

Learning Style and Academic Success of Secondary Students: A Critical Study

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Abstract: Learning style refers to the preferential way in which the student absorbs processes, comprehends and retains information. Learning Styles influence how students learn, how teachers teach, and how the two interact. Each person is born with certain tendencies toward particular styles, but these biological or inherited characteristics are influenced by culture, personal experiences, maturity level, and development. Style can be considered a 'contextual' variable or construct because what the learner brings to the learning experience is as much a part of the context as are the important features of the experience itself.

The study aims at investigating the effect of gender, habitat and their interaction in different dimensions of learning style namely- independent, dedicated, collaborative, competitive and participative to evaluate the learning styles of the students of class ix. Style was explained to comprise a combination of environmental, emotional, sociological, physical and psychological elements that permit individuals to interaction, receive and use knowledge or abilities. The learning process profile could be used as a blue print for learning. So, the researchers have constructed and standardized a tool on Learning Style Scales following Grasha and Reichmann in their Learning Style Scales in 1974 for this study on 700 students of class ix. The study has identified that boys student are significantly different from the girl students in respect to their learning styles, but there is no significant difference among urban and rural students and there is no any significance of correlation between sex and habitat in their learning systems.

Key Words: aspiration, academic performance, blue print for learning, learning environments, learning styles,

Introduction: Academic success in life depends upon so many factors: cognitive, affective and psychomotor abilities. Dunn, R. (1992) said that "Everyone has a learning style, but each person's is different - like our fingerprints which come from each person's five fingers and look similar in many ways". So, there are varieties and problems in learning style. All the students are not independent to apply their learning styles at the time of their study. The dedication for learning, collaborativeness, competitive attitude and participative eagerness of the students has been dividing according to gender and habitat. In school life the success is very often related to intelligence, aptitude, attitude, persistent efforts and skills. Over the years, so many researchers have reported that students who have positive attitude and positive styles towards teaching can have a significant impact on students' achievement (Berman & McLaughlin, 1977; Ashton, Webb, & Doda, 1983). The primary hypotheses of this study is to find out the mean scores of gender and habitat wise and the secondary hypotheses is the correlations among the dimensions like independent, dedicative, collaborative, competitive and participative. The purpose of this study is to find out the significant difference of learning style on boys- girls and urban-rural students and the interaction of gender and habitat.

According to Wilson (1998) the learning style is the manner in which a learner perceives, interacts with, and responds to the learning environment. Dunn and Dunn (1992) said Learning Style Model is based on five different stimuli: (i) Environmental, (ii) Emotional, (iii) Sociological, (iv) Physiological, and (v) Psychological. Components of learning style are the cognitive, affective and physiological elements, all of which may be strongly influenced by a person's cultural background. So there is a relation with this study of learning style and its objectives. Class-delivering and constant discussion, educators are aware about learning style and implementing curriculum by which the students can improve their task behavior and increase content knowledge.

The learning style of students may differ gender wise and habitat wise. Pizzo (1990) and Greb (1999) showed that males and females learn differently from each other. Males tend to be more kinesthetic, tactual, and visual, and need more mobility in a more informal environment than females. Taube & Munck (1996) reported that gender differences as a

function of themes for text tasks. Thomson (1995) believes that a male's learning focuses on competition, status and independence. On the contrary, a female's world focuses on intimacy, consensus, sometimes and independence as well. Larrabee & Crook (1993), Ong (1999), Colley (2001) found out that females are better than males on language learning tasks connecting with remembering verbal information, faces, names, object locations, and landmarks along a route. It is much cleared that there are so many links as gender and habitat wise learning style with these study.

Another research by which came out that males do better on tasks connected with logic, solving problem situations (Petrovskiy, 1999, McMahan, 2002). The authors share the point of view of Gustafsson & Undheim (1996), Elley (2004), who believe that the students' approach to document reading is based on a psychometric theory of cognitive abilities and contextual dimensions, which in turn have various degrees of generality. Verma (1995) studied academic achievement of girl students in relation to their rural, urban background and found that IX grade rural students scored higher than urban students though they had lower level of aspiration and low intelligence quotient. Ojoawo (1989) studied the effects of differential distribution of resources on school performances in an examination and found that location of schools in Oyo state had significant effect on school academic performance and there was significant difference in the performance between the students of rural and urban schools. Rangappa (1992) studied self-concept and reading ability of 7th class students with the objective to identify whether boys and girls, rural and urban students differ in their achievement.

