AN ANALYTICAL STUDY OF LEARNING & THINKING STYLE: MAJOR DETERMINANT OF STUDY HABITS AMONG SCHOOL STUDENTS

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ABSTRACT:

The present study was undertaken to study the effect of learning and thinking style, locality and gender on study habits of secondary school students. The variable, study habits was treated as dependent variable whereas learning and thinking style, locality and gender were treated as independent variables. A sample of 500 secondary school students was selected through multi-stage random sampling technique. Style of Learning and Thinking (SOLAT) tool developed by Venkataraman (2011) [20] and Study Habits Inventory developed by Palsane and Sharma (2006) [12] were used to measure learning and thinking style of students in terms of their hemisphericity functions of the brain. The obtained data were analyzed using Three Way ANOVA with 2×2×2 factorial design. Levene's Test of Homogeneity of Variance was also applied to test the assumption of homogeneity of variance for ANOVA. Main effect of learning and thinking style, locality and gender on study habits of secondary school students was found to be significant. Significant interaction effect of learning and thinking style and gender; locality & gender was reported on study habits of secondary school students. Further, no significant interaction effect of learning and thinking style & locality was found on study habits of secondary school students. Triple interaction effect of learning and thinking style, locality and gender on study habits of secondary school students was found to be significant. The findings of the present study suggested that school and parents should spend a lot of time and make efforts for helping students to develop better study habits because the task of learning is not only related to the teacher alone but it also requires many things on the part of the learners like his ability to schedule his time, the plan of the study, concentration, note taking, mass and part learning etc. It is fact that hemisphericity dominance for learning & thinking style find out by the teacher helps in developing healthy and effective study habits among students.

KEYWORDS: Gender, Learning & Thinking Style, Locality and Study Habits.

INTRODUCTION

In today's world of exponential growth of knowledge, the issue of quality education and students' learning has become a topic of debate. Students are no longer required to memorize piece meal

facts and isolated bits of information. Now, they are required to demonstrate high intellectual abilities to develop proper understanding of the subject matter and also to be able to apply this knowledge in real life situations. Since the last few decades, a new pedagogical approach, 'constructivism' has become well-established. According to this approach, students should be provided with an opportunity to construct their own knowledge and meaning, instead of cramming the factual information. One among chief requirements of constructivism is that the students should adopt desired, effective and efficient study habits, so that they may learn independently at their own pace and as per their requirements. Study habits are the essence of a dynamic personality. These are techniques which a student employs to go about his or her studies, which are consistent and have become stereotyped as a result of long application or practice (Onubugwu, 1990) [10]. Study habits of the students are affected by several factors i.e. ability, health, self-concept, family environment, school environment, cognitive style, learning and thinking style, motivation etc. Finally, it can be seen that learning & thinking style is an important factor that affects study habits of students.

For providing quality education, instructor must know the needs of the learners; every child comes with some innate qualities. These qualities differentiate him from the others. Every student uses different approaches for receiving and processing information which are often termed as styles, that is, style of learning and thinking. Individuals differ in hemisphericity function of their brain. Brain hemisphericity is the tendency of an individual to process information through the left hemisphere or the right hemisphere or in combination (Bradshaw & Nettleton, 1981; [3] and Springer & Deutsch, 1993) [17]. The differences in preference of the two hemispheres for information processing have been referred to as styles of learning and thinking (SOLAT) by Torrance. The styles of learning and thinking are as important as levels of ability and we ignore to identify and develop them in students at an early and appropriate stage. It is considered that styles depend upon cerebral dominance of an individual in retaining & processing different modes of information in his own style of learning and thinking. Style indicates the hemispheric function of the brain and students learning strategy and information processing are based on the preferences of the brain area. The human left cerebral hemisphere is to be specialized for primarily verbal, analytical, abstract, temporal and digital operations (Bogen, 1989) [1]. The same investigation revealed that the right cerebral hemisphere is to be specialized for primarily non-verbal holistic, concrete, creative, analogical and aesthetic functions. In academic institutions, learning and teaching processes are mismatched. Teaching & thinking styles of the teachers and learning & thinking styles of students differ because learning differences are not tied up to the understanding and thinking abilities of students. Due to the mismatch in styles among the students and teachers, so many students derail from their preferred areas of studies. The awareness of style of thinking is useful in perceiving the students as she/he is. Teachers should teach students how to think instead of teaching what to think.

Various studies have been conducted on learning & thinking style and other related variables. One

of the researches has showed that that students taught through methods that matched their hemispheric styles achieved statistically significant better test scores than when they were taught through other teaching methods (Brennan, 1984 [4] and Jarsonbeck, 1984) [8]. Boyle & Dunn (1998) [2] found that when students are taught through instructional methods that complement their hemispheric preference, then they are more capable of mastering new skills. Intellectual endowment also plays a vital role in students' study habits because students with low intellectual power cannot study effectively, but students endowed with high intellectual power, with little effort can study well (Emeka, 2000) [5]. Gupta and Kapoor (2012) [6] found that students with high scholastic achievement had better study habits as compared to the students with low scholastic achievement. Vengopal and Mridula (2013) [19] reported a significant difference in the right hemisphere and left (brain) hemisphere preference for information processing among students. Finding of the study conducted by Humera (2015) [7] revealed that majority of the students had right hemispheric dominant style of learning and thinking. Khan and Unnisa (2017) [9] found a significant difference in academic achievement of students learned by right & left hemisphere.

Hence, the review of related literature revealed that various studies have been conducted on learning and thinking style with respect to a number of variables. It was identified that many studies have been conducted in area of learning and thinking style separately at different levels. But the fact is that a very little amount of research has been carried out on study habits among school students in relation to their learning and thinking style simultaneously. It was found that in most of the researches the variable, study habits has been taken as an independent variable. Very few researches have been conducted on study habits by taking it as a dependent variable. Therefore, the lack of researches in the present area aggravated the researchers to take up the present topic and to study the effect of learning and thinking style, locality and gender on study habits of secondary school students.

VARIABLES INVOLVED

1. **Dependent Variable**
   ❖ Study Habits

2. **Independent Variables**
   ❖ Learning   & Thinking Style (Right & Left Hemisphericity)
   ❖ Locality (Urban & Rural)
   ❖ Gender (Male & Female)

OBJECTIVES OF THE STUDY

1) To study the effect of (a) learning & thinking style, (b) locality, and (c) gender on study habits of school students..

2) To find out the interaction effect of (a) learning & thinking style and locality; (b) learning & thinking style and gender; and (c) locality and gender on study habits of school students.

3)   To find out the interaction effect of learning & thinking style, locality and gender on study habits of school students.

HYPOTHESES OF THE STUDY

H_{01} There exists no significant effect of (a) learning & thinking style, (b) locality and (c) gender on study habits of school students.

H_{02} There exists no significant interaction effect of (a) learning & thinking style and locality; (b) learning & thinking style and gender; and (c) locality and gender on study habits of school students.

H_{03} There exists no significant interaction effect of learning & thinking style, locality and gender on study habits of school students.

