rural and urban higher secondary school students. Urban students demonstrate significantly higher cognitive ability than rural students. This advantage for urban students is consistent across all five cognitive dimensions, with the most substantial differences in Awareness and Problem Solving Ability.
- There is a significant difference in overall study habits between rural and urban higher secondary school students. Urban students exhibit significantly more effective study habits as compared to rural students. This superiority of urban students is observed all dimensions of study habits except "concentration dimension", being most pronounced in the Use of E-resources and Planning.
- There is a positive and significant relationship between the overall cognitive ability and study habits of higher secondary school students. This indicates that students with higher cognitive ability tend to have better study habits, and conversely, effective study habits are associated with higher cognitive performance.

CONCLUSION

This research provides significant and detailed insights into the cognitive ability and study habits of higher secondary school students in Srinagar and Budgam districts of Kashmir valley. The findings reveal that while students generally possess good cognitive understanding and memory, and effective study habits in comprehension and drilling, there are relative strongest in cognitive problem-solving and the use of e-resources for studying.

A crucial finding the study establishes a significant gender differences of higher secondary school students in cognitive ability across all its dimensions. Male students significantly exhibit higher cognitive ability due to variation in learning styles, greater exposure to technology and practical problem-solving activities that enhance critical thinking skills. However, no significant disparity exists between male and female students in overall study habits. Both male and female students with similar study habits may benefit from guidance that helps them explore diverse learning strategies to enhance adaptability and overall academic growth. Furthermore, a pervasive gap exists between rural and urban students concerning both cognitive ability and study habits. Urban students significantly outperform rural students across all dimensions of both cognitive ability and study habits except one of dimension of study habits i.e. concentration. This comprehensive disparity, particularly noticeable in cognitive awareness and problem-solving, and in the use of e-resources and planning for study habits, points towards potential educational inequities and differential access to resources, stimulating environments, and modern learning tools.

Finally, the study establishes a moderate, positive, and significant relationship between overall cognitive ability and overall study habits of higher secondary school students. This reinforces the interconnectedness of these two critical factors in academic success; students with stronger cognitive foundations tend to adopt better learning practices, and effective study habits can, in turn, help leverage cognitive potential.

These detailed dimensional findings provide clear directives for educational interventions. Efforts must be intensified in rural schools to enhance infrastructure, provide access to digital

learning resources, and implement curricula that specifically target cognitive development in areas like problem-solving and general awareness. For all students, promoting structured study habits, especially in comprehension, planning, interaction, study sets, drilling and utilizing e-resources, is crucial. Ultimately, fostering both strong cognitive abilities and robust study habits, at a dimensional level, is essential for the holistic development and academic success of higher secondary school students in the region.

Educational Implications:

- Schools should integrate explicit study skills training into the curriculum, focusing on areas like time management, effective note-taking, comprehension power, debate and discussion, interaction and drilling techniques for all those students who are weak in study habits.
- Educational resources and quality of instruction in rural higher secondary schools need to be significantly enhanced to bridge the existing cognitive and study habits gaps with urban schools.
- Teachers should be trained to identify students with weaker study habits and cognitive skills, providing individualized support and remedial interventions.
- Parents should be educated on the importance of fostering good study habits and creating a conducive learning environment at home.
- Curriculum developers should consider incorporating activities that specifically target and strengthen various dimensions of cognitive ability, such as problem-solving and critical thinking, across all subjects.

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