Nanda et al. (1994) studied the effect of cognitive style and creativity on academic achievement and found that rural students were significantly less intelligent and academically less aspirant than the urban students. Vyas (2002) studied learning style, mental ability, and academic performance and found there was significant difference in the learning style and mental abilities of girls residing in urban and rural areas. Adepoju (2002) studied locational factors that significant difference existed in the academic performance of students in urban and rural areas.

Learning styles are simply different approaches or ways of learning. It refers to students' preferences for some kinds of learning activities. Attention to learning styles and learner diversity in the classroom has also been shown to increase student interest and motivation to learn. It may lead to enhanced learning and character. Students who understand their own style are likely to be better learners, achieve higher grades, have more positive attitudes about their studies, self-confidence and exhibit more skill in applying their knowledge in every aspect. So, a study and its exploration are needed to find out the learning style of the secondary school students.

Variables

A) **Major:** Learning Styles of the secondary school students.

B) **Categorical variables:**

- i) Habitat (urban-rural)
- ii) Gender (boys-girls)

Operational Definition

Learning Style: Learning styles are the procedure or systems of learning. Keefe (1982) defined learning styles as "cognitive, affective, and physiological traits that serve as relatively stable indicators of how learners perceive, interact with, and respond to the learning environment. Dunn & Dunn (1992) defined that-learning style is the way in which individuals begin to concentrate on, process, internalize and retain new and difficult academic information. Grasha and Reichmann in their Learning Style Scales in 1974 mentioned several factors of which the most important.

Delimitation of the Study:

The study was delimited to the Secondary school students, from the selected district of West Bengal.

Area: Students of WB, in the district of North 24 Parganas, Nadia and Hooghly. The schools of the concerned districts were selected randomly.

Class-IX (boys and girls both)

Medium of Instruction-Bengali. (As there is a scarcity of English, Hindi or Urdu medium school in the research areas)

Board of Schools-WB Board of Secondary Education.

Sample Technique-Cluster Sampling

Sample Size-700 (Boys 354+Girls 346)

No. of schools-22 (Boys 11+Girls 11)

Stratification:**Table no-1, students & habitat**

Gender ↓	Habitat ↓		Total
	Urban	Rural	
Boys	176	178	354
Girls	171	175	346
Total	347	353	700

Objectives of the Study:

- i) To find out if there is any significant difference of learning style on students gender-wise.
- ii) To find out if there is any significant difference of learning style on students habitat-wise.
- iii) To find out if there is any significant difference of learning style on students due to interaction of gender and habitat wise.

Hypotheses:

The following **null** hypotheses are to be tested:

- H₀₁:The boys and girls do not differ significantly in the mean scores on learning style.
- H₀₂:The urban and rural students do not differ significantly in the mean scores on learning style.
- H₀₃:The urban boys and urban girls do not differ significantly in the mean scores on learning style.
- H₀₄:The rural boys and rural girls do not differ significantly in the mean scores on learning style.
- H₀₅:The urban boys and rural boys do not differ significantly in the mean scores on learning style.
- H₀₆:The urban girls and rural girls do not differ significantly in the mean scores on learning style.

Methodology: Seven hundred students between the age group 14-15 (class-ix) years formed the sample of the study.

Tools: For the present study the researchers have prepared and standardized a tool on *Learning Style Scales*. They developed the items following the dimensions (seven only) put forward by Grasha and Reichmann in their Learning Style Scales in 1974. Researchers finally adapted five major dimensions out of seven, which are:

- (1) Independent, (2) Dedicated (3) Collaborative, (4) Competitive (5) Participative

Definition of Dimensions:

(1)Independent: According to Grasha and Reichmann (1974), Independent Learning is learning that is self-directed. It is organized and completed by the learner. Educators (experts) may act as facilitators or guides. When an individual is able to think, act and pursue their own studies autonomously, without the support of tutor, instructor or a teacher at school.

(2) Dedicated: Dedication means extreme devotion or admiration to the education or learning things. When the learners devote wholly and earnestly to acquire knowledge or some special purpose, it's called dedication.

(3) Collaborative: Collaborative learning is a situation in which two or more people learn or attempt to learn something together. It is an umbrella term for a variety of educational approaches involving joint intellectual effort by students, or students and teachers together. More specifically, collaborative learning is based on the model that knowledge can be created within a population where members actively interact by sharing experiences.