METHODOLOGY

In the present study, descriptive survey method was used. The independent variables i.e. learning & thinking Style (Right Hemisphericity & Left Hemisphericity), locality (Urban & Rural), and gender (Male & Female) were divided into two categories which is shown below.
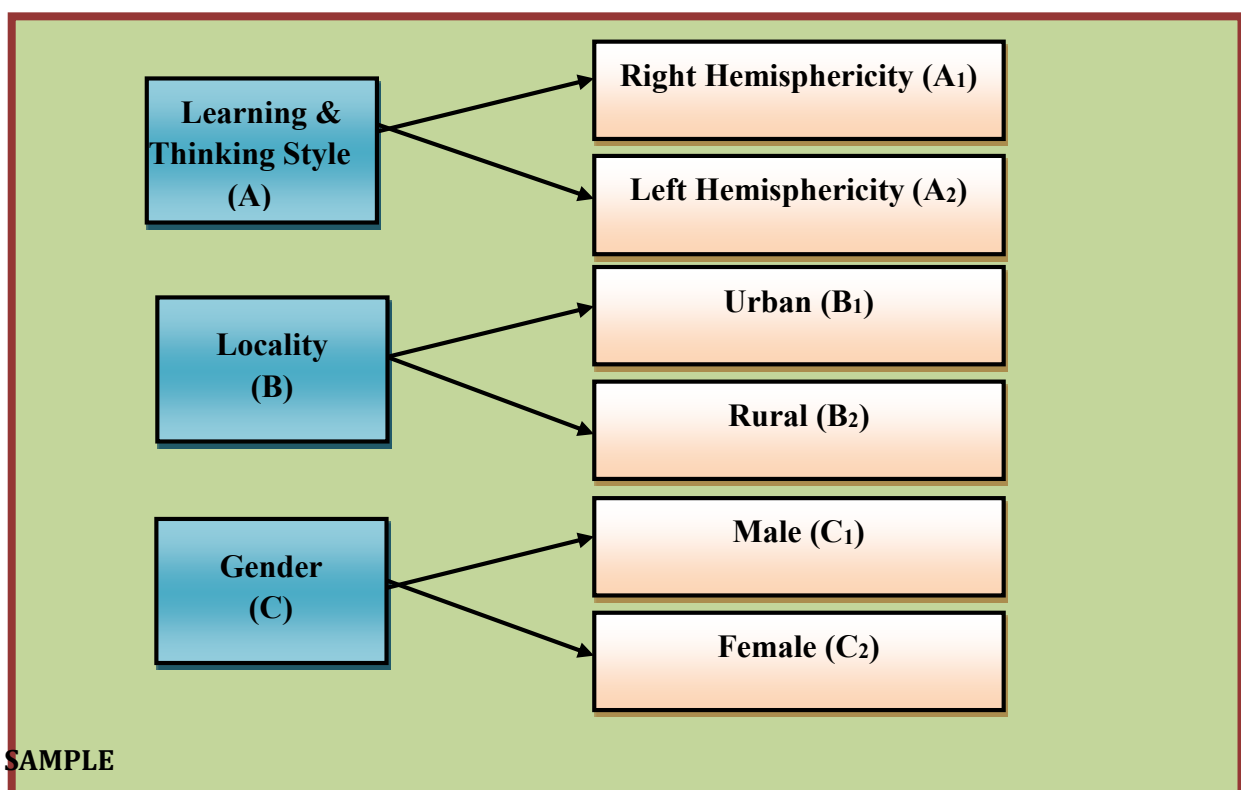
At the outset, a sample of 500 secondary school students was selected through multi-stage random sampling technique. The sample was further classified on the basis of their learning & thinking Style, locality and gender. As per the norms given in manual the hemisphericity dominance was determined on the basis of the highest score in three categories (Right, Left & Integrated

Hemisphericity) of dominance, as far as a group testing or score is concerned. In the present study, only those students were selected who had only right and left hemisphericity. The strength of right hemisphere preferred students was 256 and the strength of left hemisphere preferred students was 221. Therefore, a sample of 477 students was considered for computing the data as 23 students having integrated hemisphericity were not considered in the study. In this way as per the requirement of the 2×2×2 cells of the paradigm, distribution of cells for analysis of interaction effect of learning & thinking style, locality and gender on study habits of school students has also been illustrated in the Fig.1.
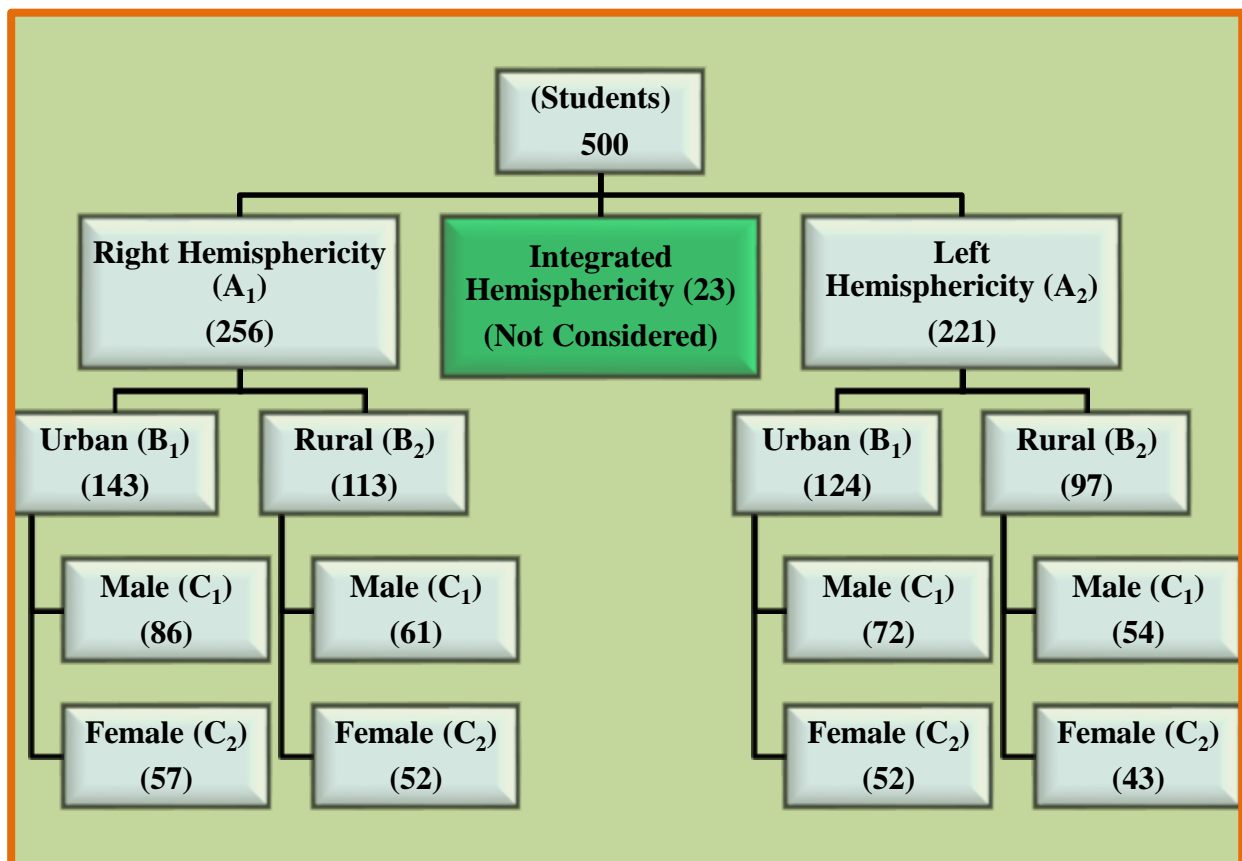

Fig. 1: Distribution of cells for Analysis of Interaction Effect of Learning & Thinking Style, Locality and Gender on Study Habits of School Students

TOOLS USED

❖ In the present study the Indian version of the SOLAT test developed by Venkataraman (2011) [20] was used to measure learning & thinking style of school students in terms of hemisphericity functions of their brain. In this tool, 1 to 25 items measure learning styles and 26 to 50 items measure thinking styles. Therefore, this tool containing 50 items was administered to school students to collect the data pertaining to their learning styles as well as their thinking styles. The reliability coefficient of correlations for the right hemisphere function, left hemisphere function and

integrated hemisphere function were found to be 0.89, 0.65 and 0.71 respectively. The validity coefficient of correlation was 0.842 for the right hemisphere part; 0.621 for the left hemisphere part and 0.678 for the integrated part. The correlation coefficients reveal that the SOLAT tool possesses reasonable level of concurrent validity.

❖ The Study Habits Inventory developed by Palsane and Sharma (2006) [12] was used to measure study habits of school students. This inventory contains 45 statements under major eight areas which pertain to the study habits of the students. There is no time limit. Eight areas of the inventory are: (a) Budgeting Time (b) Physical Conditions (c) Reading Ability (d) Note Taking (e) Learning Motivation (f) Memory (g) Taking Examination (h) Health. The reliability coefficients for the inventory were determined by two methods i.e. test-retest (0.88) and split-half method (0.56). The inventory, besides having high face validity, has sufficiently high validity with other similar inventories and allied measures by other authors.

