A STUDY ON THE ATTITUDINAL DIFFERENCES TOWARDS LEARNING BETWEEN LEFT- HANDED AND RIGHT-HANDED STUDENTS OF NORTH 24 PARGANAS OF WEST BENGAL

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ABSTRACT

The research article entitled 'A Study on the Attitudinal Differences Towards Learning Between Left- handed and Right-Handed Students of North 24 Parganas of West Bengal'. This study explores the attitudinal differences toward learning between left-handed and right-handed higher secondary students in North 24 Parganas, West Bengal. Recognizing that handedness is linked to brain hemispheric dominance and cognitive styles, the research investigates whether handedness influences students' attitudes toward learning, considering gender and school location as additional factors. The major objectives of the study were to know the level of Attitude towards Learning of Higher Secondary Level Students, to compare the Attitude towards Learning of Higher Secondary Level Students in relation to Handedness (left-handed and right-handed), to compare the Attitude towards Learning of left-handed Students at Higher Secondary Level under different categorical variables like Gender (Boys and Girls) and Location of the School (Urban and Rural), and to compare the Attitude towards Learning of right-handed Students at Higher Secondary Level under different categorical variables like Gender (Boys and Girls) and Location of the School (Urban and Rural). The present study adopted a quantitative, descriptive-comparative research design. A sample of 327 students from 26 government-aided schools, representing urban and rural areas, participated in the study. The Attitude Towards Learning Scale (ATLS), a 25-item Likert-type instrument developed by the researcher, was used to measure students' motivational, emotional, and engagement-related attitudes toward learning. Results showed no significant difference in learning attitudes between left-handed and right-handed students. Furthermore, analyses within left- and right-handed groups revealed no significant attitudinal differences based on gender or school location. The major findings of the study were suggest that handedness, gender, and school location do not significantly impact students' attitudes toward learning in this sample. The study underscores the importance of focusing on inclusive teaching practices that address all learners' needs, regardless of neurocognitive or demographic variations. Further research is recommended to explore other factors influencing learning attitudes in diverse educational settings.

OPERATIONAL TERMS: Handedness, Attitude Towards Learning, Higher Secondary Students, Gender Differences, School Location, Cognitive Styles

1.0 INTRODUCTION

Learning attitudes significantly shape students' academic engagement, motivation, and overall performance. Among the various cognitive and physiological variables influencing attitudes toward learning, handedness particularly left- and right-handedness has garnered increasing scholarly interest. Handedness is often associated with hemispheric dominance in the brain, which may result in different cognitive styles, learning preferences, and educational outcomes (McManus, 2002). While right-handed individuals represent the majority of the population, left-handed individuals constitute a notable minority and often experience environments predominantly tailored to right-handed norms (Annett, 2002).

In educational contexts, such differences in neuro-cognitive orientation may influence how students perceive, approach, and adapt to learning tasks. Several studies suggest that left-handed learners may exhibit distinct strengths in creativity and spatial reasoning, while right-handed learners often perform better in verbal and sequential tasks (Kavakçı et al., 2014; Somers et al., 2015). Despite these findings, educational systems rarely accommodate the learning needs of left-handed students, potentially affecting their academic experiences and attitudes.

The district of North 24 Parganas in West Bengal represents a culturally diverse and educationally active region. Investigating attitudinal differences toward learning between left- and right-handed students in this region is crucial to identifying latent disparities and promoting inclusive pedagogical practices. This study aims to explore whether handedness is significantly related to students' attitudes toward learning, with a focus on the psychological, environmental, and cognitive dimensions influencing such attitudes.

1.1 Rationale of the Study

Education in the 21st century demands an inclusive and learner-centered approach that recognizes individual differences among students. One often-overlooked factor in understanding student diversity is *handedness*, which reflects the dominant use of one hand over the other and is closely linked to cerebral lateralization (McManus, 2002). Though left-handed individuals constitute approximately 10% of the global population, the educational landscape continues to favor right-handed norms in terms of classroom tools, seating arrangements, writing practices, and cognitive expectations (Annett, 2002). This systemic oversight may influence left-handed students' attitudes toward learning in subtle yet significant ways.