(4) Competitive: Competitive learning exists when one student goal is achieved; all other students fail to reach that goal. (Johnson & Johnson,1991). Competitive learning can be interpersonal (between individuals), where rows are most important or intergroup is appropriate.

(5)Participative: Participatory learning is an active learning, defined as the extent to which students are involved in experiences. Active participation constructs new knowledge and new understanding. Barab, et al. (2001) defined participatory learning environments as systems that engage the students in the construction of products collaboratively.

Tools

Preparation of Items: Initially total no. of items in the test was 36 including both the positive and negative statements each having 3 options - Agree, Don't know, Don'tagree. The scores of the each item were 3, 2,1 respectively for the options for a positive statement and 1, 2, 3 for negative statement respectively.

Item Analysis

For internal consistency and face and validity of the test, it was verified by the experts in the field of psychology and education. 3 (three) items had to be excluded as the raters (experts) could not agree on those items.

Expert Rating:

Table no: 2, (**Inter raters' agreement ratio**):

Raters agreed on no. of items						Mean Inter Raters' Agreement Ratio
1 st & 2 nd raters	2 nd &3 rd Raters	1 st & 3 rd raters	Agreement ratio for raters 1,2	Agreement ratio for raters 2,3	Agreement ratio for raters 1,3	
34	32	33	34/36	32/36	33/36	33/36=0.916

After rejecting the unsuitable items under the advice of experts, the discrimination indices of 33items were found out with t – tests(by finding the difference of means of upper and lower 27% achievers. t's were significant (**at 0.05 level with df=234**) for thirty items and hence three other items of low discrimination were rejected.

30 items were administered on 236 students of class IX. Using Cronbach's Alpha (CA) the reliability of the test (in terms of internal consistency of the items) was estimated by SPSS. The values of C A were calculated for each of the 30items. The CA for the test was 0.606. This value indicates the moderate internal consistency of the items. Time allotted for the final test was **20** minutes. Directions for answering the test were given in the test booklet and they were also verbally communicated to the students before starting the test.

Table no-3, Dimensions of test-questions

Sl.No	Dimensions of test-questions	Number of items
1	Independent	6
2	Dedicated	6
3	Collaborative	6
4	Competitive	6
5	Participative	6
Total		30

Test retest reliability: Total samples of the test were 700.The test in its final form was used to find the test retest coefficient if correlation over 150students and its value was 0.827 --fordf=148 which issignificant at 0.05 level .So the test has significant stability index in the form of coefficient of correlation.

Validity: Construct validity of the test was found out by Factor Analysis. 10 factors were identified all having eigen value >1.The 10 factors and distribution of items over them are shown below:

Factors	1	2	3	4	5	6	7	8	9	10
	8	7	3	2	2	2	2	2	1	1

Only three factors are on the vertical side of the scree plots having eigen values 2.931, 2.631 & 1.711 respectively, covering 18 items out of a total thirty.

Table No-4: Inter Correlation of the dimensions of LS

	Independent	Dedicated	Collaborative	Competitive	Participative	LS test
Independent	1.000	.190	.186	.107	.100	.510
Dedicated	-	1.000	.196	.217	.210	.616
Collaborative	-	-	1.000	.313	.176	.652
Competitive	-	-	-	1.000	.172	.596
Participative	-	-	-	-	1.000	.568

Table no.4, shows that the pairs: Dedicated & Participative; Collaborative & Competitive have significantly high correlations. So each pair may be represented by a factor. The dimension Independent remains isolated claiming another factor. The dimensions and three factors may be represented as follows:

1st factor: dedicated & participative; **2nd factor:** Collaborative & competitive; **3rd factor:** Independent. This 'three factors' corroborates the three factors obtained from Factor Analysis of LS.

Administration of Test:

The final form of the test was administered on 700 students selected by cluster sampling method for 20 minutes. The papers were scored. Maximum scores for the test= 90 & minimum score=0.

Presentation of Data:

Table No 5.