STATISTICAL TECHNIQUES USED

The data were analyzed using descriptive as well as inferential statistics. The Three-Way Analysis of Variance (ANOVA) with 2×2×2 factorial design was computed using SPSS version 20 to study the main effects and interaction effects of learning & thinking style, locality and gender on study habits of secondary school students. Levene's Test of Homogeneity of Variance was used to test the assumption of homogeneity of variance before applying Three-Way ANOVA. Wherever F-value was found significant, then t-test was applied for further investigation.

DATA ANALYSIS AND DISCUSSION

The main objective of the present study was to find out the main and interaction effects of learning & thinking style, locality and gender on study habits of school students. The independent variables i.e. learning & thinking style, locality and gender were coded as A, B, C respectively and were varied into two ways as: Right Hemisphericity (A_1) & Left Hemisphericity   (A_2); Urban (B_1) & Rural (B_2); and Male (C_1) & Female (C_2). Means and SDs of different sub-samples have been presented in the Table-1 and Fig.2. The summary of ANOVA (2×2×2) has also been presented in Table-2, which is analyzed in terms of main effects and interaction effects.

Table - 1

Means and SDs of Sub Samples of 2×2×2 Design for Study Habits of School Students with respect to Learning & Thinking style   (A), Locality (B) and Gender (C)

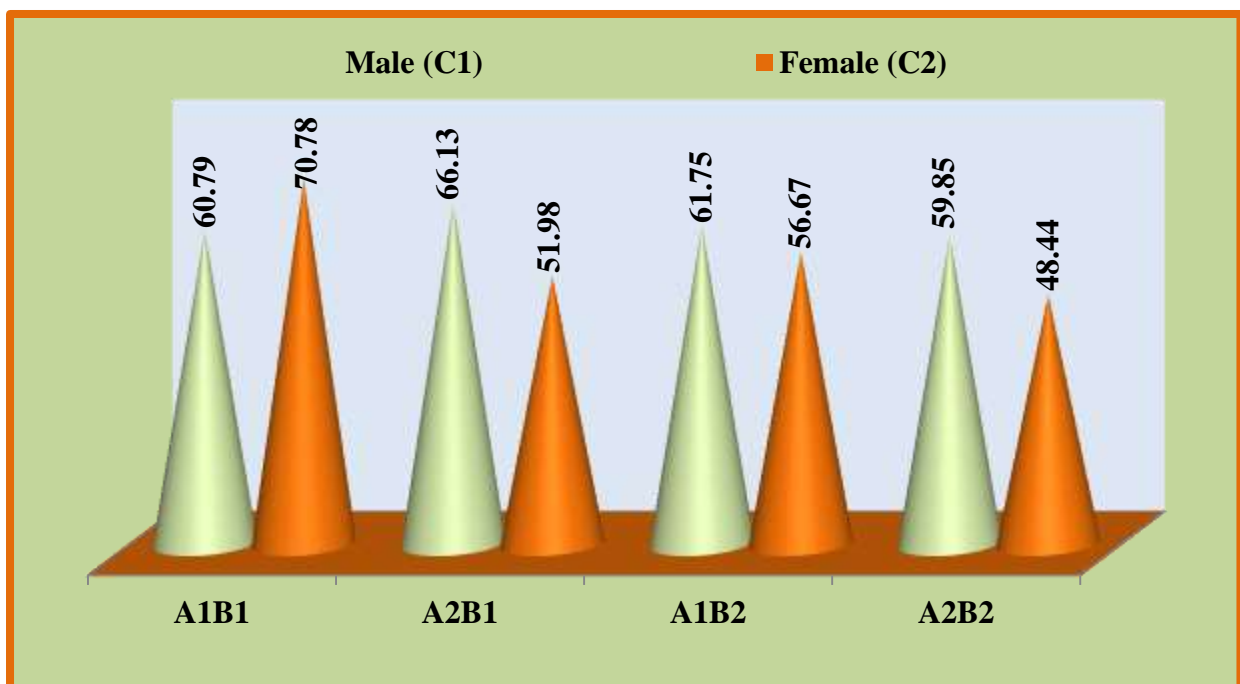| Learning & Thinking style	Locality	Male (C₁)	Female (C₂)
Right Hemisphericity (A₁) (256)	**Urban (B₁) (143)**	N= 86 Mean= 60.79 SD= 9.98	N= 57 Mean= 70.78 SD= 8.64
	Rural (B₂) (113)	N= 61 Mean= 61.75 SD= 9.37	N= 52 Mean= 56.67 SD= 11.26
Left Hemisphericity (A₂) (221)	**Urban (B₁) (124)**	N= 72 Mean= 66.13 SD= 10.16	N= 52 Mean=51.98 SD= 12.05
	Rural (B₂) (97)	N= 54 Mean= 59.85 SD= 8.64	N= 43 Mean= 48.44 SD= 9.22

Fig. 2:Mean Scores of Sub Samples of 2×2×2 Design for   Study Habits of School Students with respect to Learning & Thinking Style, Locality and Gender

Table - 2

Summary of Three Way ANOVA (2×2×2 Factorial Design) for Study Habits of School Students with respect to Learning & Thinking Style, Locality and Gender

Source of Variance	df	Sum of Squares (SS)	Mean Sum of Squares (MS)	F-ratios
Main Effects				
(Learning & Thinking Style) (A)	1	3985.08	3985.08	**40.02****
(Locality) (B)	1	3780.02	3780.02	**37.96****
(Gender) (C)	1	3052.74	3052.74	**30.66****
Double Interaction Effects				
Interaction (A×B)	1	79.24	79.24	**0.79(NS)**
Interaction (A×C)	1	6653.21	6653.21	**66.82****
Interaction (B×C)	1	1088.62	1088.62	**10.93****
Triple Interaction Effect				
Interaction (A×B×C)	1	2275.28	2275.28	**22.85****
Between Cells	7	65913.65	----------	----------
Within Cells	469	46697.47	99.56	----------
Total	476	----------	----------	----------

** Significant at 0.01 level

NS = Not Significant

❖ **Main Effects of Learning & Thinking Style, Locality and Gender on Study Habits of School Students**

Learning & Thinking Style (A)

It can be inferred from Table-2 that F-ratio 40.02 for main effect of learning & thinking style on study habits of school students is found significant at 0.01 level which indicates that students with right and left hemishericity differ significantly with respect to their study habits. Therefore, the null hypothesis H_{01} (a), 'There exists no significant effect of learning & thinking style on study habits of school students' is not retained. From the mean scores, it is inferred that students learned by right hemisphere have significantly good study habits (62.41) in comparison to students learned by left hemisphere (57.82). The present result is in agreement with the result of Varghese and Pandya (2016) [18] who also found that there was a significant effect of hemisphericity on study habits of students.

Locality (B)

It is cogent from the Table-2 that F-ratio 37.96 for main effect of locality on study habits of school students is found to be significant at 0.01 level leading to the inference that urban and rural students differ significantly with respect to their study habits. Therefore, the null hypothesis H_{01} (b), 'There exists no significant effect of locality on study habits of school students' is not retained. From the mean scores, it can be deduced that urban students possess significantly better study habits (62.65) than that of rural students (57.28). This result is in tune with the result of Pachaiyappan and Prabu (2014) [11] who observed the difference in study habits of urban and rural higher secondary school students. However, this finding is in contrast with the finding of Rajakumar and Soundararajan (2012) [15] who reported that there was no significant difference between rural and urban higher secondary school students with respect to their study habits.

Gender (C)

It is palpable from the Table-2 that the F-ratio 30.66 for the main effect of gender on study habits of school students is significant at 0.01 level which reveals that there is a significant difference between the study habits of male and female students. In this case the null-hypothesis H_{01} (c), 'There exists no significant effect of gender on study habits of school students' is not retained. In terms of mean score, it is found that male students have significantly good study habits (62.23) in comparison to female students (57.68). The present finding is supportive to the finding of Promila (2014) [13] who revealed that female students have better study habits than male students whereas finding of Raja and Reddy (2013) [14] revealed that boy students adopted better study habits than girl students. Result of the study conducted by Razia (2015) [16] also reported a significant difference in study habits of students in relation to gender.