Attitude toward learning is a multidimensional construct encompassing motivation, interest, confidence, and perceptions of the learning environment (Reid, 2003). Research has shown that cognitive styles associated with handedness such as divergent thinking in left-handed individuals and sequential processing in right-handed ones can affect how students engage with educational content (Somers et al., 2015). However, empirical evidence exploring the attitudinal differences based on handedness, particularly in Indian contexts, remains scarce.

The district of North 24 Parganas in West Bengal, with its socio-educational diversity, provides a fertile ground for examining how handedness influences learners' attitudes. Understanding such differences is crucial not only for academic research but also for informing inclusive pedagogical strategies that accommodate neurodiverse

learners. The present study seeks to investigate whether left-handed and right-handed students differ significantly in their attitudes toward learning, with attention to psychological and environmental influences. By focusing on a regionally specific sample and adopting a comparative approach, this study aims to fill a critical gap in Indian educational research. Its findings could have practical implications for curriculum design, classroom management, teacher training, and policy formulation. Moreover, it advocates for recognizing handedness as a legitimate factor in educational planning, thereby contributing to the broader goal of equitable and inclusive education for all learners.

1.2 Objectives of the Study

The following objectives have been formulated for the current study –

O_1: To know the level of Attitude towards Learning of Higher Secondary Level Students.

O_2: To compare the Attitude towards Learning of Higher Secondary Level Students in relation to Handedness (left-handed and right-handed).

O_3: To compare the Attitude towards Learning of left-handed Students at Higher Secondary Level under different categorical variables like Gender (Boys and Girls) and Location of the School (Urban and Rural)

O_4: To compare the Attitude towards Learning of right-handed Students at Higher Secondary Level under different categorical variables like Gender (Boys and Girls) and Location of the School (Urban and Rural).

1.3 Research Questions and Hypotheses of the Study

The researcher has developed the following objective-specific research questions and hypotheses for empirical verification.

- **For Objective O_1 following research question is formed.**

RQ_1: What is the level of Attitude towards Learning of Higher Secondary Level Students?

- **For Objective O_2 following research hypotheses are formed.**

$H_0$1: There would be no significant difference in the mean scores of Attitude towards Learning between left-handed and right-handed students at Higher Secondary Level.

- **For Objective O_3 following research hypotheses are formed.**

$H_0$2: There would be no significant difference in the mean scores of Attitude towards Learning of left-handed students at Higher Secondary Level with reference to their Gender (Boys and Girls) variation.

$H_0$3: There would be no significant difference in the mean scores of Attitude towards Learning of left-handed students at Higher Secondary Level with reference to their Location of the School (Urban and Rural) variation.

- **For Objective O_4 following research hypotheses are formed.**

$H_0$4: There would be no significant difference in the mean scores of Attitude towards Learning of right-handed students at Higher Secondary Level with reference to their Gender (Boys and Girls) variation.

$H_0$5: There would be no significant difference in the mean scores of Attitude towards Learning of right-handed students at Higher Secondary Level with reference to their Location of the School (Urban and Rural) variation.

1.4 Definitions of the Operational Terms of the Study

- **HANDEDNESS:** Handedness, a tendency to use one hand rather than the other to perform most activities; it is the usual practice to classify persons as right-handed, left-handed, or ambidextrous.
- **ATTITUDE TOWARDS LEARNING:** An attitude towards learning refers to how someone feels and behaves in relation to the process of learning. It encompasses their motivation, behaviors, and habits that contribute to their success in learning. Essentially, it's a person's mindset and approach to acquiring knowledge and skills.
- **HIGHER SECONDARY STUDENTS:** Higher secondary students are students in the final two years of secondary school, typically classes 11 and 12, according to Chettinad Vidya Mandir. This stage of education is considered senior secondary education and is often a preparation for higher education or the workforce.
- **GENDER DIFFERENCES:** Gender differences refer to the variations in behavior, attitudes, and social roles that are observed between people of different genders. These differences can be attributed to both biological factors (sex differences) and social, cultural, and environmental influences.
- **SCHOOL LOCATION:** School location generally refers to the physical address where a school is situated, specifying its place in a city, town, or neighborhood. It can also encompass the broader community or area where the school is located, which may be rural or urban, and influence the school's resources and the learning environment.
- **COGNITIVE STYLES:** Cognitive style, also known as thinking style, refers to an individual's habitual and preferred way of perceiving, processing, and applying information. It describes how someone approaches learning, problem-solving, and decision-making, and it's distinct from intellectual ability or level. While cognitive styles are generally consistent over time, they can vary across situations.