Scores	13-17	18-22	23-27	28-32	33-37	38-42	43-47	48-52	53-57	58-62
Freq(f)	00	02	06	58	117	228	181	94	14	0

Table no. 6: The descriptive statistics sex-wise and strata-wise

Pupils	Total	Boys	Girls	Urban	Rural	U.boys	U.girls	R.boys	R.girls
No.	700	354	346	347	353	176	171	178	175
Mean	41.0071	39.9435	42.0954	41.0720	40.9433	39.8977	42.2807	39.9888	41.9143
Median	41.0000	40.0000	43.0000	41.0000	41.0000	40.0000	43.0000	40.0000	43.0000
SD	6.07334	6.03316	5.92804	5.99884	6.15354	5.92340	5.85035	6.15615	6.01421
SKWN	-.199	.107	-.531	-.139	-.253	.066	-.363	.141	-.682
KRTS	-.223	-.401	.436	-.349	-.107	-.467	.112	-.333	.717

The mean (41.0071) and median (41.0000) of the total sample are very close to each other. The distribution seems to be almost normal.

Data Analysis

For testing the null hypotheses, 2x2 ANOVA and t-tests have been used. To find the main effect of Sex and Habitat ANOVA has been used. To find the interaction of sex and habitat explicitly t-tests have been used. For ANOVA 4(four) cells have been used as Urban Boys(UB), Urban Girls(UG), Rural Boys(RB), Rural Girls(RG). For each cell 50 LS

scores have been randomly selected from the total number of the corresponding cell. The descriptive statistics of the LS scores of 200 students have been tabulated below sex and habitat-wise.

Table no.7: Mean and SD of the 4 cells of ANOVA

Categories	N	Mean	SD
U.BOYS(UB)	50	40.0800	6.62660
U.GIRLS(UG)	50	43.6600	6.02921
R.BOYS(RB)	50	41.5600	6.66444
R.GIRLS(RG)	50	42.8200	6.91845

Table no.8: 2x2 ANOVA for LS scores

SOURCES	df	ss	Mean ss	F	sig	P	Remarks
Sex	1	292.820	292.820	6.788	.010	P<0.05	S
Habitat	1	5.120	5.120	.119	.731	P>0.05	NS
Sex x Habitat	1	67.280	67.280	1.560	.213	P>0.05	NS
ERROR	196	8454.600	43.136				

Interpretation: Table shows only difference LS on the level of sex is only significant at 0.05 level and not others. So, (i) Boys and Girls significantly differ in their mean LS scores. Hence the null hypothesis H_{01} is **rejected**. (ii) Urban and Rural students do not significantly differ in their mean LS scores. Hence null hypothesis H_{02} is **retained**.

Since F is significant here at least for one level (sex), t-test is inevitable to find any significant difference in any subsidiary level.

Table no-9: t- test. (As Sex is significant)

STRATA	MEAN	SD	SED	DF	t-value	Sig.(2tailed)
UB vs UG	39.2800 vs 43.6000	6.12136 vs 4.51302	.86569 vs .63824	49	4.070	.000,S
RB vs RG	40.7400 vs 42.2800	6.37537 vs 5.42120	.90161 vs .76667	49	1.156	.253,NS
UB vs RB	39.2800 vs 40.7400	6.12136 vs 6.37537	.86569 vs .90161	49	1.280	.206,NS
UG vs RG	43.6000 vs 42.2800	4.51302 vs 5.42120	.63824 vs .76667	49	1.314	.196,NS

Interpretation of t-tests:

UB vs UG:

From the analysis in table 9, t value for the difference of mean learning style scores between urban boys(UB) and urban girls(UG) is 4.070 ($p < 0.05$). Hence, t- is significant at 0.05 level. So, UB&UG differ significantly in mean scores in LS. Hence, H_{03} is **rejected**.

RB vs RG; UB vs RB & UG vs RG:

t- values for each of the above pairs are not significant at 0.05 level. Hence, differences of mean learning styles for each of the above pairs are not significant at 0.05 level.

So H_{04} , H_{05} & H_{06} are **retained**.

Findings:

The results in this study shows that there is a significant difference of mean scores on LS **only** between (1) boys(B) & girls (G); (2) urban boys(UB)& urban girls(UG).

Limitation of the study:

The present study suffered from several limitations which were as:

- i) The personality based learning style is relatively new field and all the relevant literature was not readily available.
- ii) Sample could not be always collected strictly in accordance with rule of cluster sampling due to administrative compulsions of the schools.
- iii) Schools were selected randomly only from five districts (North 24 Parganas, Nadia, Hooghly, Purulia & Malda of West Bengal).
- iv) The sample of this study was only selected from the Govt. aided schools (Bengali Medium) under WBBSE.