❖ **Double Interaction Effects of Learning & Thinking Style, Locality and Gender on Study Habits of School Students**

Learning & Thinking Style (A) × Locality (B)

It is apparent from the Table-2 that the F-ratio 0.79 for the interaction between learning & thinking style and locality is found insignificant at 0.05 level leading to the inference that learning & thinking style and locality do not interact with each other in relation to study habits of school students. Therefore, the null hypothesis H_{02}(a), 'There exists no significant interaction effect of learning & thinking style and locality on study habits of school students' is retained. It is inferred that there is no significant interaction effect of learning & thinking style and locality on study habits of school students.

Learning & Thinking Style (A) × Gender (C)

A close perusal of Table-2 indicates that the F-ratio 66.82 for the interaction between learning & thinking style and gender which is found to be significant at 0.01 level leading to the inference that learning & thinking style and gender interact with each other in relation to study habits of

school students. Therefore, the null hypothesis H_{02}(b), 'There exists no significant interaction effect of learning & thinking style and gender on study habits of school students' is not retained. Then, it is concluded that the interaction effect of learning & thinking style and gender on study habits of school students is significant. It is further subjected to t-test computation to find out the significance difference between mean scores of study habits of different groups for learning & thinking style and gender. The results have been shown in the Table-3. The mean scores for study habits of different groups for learning & thinking style and gender have been also presented in the form of Fig. 3.

Table - 3

't'-values for Mean Scores of Study Habits of School Students for Different Groups of Learning & Thinking Style and Gender (A×C)

Groups	N		Mean		S.D.		't'-values
A_1C_1 vs A_2C_1	147	126	61.19	63.44	9.71	10.00	1.89(NS)
A_1C_2 vs A_2C_2	109	95	64.05	50.37	12.20	10.95	8.48**
A_1C_1 vs A_2C_2	147	95	61.19	50.37	9.71	10.95	7.89**
A_1C_2 vs A_2C_1	109	126	64.05	63.44	12.20	10.00	0.41(NS)
A_1C_1 vs A_1C_2	147	109	61.19	64.05	9.71	12.20	2.02*
A_2C_1 vs A_2C_2	126	95	63.44	50.37	10.00	10.95	9.16**

Significant at 0.01 level   ***Significant at 0.05 level

NS = Not Significant

A_1 = Right Hemisphericity

A_2 = Left Hemisphericity

C_1 = Male Students

C_2 = Female Students

Table-3 reveals that t-value (1.89) for male students with right hemisphericity (A_1C_1) and male students with left hemisphericity (A_2C_1) is found to be insignificant at 0.05 level that leads to the conclusion that students of these groups don't differ significantly with respect to their study habits. The t-value (8.48) for female students with right hemisphericity (A_1C_2) and left hemisphericity (A_2C_2) is found significant at 0.01 level. From the comparison of mean scores, it can be concluded that female students with right hemisphericity adopt significantly good study habits (64.05) as compared to female students with left hemisphericity (50.37). The same Table-3 explains that the t-value (7.89) for male students with right hemisphericity (A_1C_1) and female students with left hemisphericity (A_2C_2) is found to be significant at 0.01 level leading to the conclusion that students of these groups differ significantly in relation to their study habits. From the comparison of mean scores, it is inferred that male students with right hemisphericity have

significantly good study habits (61.19) as compared to female students with left hemisphericity (50.37). As it is shown in the Table-3 that t-values (0.41) for female students with right hemisphericity (A_1C_2) and male students with left hemisphericity (A_2C_1) is found to be insignificant at 0.05 level leading to the inference that students of these groups don't differ significantly with respect to their study habits. Table-3 discloses that the t-value (2.02) for male students with right hemisphericity (A_1C_1) and female students with right hemisphericity (A_1C_2) is found to be significant at 0.05 level which reveals that students of these groups differ significantly with respect to their study habits. An analysis of the mean scores makes it clear that male students with right hemisphericity have significantly poor study habits (61.19) as compared to female students with right hemisphericity (64.05). The same Table-3 further discloses that t-value (9.16) for male students with left hemisphericity (A_2C_1) and female students with left hemisphericity (A_2C_2) is found to be significant at 0.01 level. From the comparison of mean scores, it is inferred that male students with left hemisphericity adopt significantly good study habits (63.44) than female students with left hemisphericity (50.37).
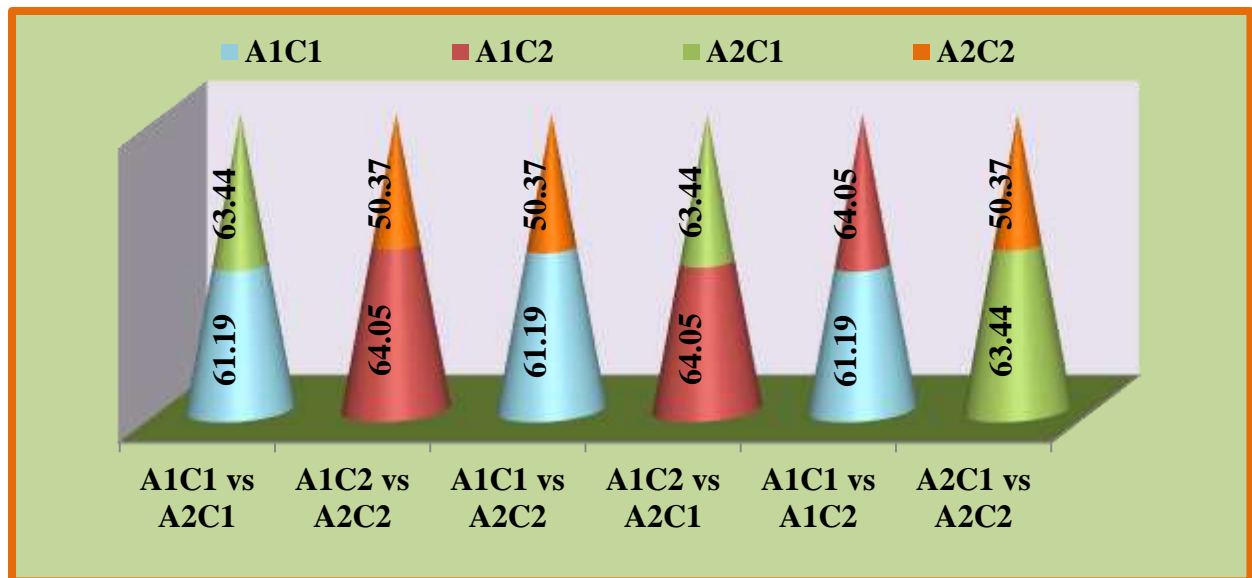

Fig. 3: Mean Scores for Interaction Effect of Learning & Thinking Style and Gender on Study Habits of School Students

The interaction effect of learning & thinking style and gender (A×C) on study habits of school students has been also presented in the form of line graph in Fig. 4. In this figure 4, 2×2 Design interaction effect is found significant. This can be shown graphically when C_1 and C_2 are marked on the X axis at any distance and on Y ordinate a scale is taken for the mean values. The mean $M_{11}=61.19$ and $M_{12}=64.05$ are marked for plotting line A_1. Similarly, A_2 line is drawn by marking $M_{21}= 63.44$ and $M_{22}=50.37$. This figure shows a highly significant interaction effect of learning & thinking style and gender (A×C) on study habits of school students as two lines (A_1 and A_2) intersect with each other.
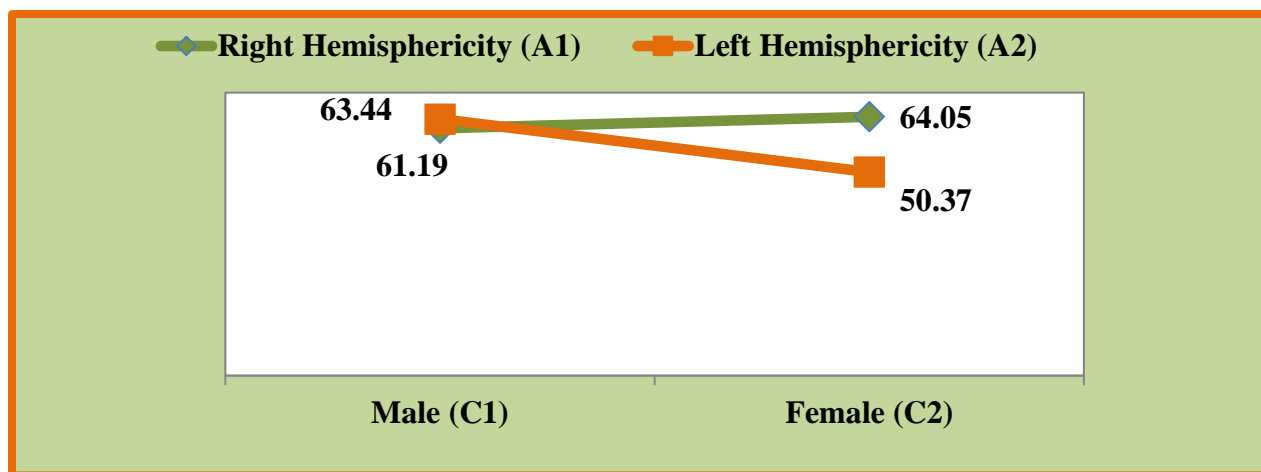
Fig. 4: Interaction Effect of Learning & Thinking Style and Gender (A×C) on Study Habits of School Students