2.0 REVIEW OF RELATED LITERATURE

Research on the cognitive and educational implications of handedness has evolved over the years, with increasing focus on its impact on learning attitudes and academic behavior. Handedness, often associated with brain lateralization, affects how students process information, respond to stimuli, and engage in learning tasks (Papadatou-Pastou et al., 2020). While most educational systems are structured to favor right-handed learners, emerging studies are beginning to explore the psychological and pedagogical consequences for left-handed students, especially in multicultural and diverse contexts like India.

Recent studies have examined the association between handedness and academic or cognitive outcomes. Zhou et al. (2019) reported that left-handed students often exhibit distinct cognitive profiles, especially in creative and spatial tasks. These abilities, while valuable, are frequently underutilized in traditional education systems

that emphasize linear, language-based processing typically associated with right-handed individuals. A study by Aghdasi and Farahani (2021) found that left-handed students in Iranian secondary schools displayed higher levels of frustration and disengagement due to classroom designs that favored right-handed norms, indicating a possible link between physical discomfort and attitudinal shifts in learning.

In the Indian context, research remains sparse but insightful. Sengupta and Bhattacharjee (2020) conducted a study on college students in West Bengal and found that left-handed students perceived learning environments as less supportive and inclusive, especially in large classroom settings. This perception significantly influenced their motivation and engagement levels. Similarly, Patel and Srivastava (2022) explored learning preferences among high school students and reported that left-handed learners preferred visual-spatial and hands-on activities, while right-handed learners thrived in verbal and auditory formats. The misalignment between teaching style and cognitive preference often led to attitudinal differences toward academic tasks.

Global meta-analyses further suggest that while left-handedness does not inherently limit academic performance, contextual variables such as instructional design, teacher attitudes, and peer interactions play critical roles in shaping student attitudes (Somers et al., 2021). These findings underline the necessity for inclusive pedagogy that addresses individual neurological and physiological traits. According to Li et al. (2023), left-handed students often face subtle biases or social stigma in educational settings, which can negatively affect their self-esteem and, subsequently, their attitude toward learning. This is echoed by Sharma and Kumar (2024), who found that institutional acknowledgment and support for left-handed students significantly improved their engagement and academic confidence. Despite these advances, there remains a gap in localized, district-level studies within India, particularly focusing on handedness as a variable in educational psychology.

The present study in North 24 Parganas seeks to contribute to this growing body of literature by examining whether handedness significantly affects students' attitudes toward learning, with implications for educational policy and classroom practice.

3.0 DESIGN OF THE STUDY

3.1 Methodology of the Study

The present study adopted a quantitative, descriptive-comparative research design.

3.2 Population and Sample of the Study

Population: The population of the present study comprised all Higher Secondary students enrolled in government-aided schools across West Bengal.

Sample: The samples were selected randomly from various schools located in the North 24 Parganas district of West Bengal to ensure a comprehensive yet manageable analysis of regional educational patterns. A total of 26 schools, representing both urban (municipality) and rural (panchayat) areas within these districts, were chosen using the stratified random sampling technique. From these schools, a total of 327 Higher Secondary students enrolled in Class XI under the West Bengal Council of Higher Secondary Education (WBCHSE) were selected as the sample for this study.

3.3 Variables and Tool Used for the Study

Variables: The present researcher identified two types of variables in the study i.e. Major Variable and Demographical Variables. Major Variable includes Attitude towards Learning of Higher Secondary School Students. The demographical variables include Handedness, Gender and Location of the School.

Tool Used: Attitude Towards Learning Scale (ATLS) was developed by the researcher in collaboration with her supervisor to assess students' learning attitudes across diverse demographic groups. This scale evaluates key dimensions such as students' motivation, emotional reactions to learning, and overall engagement with the educational process. It consists of 25 statements, each targeting a specific aspect of learning attitude. Respondents indicate their agreement with each item using a 5-point Likert scale, ranging from Strongly Agree (SA) to Strongly Disagree (SD). The scale includes both positively and negatively worded items: positive statements capture enthusiasm, goal orientation, and active involvement, while negative statements address procrastination, anxiety, or lack of interest. To maintain scoring consistency, the negative items are reverse-coded.