Locality (B) × Gender (C)

It is shown in the Table-2 that F-ratio for the interaction between locality and gender is 10.93 which is found to be significant at 0.01 level which leads to the conclusion that locality and gender interact with each other in relation to study habits of school students. Therefore, the null hypothesis $H_{02}(c)$, 'There exists no significant interaction effect locality and gender on study habits of school students' is not retained. It is concluded that there is a significant interaction effect of locality and gender on study habits of school students. For further investigation, t-test was employed to find out the significant difference between mean scores of study habits of different groups for locality and gender. The results have been shown in the Table-4. The mean scores for study habits of different groups for locality and gender have been also presented in the form of Fig. 5.

Table - 4

't'-values for Mean Scores of Study Habits of School Students for Different Groups of Locality and Gender (B×C)

Groups	N		Mean		S.D.		't'-values
B_1C_1 vs B_2C_1	158	115	63.22	60.86	10.38	9.05	2.01*
B_1C_2 vs B_2C_2	109	95	61.81	52.94	14.01	11.13	5.03**
B_1C_1 vs B_2C_2	158	95	63.22	52.94	10.38	11.13	7.34**
B_1C_2 vs B_2C_1	109	115	61.81	60.86	14.01	9.05	0.60(NS)
B_1C_1 vs B_1C_2	158	109	63.22	61.81	10.38	14.01	0.89(NS)
B_2C_1 vs B_2C_2	115	95	60.86	52.94	9.05	11.13	5.61**

Significant at 0.01 level   ***Significant at 0.05 level

NS = Not Significant

B_1 = Urban Students

B_2 = Rural Students

C_1 = Male Students

C_2 = Female Students

As it is palpable from the Table-4 that t-value (2.01) for urban male students (B_1C_1) and rural male students (B_2C_1) is found significant at 0.05 level. From the mean scores it can be concluded that urban male students adopt significantly good study habits (63.22) as compared to rural male students (60.86). Table-4 exhibits that t-value (5.03) for urban female students (B_1C_2) and rural female students (B_2C_2) is found significant at 0.01 level leading to the inference that students of these groups differ significantly with respect to their study habits. On the comparison of mean scores, it may, therefore, be deduced that urban female students have significantly good study habits (61.81) as compared to rural female students (52.94). The same Table-4 further reveals that t-value (7.34) for urban male students (B_1C_1) and rural female students (B_2C_2) is found to be significant at 0.01 level. Further, it may be concluded from the mean scores that urban male students have significantly good study habits (63.22) as compared to rural female students (52.94). Table-4 depicts that the t-value (0.60) for urban female students (B_1C_2); and rural male students (B_2C_1) and another t-value (0.89) for urban male students (B_1C_1) and urban female students (B_1C_2) are found to be insignificant at 0.05 level leading to the conclusion that students of these groups don't differ significantly with respect to their study habits. The same Table-4 further illustrates that t-value (5.61) for rural male students (B_2C_1) and rural female students (B_2C_2) is found to be significant at 0.01 level that leads to the inference that students of these groups differ significantly with respect to their study habits. From the comparison of mean scores, it can be concluded that rural male students have significantly good study habits (60.86) than rural female students (52.94).
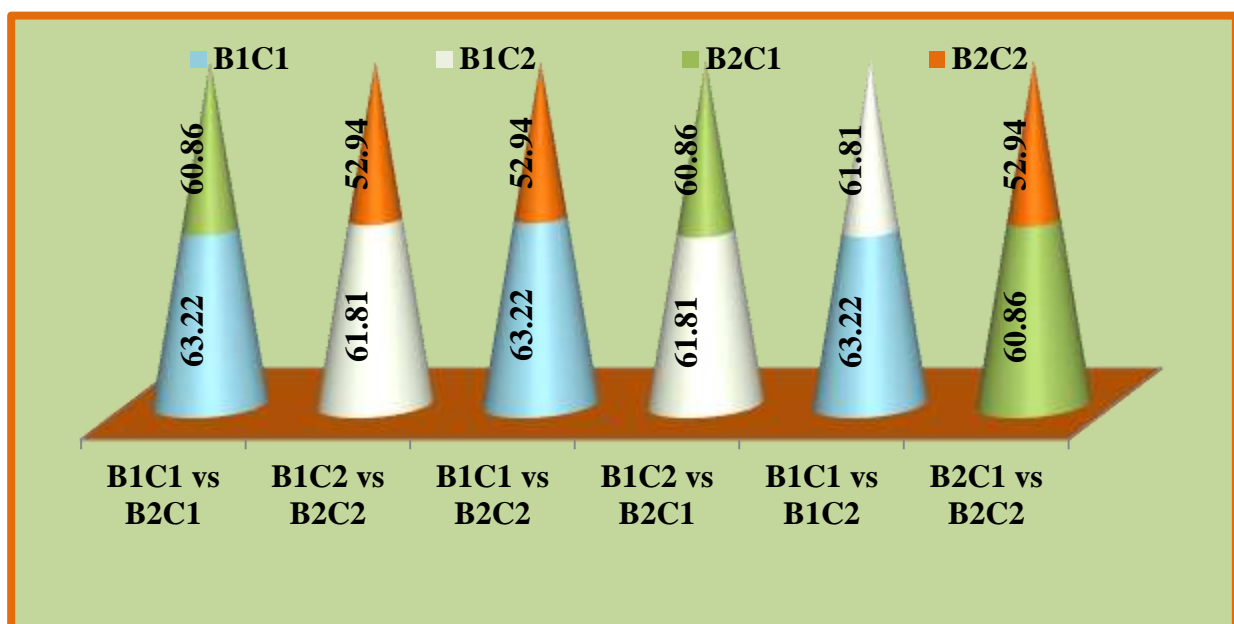

Fig. 5: Mean Scores for Interaction Effect of Locality and Gender on Study Habits of School

Students

The interaction effect of locality and gender (B×C) on study habits of school students has been also presented in the form of line graph in Fig. 6. In this figure 6, 2×2 Design interaction effect is found significant. It can be shown graphically when C_1 and C_2 are marked on the X axis at any distance and on Y ordinate a scale is taken for the mean values. The mean M_{11}=63.22 and M_{12}=61.81 are marked for plotting line B_1. Similarly, B_2 line is drawn by marking M_{21}= 60.86 and M_{22}=52.94. This figure shows a highly significant interaction effect of locality and gender (B×C) on study habits of school students as two lines (B_1 and B_2) intersect with each other.
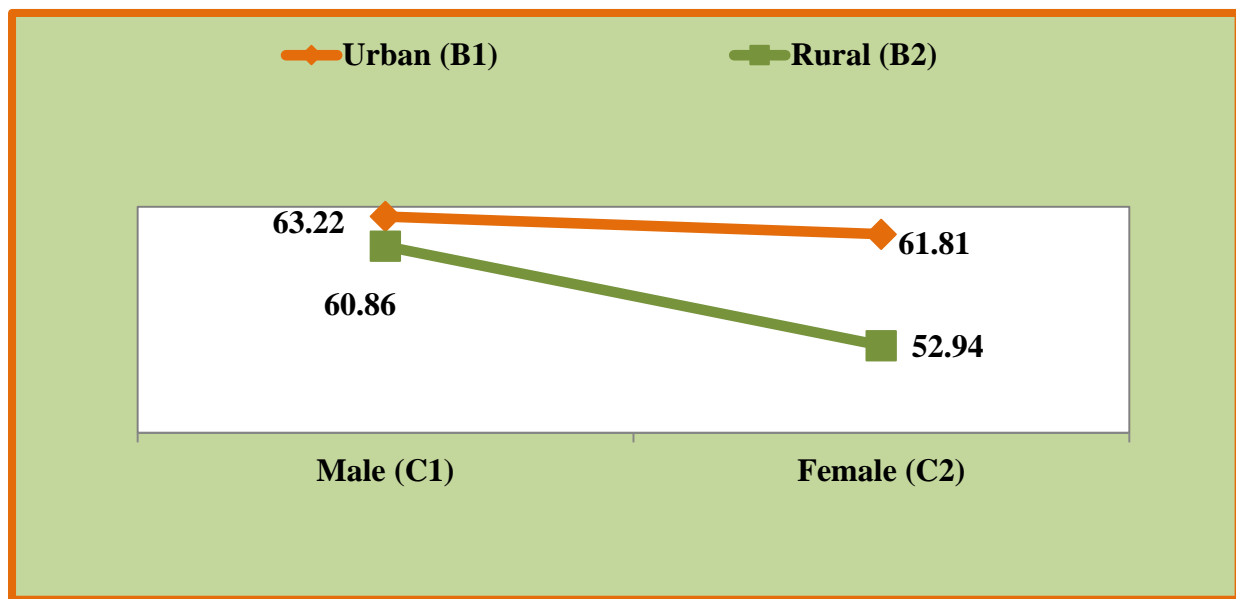

Fig. 6: Interaction Effect of Locality and Gender (B×C) on Study Habits of School Students

❖ **Triple Interaction Effect of Learning & Thinking Style, Locality and Gender on Study Habits of School Students**

Learning & Thinking Style × Locality × Gender (A×B×C)

An examination of the Table-2 indicates that the F- ratio 22.85 for the interaction between learning & thinking style, locality and gender with respect to study habits of school students is found significant at 0.01 level which leads to the inference that learning & thinking style, locality and gender interact with each other. Therefore, the null hypothesis H_{03}, 'There exists no significant interaction effect of learning & thinking style, locality and gender on study habits of school students' is not retained. It is inferred that there is significant interaction effect of learning & thinking style, locality and gender on study habits of school students. Further, it is subjected to t-test computation to find out the significant difference between mean scores of study habits of different groups for learning & thinking style, locality and gender. The results have been shown in the Table-5. The mean scores for study habits of different groups for learning & thinking style, locality and gender have been also presented in the form of Fig. 7.

Table - 5

't'-values for Mean Scores of Study Habits of School Students for Different Groups   of Learning & Thinking Style, Locality and Gender (A×B×C)

Sr. No.	Groups	N		Mean		S.D.		't'-values
1	$A_1B_1C_1$ vs $A_2B_2C_2$	86	43	60.79	48.44	9.98	9.22	7.01**
2	$A_1B_1C_2$ vs $A_2B_2C_1$	57	54	70.78	59.85	8.64	8.64	6.70**
3	$A_1B_2C_2$ vs $A_2B_1C_1$	52	72	56.67	66.13	11.26	10.16	4.82**
4	$A_1B_2C_1$ vs $A_2B_1C_2$	61	52	61.75	51.98	9.37	12.05	4.76**
5	$A_1B_1C_1$ vs $A_1B_1C_2$	86	57	60.79	70.78	9.98	8.64	6.40**
6	$A_1B_1C_1$ vs $A_1B_2C_1$	86	61	60.79	61.75	9.98	9.37	0.6(NS)
7	$A_1B_1C_1$ vs $A_1B_2C_2$	86	52	60.79	56.67	9.98	11.26	2.17*
8	$A_1B_1C_2$ vs $A_1B_2C_1$	57	61	70.78	61.75	8.64	9.37	5.47**
9	$A_1B_1C_2$ vs $A_1B_2C_2$	57	52	70.78	56.67	8.64	11.26	7.31**
10	$A_2B_2C_2$ vs $A_2B_2C_1$	43	54	48.44	59.85	9.22	8.64	6.23**
11	$A_2B_2C_2$ vs $A_2B_1C_2$	43	52	48.44	51.98	9.22	12.05	1.62(NS)
12	$A_2B_2C_2$ vs $A_2B_1C_1$	43	72	48.44	66.13	9.22	10.16	9.61**
13	$A_2B_2C_1$ vs $A_2B_1C_2$	54	52	59.85	51.98	8.64	12.05	3.85**
14	$A_2B_2C_1$ vs $A_2B_1C_1$	54	72	59.85	66.13	8.64	10.16	3.76**
15	$A_1B_1C_1$ vs $A_2B_1C_1$	86	72	60.79	66.13	9.98	10.16	3.33**
16	$A_1B_1C_1$ vs $A_1B_1C_2$	86	52	60.79	51.98	9.98	12.05	4.44**
17	$A_1B_1C_1$ vs $A_2B_2C_1$	86	54	60.79	59.85	9.98	8.64	0.59(NS)
18	$A_1B_1C_2$ vs $A_2B_1C_1$	57	72	70.78	66.13	8.64	10.16	2.81**
19	$A_1B_1C_2$ vs $A_2B_1C_2$	57	52	70.78	51.98	8.64	12.05	9.30**
20	$A_1B_1C_2$ vs $A_2B_2C_2$	57	43	70.78	48.44	8.64	9.22	12.41**
21	$A_1B_2C_1$ vs $A_1B_2C_2$	61	52	61.75	56.67	9.37	11.26	2.59*
22	$A_1B_2C_1$ vs $A_2B_1C_1$	61	72	61.75	66.13	9.37	10.16	2.59*
23	$A_1B_2C_1$ vs $A_2B_2C_1$	61	54	61.75	59.85	9.37	8.64	1.13(NS)
24	$A_1B_2C_1$ vs $A_2B_2C_2$	61	43	61.75	48.44	9.37	9.22	7.23**
25	$A_1B_2C_2$ vs $A_2B_1C_2$	52	52	56.67	51.98	11.26	12.05	2.05*
26	$A_1B_2C_2$ vs $A_2B_2C_1$	52	54	56.67	59.85	11.26	8.64	1.63(NS)
27	$A_1B_2C_2$ vs $A_2B_2C_2$	52	43	56.67	48.44	11.26	9.22	3.93**
28	$A_2B_1C_1$ vs $A_2B_1C_2$	72	52	66.13	51.98	10.16	12.05	6.90**