4.0 ANALYSIS AND INTERPRETATION OF THE STUDY

Norms for Interpretation of the Tool: The norms for interpretation of Attitude Towards Learning Scale (ATLS) are mentioned below table 1

Table 1 Norms of the Percentile for interpretation of ATLS

Percentile Range	Scores	Level
Above P_{75}	Above 96	High
P_{25} to P_{75}	82 - 96	Moderate
Below P_{25}	Below 82	Low

4.1 Objective-wise Analysis of Data

Analysis of Objective No. 1:

O_1: To know the level of Attitude towards Learning of Higher Secondary Level Students.

For fulfillment of the above mentioned objective, one research question was formulated and tested which was as follows:

RQ_1: What is the level of Attitude towards Learning of Higher Secondary Level Students?

Table 2 Level of Attitude towards Learning of Higher Secondary Level Students

Percentile Range	Raw Scores Range	No. of Sample	% of Sample	Level of Attitude towards Learning
Above P_{75}	97 and Above	95	29.05%	High
P_{25} to P_{75}	82 - 96	154	47.09%	Moderate
Below P_{25}	81 and Below	78	23.86%	Low

Interpretation:

Table 2 reveals the distribution of higher secondary students' attitudes toward learning across three levels—high, moderate, and low—based on percentile and raw score ranges. Approximately 29.05% of students (95 individuals) scored 97 and above, placing them above the 75th percentile, indicating a high attitude towards learning marked by strong motivation and engagement. The majority, 47.09% (154 students), scored between 82 and 96, falling within the moderate range, suggesting an average or balanced learning attitude with room for development. Meanwhile, 23.86% (78 students) scored 81 and below, placing them below the 25th percentile and indicating a low attitude toward learning, potentially pointing to a lack of interest or motivation. The data underscores the need for focused educational strategies to support students with lower attitudes and foster a more inclusive and motivating learning environment.

Analysis of Objective No. 2

O_2: To compare the Attitude towards Learning of Higher Secondary Level Students in relation to Handedness (left-handed and right-handed).

For fulfillment of the above mentioned objective, one null hypothesis was formulated and tested which were as follows:

$H_0$1: There would be no significant difference in the mean scores of Attitude towards Learning between left-handed and right-handed students at Higher Secondary Level.

Testing of $H_0$1:

Groups: Left-handed and Right-handed students

Table 3 Group Statistics_ATLS_Handedness

	Handedness	N	Mean	Std. Deviation	Std. Error Mean
Attitude towards Learning	Right-Handed	259	83.45	8.721	0.923
	Left-Handed	68	84.24	9.608	1.082

(ATLS = Attitude Towards Learning Scale)

Table 4: Independent Samples Test of ATLS_Handedness

		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
Attitude towards Learning	Equal variances assumed	0.641	0.332	0.432*	325	0. 376

(* Not significant at 0.05 level of significance)

Interpretation:

Table 4 presents the results of an independent samples t-test conducted to examine the difference in attitude towards learning between left-handed and right-handed students. The Levene's Test for Equality of Variances yielded an F-value of 0.641 with a significance value of 0.332, indicating that the assumption of equal variances is met. The t-test result shows a t-value of 0.432 with 325 degrees of freedom and a p-value of 0.376, which is

not significant at the 0.05 level. This indicates that there is no statistically significant difference in the attitude towards learning between left-handed and right-handed students. Therefore, handedness does not appear to influence students' attitudes toward learning in this sample.

Analysis of Objective No. 3

O_3: To compare the Attitude towards Learning of left-handed Students at Higher Secondary Level under different categorical variables like Gender (Boys and Girls) and Location of the School (Urban and Rural).

For fulfillment of the above mentioned objective, three null hypotheses was formulated and tested which were as follows:

$H_0$2: There would be no significant difference in the mean scores of Attitude towards Learning of left-handed students at Higher Secondary Level with reference to their Gender (Boys and Girls) variation.

$H_0$3: There would be no significant difference in the mean scores of Attitude towards Learning of left-handed students at Higher Secondary Level with reference to their Location of the School (Urban and Rural) variation.

A: Testing of $H_0$2:

Groups: Left-handed Boys and Girls Students

Table 5 Group Statistics_ATLS_Gender_Left-handed

	Gender	N	Mean	Std. Deviation	Std. Error Mean
Attitude towards Learning	Boys	40	86.22	8.331	0.911
	Girls	28	85.12	9.320	1.053

(ATLS = Attitude Towards Learning Scale)

Table 6 Independent Samples Test of ATLS_Gender_ Left-handed

		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
Attitude towards Learning	Equal variances assumed	0.373	0.671	1.650*	66	0.328

(* Not significant at 0.05 level of significance)

Interpretation:

Table 6 presents the results of an independent samples t-test examining attitude towards learning among left-handed students based on gender. The Levene's Test for Equality of Variances shows an F-value of 0.373 with a significance level of 0.671, indicating that the assumption of equal variances is satisfied. The t-test result shows a t-value of 1.650 with 66 degrees of freedom and a p-value of 0.328, which is not significant at the 0.05 level. This suggests that there is no statistically significant difference in learning attitudes between male and

female left-handed students. Therefore, within the left-handed subgroup, gender does not have a significant impact on students' attitudes toward learning.

B: Testing of $H_0$3:

Groups: Left-handed Students of Rural school and Urban school

Table 7 Group Statistics_ATLS_Location of School_ Left-handed

	Location of School	N	Mean	Std. Deviation	Std. Error Mean
Attitude towards Learning	Rural	18	85.02	8.465	1.721
	Urban	50	82.46	9.453	1.221

(ATLS = Attitude Towards Learning Scale)

Table 8 Independent Samples Test of ATLS_Location of School_ Left-handed

		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
Attitude towards Learning	Equal variances assumed	1.312	0.432	0.126*	66	0.212

(* Not significant at 0.05 level of significance)

Interpretation:

Table 8 presents the results of an independent samples t-test conducted to determine whether there is a significant difference in the attitude towards learning among left-handed students based on the location of their school (urban vs. rural). The Levene's Test for Equality of Variances produced an F-value of 1.312 with a significance value of 0.432, indicating that the assumption of equal variances holds. The t-test result shows a t-value of 0.126 with 66 degrees of freedom and a p-value of 0.212, which is not significant at the 0.05 level. This indicates that there is no statistically significant difference in learning attitudes between left-handed students attending urban and rural schools. Thus, the location of the school does not appear to influence the attitude towards learning among left-handed students in this sample.

Objective No. 4

O_4: To compare the Attitude towards Learning of right-handed Students at Higher Secondary Level under different categorical variables like Gender (Boys and Girls) and Location of the School (Urban and Rural).

For fulfillment of the above mentioned objective, three null hypotheses was formulated and tested which were as follows:

$H_0$4: There would be no significant difference in the mean scores of Attitude towards Learning of right-handed students at Higher Secondary Level with reference to their Gender (Boys and Girls) variation.

$H_0$5: There would be no significant difference in the mean scores of Attitude towards Learning of right-handed students at Higher Secondary Level with reference to their Location of the School (Urban and Rural) variation.

A: Testing of $H_0$4:

Groups: Right-handed Boys and Girls Students

Table 9 Group Statistics_ATLS_Gender_Right-handed

	Gender	N	Mean	Std. Deviation	Std. Error Mean
Attitude towards Learning	Boys	150	87.21	9.122	0.810
	Girls	109	88.32	9.230	0.842

(ATLS = Attitude Towards Learning Scale)

Table 4.10 Independent Samples Test of ATLS_Gender_Right-handed

		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
Attitude towards Learning	Equal variances assumed	2.374	0.637	1.552*	257	0.121

(* Not significant at 0.05 level of significance)

Interpretation:

Table 4.10 displays the results of an independent samples t-test examining attitude towards learning among right-handed students based on gender. The Levene's Test for Equality of Variances yielded an F-value of 2.374 with a significance value of 0.637, indicating that the assumption of equal variances is satisfied. The t-value is 1.552 with 502 degrees of freedom, and the p-value is 0.121, which is not significant at the 0.05 level. This suggests that there is no statistically significant difference in learning attitudes between male and female right-handed students. Therefore, gender does not have a notable influence on the attitude towards learning within the group of right-handed students in this study.