** Significant at 0.01 level   *** Significant at 0.05 level**

NS= Not Significant

A_1 = Right Hemisphericity

A_2 = Left Hemisphericity

B_1 = Urban Students

B_2 = Rural Students

C_1 = Male Students
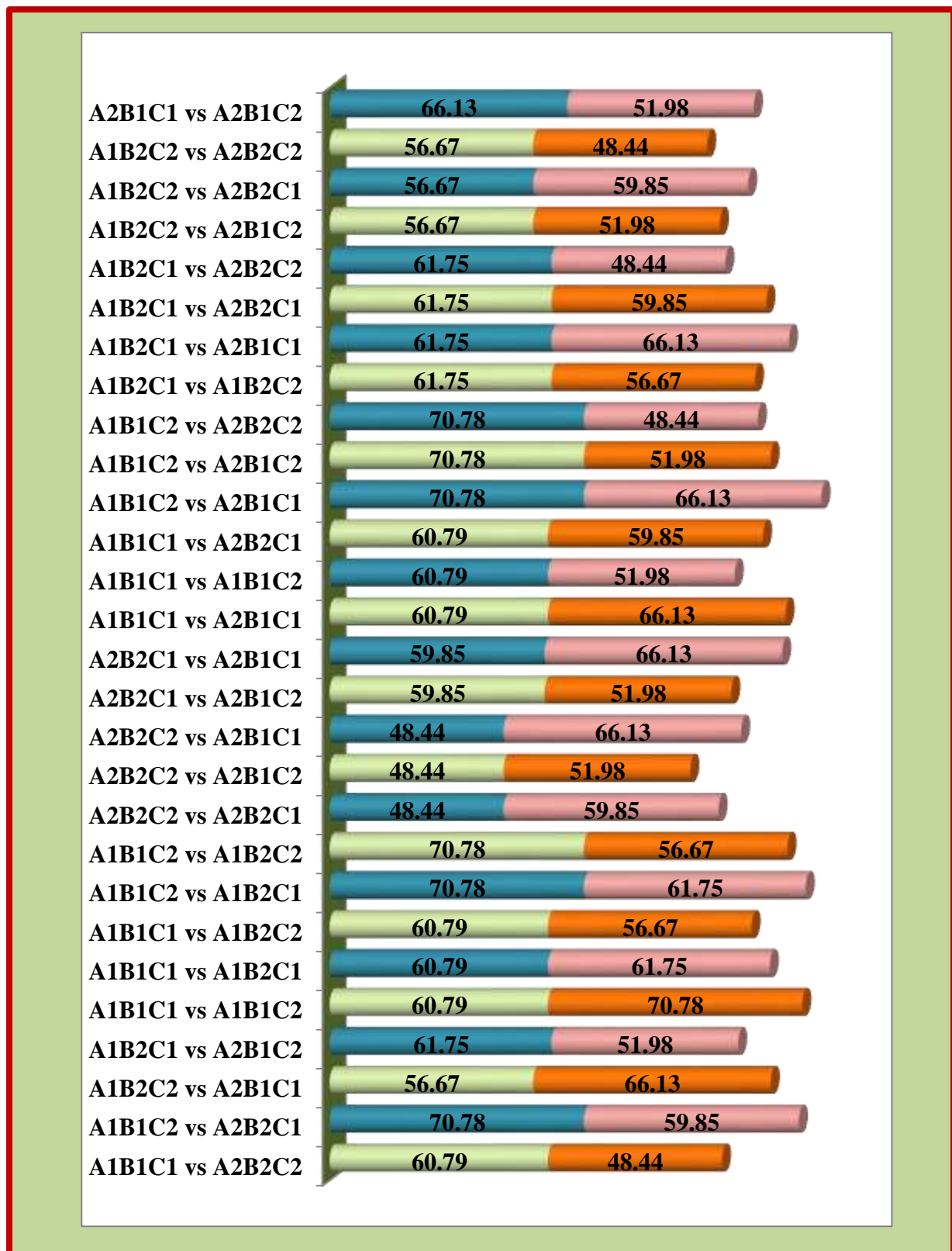
C_2 = Female Students

469

Fig.7:   Mean Scores for Interaction Effect of Learning & Thinking Style, Locality and Gender (A×B×C) on Study Habits of School Students

An inspection of the Table-5 shows that t-value (7.01) for urban male students with right hemisphericity ($A_1B_1C_1$) and rural female students with left hemisphericity ($A_2B_2C_2$) is found to be

significant at 0.01 level that leads to the inference that students of these groups differ significantly with respect to their study habits. From the comparison of mean scores, it can be concluded that urban male students with right hemisphericity have significantly better study habits (60.79) than rural female students with left hemisphericity (48.44). It is depicted in the Table-5 that the t-value (6.70) for urban female students with right hemisphericity ($A_1B_1C_2$) and rural male students with left hemisphericity ($A_2B_2C_1$) is found to be significant at 0.01 level. In the context of mean scores, it can be deduced that urban female students with right hemisphericity adopt significantly better study habits (70.78) as compared to rural male students with left hemisphericity (59.85). An examination of the Table-5 illustrates that the t-value (4.82) for rural female students with right hemisphericity ($A_1B_2C_2$) and urban male students with left hemisphericity ($A_2B_1C_1$) is significant at 0.01 level. It can be inferred from the mean scores that rural female students with right hemisphericity have significantly poor study habits (56.67) than urban male students with left hemisphericity (66.13). Table-5 further reveals that t-value (4.76) for rural male students with right hemisphericity ($A_1B_2C_1$) and urban female students with left hemisphericity ($A_2B_1C_2$) is found to be significant at 0.01 level leads to the inference that students of these groups differ significantly in relation to their study habits. From mean scores, it can be inferred that rural male students with right hemisphericity have significantly good study habits (61.75) than urban female students with left hemisphericity (51.98).

A glimpse at the Table-5 further indicates that t-value (6.40) for urban male students with right hemisphericity ($A_1B_1C_1$) and urban female students with right hemisphericity ($A_1B_1C_2$) is significant at 0.01 level. From mean scores, it may, therefore, be inferred that urban male students with right hemisphericity have significantly poor study habits (60.79) than rural female students with right hemisphericity (70.78). An inspection of the Table-5 indicates that t-value (2.17) for urban male students with right hemisphericity ($A_1B_1C_1$) and rural female students with right hemisphericity ($A_1B_2C_2$) is significant at 0.05 level. From the comparison of mean scores, it can be concluded that urban male students with right hemisphericity have significantly good study habits (60.79) than rural female students with right hemisphericity (56.67). Table-5 further indicates that t-value (5.47) for urban female students with right hemisphericity ($A_1B_1C_2$) and rural male students with right hemisphericity ($A_1B_2C_1$) is found to be significant at 0.01 level. It may, therefore, be deduced from mean scores that urban female students with right hemisphericity have significantly good study habits (70.78) than rural male students with right hemisphericity (61.75). The t-value (7.31) vide Table-5 for urban female students with right hemisphericity ($A_1B_1C_2$) and rural female students with right hemisphericity ($A_1B_2C_2$) is significant at 0.01 level. From the mean scores, it may, therefore, be concluded that urban female students with right hemisphericity have significantly good study habits (70.78) than rural female students with right hemisphericity (56.67).

An examination of the Table-5 it is further depicted that the t-value (6.23) for rural female students with left hemisphericity ($A_2B_2C_2$) and rural male students with left hemisphericity ($A_2B_2C_1$) is

significant at 0.01 level. From the mean scores, it can be concluded that rural female students with left hemisphericity have significantly poor study habits (48.44) than rural male students with left hemisphericity (59.85). An inspection of the Table-5 depicts that the t-value (9.61) for rural female students with left hemisphericity ($A_2B_2C_2$) and urban male students with left hemisphericity ($A_2B_1C_1$) is found to be significant at 0.01 level. From the mean scores, it can be deduced that rural female students with left hemisphericity possess significantly poor study habits (48.44) as compared to urban male students with left hemisphericity (66.13). It is depicted in the Table-5 that the t-value (3.85) for rural male students with left hemisphericity ($A_2B_2C_1$) and urban female students with left hemisphericity ($A_2B_1C_2$) is significant at 0.01 level. In the context of mean scores, it can be concluded that rural male students with left hemisphericity have significantly good study habits (59.85) than urban female students with left hemisphericity (51.98). An examination of the Table-5 indicates that t-value (3.76) for rural male students with left hemisphericity ($A_2B_2C_1$) and urban male students with left hemisphericity ($A_2B_1C_1$) is found to be significant at 0.01 level. From the comparison of mean scores, it can, therefore, be concluded that rural male students with left hemisphericity have significantly poor study habits (59.85) as compared to urban male students with left hemisphericity (66.13).

It is also evident from the Table-5 that t-value (3.33) for urban male students with right hemisphericity ($A_1B_1C_1$) and urban male students with left hemisphericity ($A_2B_1C_1$) is found to be significant at 0.01 level leading to the inference that students of these groups differ significantly in relation to their study habits. From the mean scores, it can be concluded that urban male students with right hemisphericity have significantly poor study habits (60.79) as compared to urban male students with left hemisphericity (66.13). The t-value (4.44) vide Table-5 for urban male students with right hemisphericity ($A_1B_1C_1$) and urban female students with left hemisphericity ($A_2B_1C_2$) is significant at 0.01 level. It may, therefore, be concluded from the mean scores that urban male students with right hemisphericity possess significantly good study habits (60.79) than urban female students with left hemisphericity (51.98). It is depicted in the Table-5 that the t-value (2.81) for urban female students with right hemisphericity ($A_1B_1C_2$) and urban male students with left hemisphericity ($A_2B_1C_1$) is found to be significant at 0.01 level. In the context of mean scores, it can be deduced that urban female students with right hemisphericity have significantly good study habits (70.78) than urban male students with left hemisphericity (66.13).