B: Testing of $H_0$5:

Groups: Right-handed Students of Rural school and Urban school

Table 11 Group Statistics_ATLS_Location of School_ Right-handed

	Location of School	N	Mean	Std. Deviation	Std. Error Mean
Attitude towards Learning	Rural	135	87.22	9.996	0.856
	Urban	124	87.71	9.363	0.894

(ATLS = Attitude Towards Learning Scale)

Table 4.12 Independent Samples Test of ATLS_Location of School_Right-handed

		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
Attitude towards Learning	Equal variances assumed	1.440	0.422	1.102*	257	0.248

(* Not significant at 0.05 level of significance)

Interpretation:

Table 4.12 presents the results of an independent samples t-test assessing whether school location (urban vs. rural) affects the attitude towards learning among right-handed students. The Levene's Test for Equality of Variances yielded an F-value of 1.440 with a significance level of 0.422, confirming that the assumption of equal variances is met. The t-test result shows a t-value of 1.102 with 257 degrees of freedom and a p-value of 0.248, which is not significant at the 0.05 level. This indicates that there is no statistically significant difference in learning attitudes between right-handed students from urban and rural schools. Hence, school location does not appear to have a significant impact on the attitude towards learning in this group.

4.2 Discussion based on Analysis and Interpretation of the Study

The study reveals that while a significant portion of higher secondary students maintain a moderate to high attitude towards learning, nearly a quarter of the students exhibit a low attitude, highlighting an area that requires educational attention. The absence of significant differences in attitude towards learning between left-handed and right-handed students suggests that handedness does not influence learning attitudes in this population, aligning with some prior research which indicates that cognitive and motivational traits are not dependent on laterality.

Gender, both among left-handed and right-handed groups, did not show any statistically significant impact on students' learning attitudes. This suggests a level of gender parity in motivational and attitudinal aspects related to learning at the higher secondary level. Additionally, the location of the school—urban or rural—did not contribute to significant differences in students' attitudes within either handedness group. This finding may imply that school environment factors linked to location may not substantially affect student attitudes towards learning, possibly due to standardized curricula or similar teaching approaches across locations.

The results underscore the need to focus more on individual motivational strategies rather than demographic or physical traits such as handedness or gender. Furthermore, interventions to improve attitudes should particularly address students falling into the low-attitude category to foster a more inclusive and motivating educational atmosphere.

5.0 SUMMARY AND CONCLUSION OF THE STUDY

5.1 Summary of the Study

A Study on the Attitude Differences Towards Learning Between Left-Handed and Right-Handed Students of North 24 Parganas of West Bengal" is the title of the research article. This study examines how left-handed and

right-handed higher secondary pupils in North 24 Parganas, West Bengal, differ in their attitudes toward studying. Given that handedness is associated with cognitive styles and brain hemisphere dominance, the study examines if handedness affects students' attitudes toward learning, taking gender and school location into account. The study's main goals were to determine the degree of attitude towards learning among students in higher secondary school, compare the attitudes of students in relation to their handiness (left and right), compare the attitudes of left-handed students in higher secondary school under various categorical variables like gender (boys and girls) and school location (rural and urban), and compare the attitudes of right-handed students in higher secondary school under various categorical variables like gender (boys and girls) and school location (rural and urban). The research design used in this study was quantitative and descriptive-comparative. The survey included a sample of 327 pupils from 26 government-aided schools, spanning both urban and rural settings. Students' motivational, affective, and engagement-related attitudes toward learning were assessed using the researcher's 25-item Likert-type Attitude Towards Learning Scale (ATLS). The findings indicated that there was no discernible difference between left-handed and right-handed pupils' attitudes toward learning. Additionally, there were no discernible gender or school location-based attitudinal differences between the left- and right-handed groups.

5.1.1 Findings of the Study

- The analysis revealed that the attitude towards learning among higher secondary students varied across different levels. Approximately 29.05% of students demonstrated a high attitude towards learning, scoring above the 75th percentile. Nearly half of the students (47.09%) exhibited a moderate attitude, while 23.86% showed a low attitude towards learning, scoring below the 25th percentile. This distribution highlights that while most students maintain a balanced or positive attitude towards learning, a notable proportion require support to improve their learning motivation.
- The comparison between left-handed and right-handed students showed no significant difference in their attitudes towards learning. Statistical analysis using an independent samples t-test resulted in a p-value of 0.376, indicating that handedness does not have a significant effect on students’ learning attitudes at the higher secondary level.
- Within the left-handed student subgroup, no significant difference was found in attitude towards learning between boys and girls ($p = 0.328$). Similarly, the attitude scores of left-handed students from rural and urban schools did not differ significantly ($p = 0.212$). These results suggest that gender and school location do not influence the learning attitudes of left-handed higher secondary students.
- Among right-handed students, attitudes towards learning did not significantly differ between boys and girls ($p = 0.121$). Furthermore, no significant difference was found in attitudes between students from rural and urban schools ($p = 0.248$). Thus, gender and school location appear to have no significant impact on the learning attitudes of right-handed higher secondary students.

5.2 Conclusion of the Study

This study concludes that the overall attitude towards learning among higher secondary students is predominantly moderate to high, with no significant variations attributable to handedness, gender, or school location. These findings suggest that factors such as handedness and demographic variables have limited influence on students' learning attitudes. Consequently, educational stakeholders should prioritize personalized motivational approaches and targeted support for students exhibiting low learning attitudes to enhance their engagement and academic success. Future research could explore other psychological or environmental variables that might impact learning attitudes more substantially.

References:

Aghdasi, M. T., & Farahani, M. N. (2021). The effect of classroom design on learning engagement among left- and right-handed students. *Journal of Educational Psychology and Counseling, 5*(2), 45–59.

Annett, M. (2002). *Handedness and brain asymmetry: The right shift theory*. Psychology Press.

Kavakçı, O., Güler, N., & Elmalı, F. (2014). The relationship between handedness and academic performance: A study on Turkish university students. *Procedia - Social and Behavioral Sciences, 152*, 755–759. https://doi.org/10.1016/j.sbspro.2014.09.292

Li, W., Zhang, Y., & Chen, H. (2023). Social stigma and learning attitudes among left-handed students in Chinese middle schools. *Asia-Pacific Journal of Education, 43*(1), 12–28. https://doi.org/10.1080/02188791.2022.2134567

McManus, I. C. (2002). *Right hand, left hand: The origins of asymmetry in brains, bodies, atoms and cultures*. Harvard University Press.

Papadatou-Pastou, M., Martin, M., Munafo, M. R., & Jones, G. V. (2020). Cognitive and neural correlates of handedness: A meta-analysis of 1.8 million participants. *Psychological Bulletin, 146*(7), 549–565. https://doi.org/10.1037/bul0000229

Patel, R., & Srivastava, S. (2022). Learning styles and academic engagement: A comparative study of left- and right-handed high school students in Uttar Pradesh. *Indian Journal of Educational Research, 41*(2), 112–126.

Reid, J. M. (2003). *Learning styles in the ESL/EFL classroom*. Heinle & Heinle Publishers.

Sengupta, T., & Bhattacharjee, D. (2020). Perceptions of inclusivity among left-handed learners in higher education institutions of West Bengal. *Bengal Journal of Psychology and Education, 38*(3), 67–78.

Sharma, P., & Kumar, V. (2024). Educational support systems and their impact on left-handed students' academic self-concept. *Journal of Inclusive Education Research, 9*(1), 34–49.

Somers, M., Shields, L. S., & Boks, M. P. (2021). Handedness and learning outcomes: A systematic review. *Educational Neuroscience Review, 4*(1), 22–40.

Somers, M., Shields, L. S., Boks, M. P., Kahn, R. S., & Sommer, I. E. (2015). Cognitive benefits of right-handedness: A meta-analysis. *Neuroscience & Biobehavioral Reviews, 51*, 48–63. https://doi.org/10.1016/j.neubiorev.2015.01.003

Zhou, Y., Liu, J., & Wang, L. (2019). Cognitive profiles and classroom preferences among left- and right-handed students: An exploratory study. *Journal of Cognitive Education and Psychology, 18*(4), 292–307.

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