It is also evident from the Table-5 that t-value (9.30) for rural female students with right hemisphericity ($A_1B_1C_2$) and urban female students with left hemisphericity ($A_2B_1C_2$) is found to be significant at 0.01 level. From the comparison of mean scores, it can be concluded that rural female students with right hemisphericity have significantly good study habits (70.78) as compared to urban female students with left hemisphericity (51.98). Table-5 further indicates that t-value (12.41) for urban female students with right hemisphericity ($A_1B_1C_2$) and rural female students with left hemisphericity ($A_2B_2C_2$) is found to be significant at 0.01 level. It may, therefore,

be deduced from mean scores that urban female students with right hemisphericity adopt significantly better study habits (70.78) as compared to rural female students with left hemisphericity (48.44). The t-value (2.59) vide Table-5 for rural male students with right hemisphericity ($A_1B_2C_1$) and rural female students with right hemisphericity ($A_1B_2C_2$) is significant at 0.05 level. From the mean scores, it may, therefore, be concluded that rural male students with right hemisphericity have significantly good study habits (61.75) than rural female students with right hemisphericity (56.67).

An examination of the Table-5 further depicts that t-value (2.59) for rural male students with right hemisphericity ($A_1B_2C_1$) and urban male students with left hemisphericity ($A_2B_1C_1$) is significant at 0.05 level. From the mean scores, it can be concluded that rural male students with right hemisphericity have significantly poor study habits (61.75) than urban male students with left hemisphericity (66.13). It is depicted in the Table-5 that t-value (7.23) for rural male students with right hemisphericity ($A_1B_2C_1$) and rural female students with left hemisphericity ($A_2B_2C_2$) is significant at 0.01 level. In the context of mean scores, it can be concluded that rural male students with right hemisphericity adopt significantly better study habits (61.75) as compared to rural female students with left hemisphericity (48.44). An examination of the Table-5 indicates that t-value (2.05) for rural female students with right hemisphericity ($A_1B_2C_2$) and urban female students with left hemisphericity ($A_2B_1C_2$) is found to be significant at 0.05 level. In the context of mean scores, it can, therefore, be concluded that rural female students with right hemisphericity have significantly good study habits (56.67) as compared to urban female students with left hemisphericity (51.98).

It is also palpable from the Table-5 that t-values (3.93) for rural female students with right hemisphericity ($A_1B_2C_2$) and rural female students with left hemisphericity ($A_2B_2C_2$) is found to be significant at 0.01 level leading to the inference that students of these groups differ significantly with respect to their study habits. From the mean scores, it can be concluded that rural female students with right hemisphericity have significantly good study habits (56.67) as compared to rural female students with left hemisphericity (48.44). It is depicted in the same Table-5 that t-value (6.90) for urban male students with left hemisphericity ($A_2B_1C_1$) and urban female students with left hemisphericity ($A_2B_1C_2$) is found to be significant at 0.01 level. In the context of mean scores, it can be deduced that urban male students with left hemisphericity have significantly good study habits (66.13) as compared to urban female students with left hemisphericity (51.98). Table-5 further indicates that t-values 0.6, 1.62, 0.59, 1.13 and 1.63 for the groups $A_1B_1C_1$ vs $A_1B_2C_1$, $A_2B_2C_2$ vs $A_2B_1C_2$, $A_1B_1C_1$ vs $A_2B_2C_1$, $A_1B_2C_1$ vs $A_2B_2C_1$ and $A_1B_2C_2$ vs $A_2B_2C_1$ respectively have not been found significant at 0.05 level leading to the inference that students of these groups do not differ significantly with each other in relation to their study habits.

CONCLUSION

In the present study it was found that right hemisphere preferred students had better study habits in comparison to left hemisphere preferred students. The fact is that right hemisphere preferred

students put study information into categories for better understanding. They use their abilities to know whether something is right or wrong. In the classroom, they don't mess by thinking of all possibilities in answering questions. Thus, to solve this problem teacher should screened students for level of study habits in the beginning according to their hemisphere dominance. If they are low in the domain, teachers in concurrence with the guidance counselors can work with such students to promote and enhance their study habits. Teachers should plan their teaching accordingly by adopting effective teaching methods, proper teaching strategies and by guiding students in view of their study habits. Left brained students should organize their study notes properly and study alone because they get frustrated with others.   They should not too argue with class teacher and avoid free thinking teachers if they confuse them.

REFERENCES

[1]   **Bogen, J.E. (1989).** The other side of the brain-II, An appositional mind. *Bulletin of the Los Angeles Neurological Society, 49,* 135-162.

[2]   **Boyle, R.A. and Dunn, R. (1998).** Teaching law students through individual learning styles. *Albany Law Review, 62*, 213-255.

[3]   **Bradshaw, J. and Nettleton, N. (1981).** The nature of hemispheric specialization in man. *The Behavioral and Brain Sciences, 4*, 51-91.

[4]   **Brennan, P. (1984).**   An analysis of the relationships among hemispheric preference and analytic global cognitive style, two elements of learning style, method of instruction, gender and mathematics achievement of tenth grade geometry students. (Doctoral dissertation, St. John's University, 1984). *Dissertation Abstracts International, 45*(11).

[5]   **Emeka, J.** (**2000).** Family environment and academic achievement of some secondary school student. Calabar: Umeh Publishing.

[6]   **Gupta, M. and Kapoor, M. (2012).** The impact of learning styles and study habits of high school students on their scholastic achievement in English. 1-14.

[7]   **Humera, S. (2015**). A study of hemispheric dominance and Mathematics achievement of Xth   standard students of Aurangabad city. *Scholarly Research Journal for Interdisciplinary Studies, 2*(16), 2757-2763.

[8]   **Jarsonbeck, S. (1984).** The effects of a right-brain and a mathematics curriculum on low achieving fourth grade students. Doctoral dissertation. University of South Florida. *Dissertation Abstracts International, 45*, 2791A.

[9]   **Khan, S.A. and Unnisa, K.F. (2017**). The effect of learning style, home environment and school environment on academic achievement of ninth standard students of English medium schools of Raipur city - A study. *European Journal of Education Studies, 3*(2), 372-384.

[10]   **Onubugwu, R.A. (1990).** *Study habits techniques among secondary school students in*

Anicimbra State. (Unpublished M.Ed. dissertation), UNN.

[11] **Pachaiyappan, P. and Prabu. T. (2014).** Study habits of higher secondary Biology students - An analysis. *Indian Journal of Applied Research, 4*(6), 15-17.

[12] **Palsane, M.N. and Sharma, A. (2006).** *Study Habits Inventory.* National Psychological Corporation 4/230, Kacheri Ghat, Agra.

[13] **Promila (2014).** Study habits of senior secondary school students in relation to gender and academic stream. *Global International Research Thoughts, 1,* 1-6.

[14] **Raja, N. and Reddy, V. (2013).** Effect of TV viewing on study habits among high school going children. *Indian Journal of Applied Research, 3*(12), 513-515.

[15] **Rajakumar, M. and Soundararaja, M. (2012).** A study on higher secondary students' study habits in Tirunelveli district. *Indian J. Innovations Dev, 1*(4), 203-207.

[16] **Razia, B. (2015).** Study habits of secondary school students in relation to their socio-economic status and gender. *International Journal of Social Sciences and Management, 2*(1), 68-73.

[17] **Springer, S.P. and Deutsch, G. (1993).** Left brain – right brain. San Francisco: WH Free Man and Co. New York.

[18] **Varghese, M.G. and Pandya, S. (2016).** Interactive effect of hemisphericity and brain-based learning on students' study habits. *International Journal of Advancement in Education and Social Sciences, 4*(1), 1-8.

[19] **Vengopal, K. and Mridula, K. (2013).** Styles of learning and thinking. *Journal of the Indian Academy of Applied Psychology, 33*(1), 111-118.

[20] **Venkataraman, D. (2011).** *Style of Learning and Thinking (SOLAT).* Psy-Com Services, New Delhi.