Discussion:

Learning Style (LS) on the secondary school students is integrally associated with the progress of education. The Dunn and Dunn (1992) Learning Style model is multi-dimensional and it examines the environmental, emotional, sociological, perceptual, physiological and psychological elements in each student. Moreover, it can provide access to education regardless of time and geographical barriers. It can help to enhance the quality of education with advanced practice methods, improve learning outcomes and enable reform or better management of education systems. In the present study the emotional, perceptual & physiological study were left out for while delimiting the study. The present study also presents a pattern of different modes of LS as shown below:

Table no- 10: Pattern of different modes of LS.

Learning Style	(Collaborative) LS-3	(Competitive) LS-4	(Dedicated) L S-2	(Participative) LS-5	(Independent) LS-1
Mean	9.5943	8.8314	8.2414	7.7686	6.5729

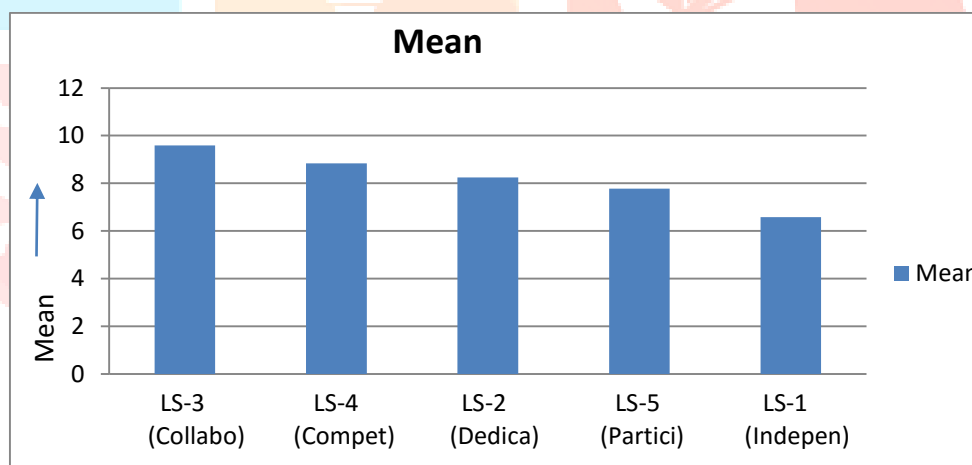


Fig: - pattern of L.S. of students

The L Styles most & least emphasized are respectively **Collaborative & Independent**. Without collaboration, it is difficult to master the multifarious & multidimensional knowledge of the world now-a days. Up to 1980's text books and teachers were the fountain heads of knowledge. Thereafter the sources of learning have been multifarious. So Collaboration in learning is an essential part of LS.

In the present study gender makes a difference in learning styles and this supports the observation of Verma (1992). Urban girls outweigh Urban boys. They adopt different styles learning styles adequately to upgrade themselves. This statement is equally applicable to rural girls but however they do not command significant differences from boys.

Educational implications of the study:

- (i) The school should provide better environment to improve the study habits with the help of different kinds of learning style. When proper infrastructural facilities of LS would be available in WB, only then enrichment of study habits is possible.
- (ii) The students must be motivated in the field of academics to modernize their learning style.
- (iii) Better e-

library, digital library facilities should be provided for students to spend more time in reading and preparing for cognitive development. They will get many references by sharing internet. E-learning systems, video conference, e-mailing and e-tuitions can help the students and provide more and more knowledge to the learners through LS.(iv)So teachers should often point out the importance of LS and techniques of their use in the class room or out of class room. Though left out in this research, it is important to compare the pattern of LS(distribution of means over the five dimensions of LS) of different categories of students.

Suggestions for further studies:

According to findings of this study on LS, there are already indications of change towards the improvement of learning awareness. A study on the subject may be extended by (I)including students of different socio economic status, castes, age groups, grade level, management of school, school boards and characteristics of habitats and also on the basis of psychological differences. (II) Developing a test including a few more components of LS. (III) Determining learning pattern of different categories of pupils.

Conclusion:

Almost there is no significant difference in learning styles among the different categories of pupils considered in the study except Urban Boys & Urban Girls. The better scores of the Urban girls show that Urban girls might adopt different learning styles for their better achievement.

REFERENCES:

- Brandt, R. (1990) *On learning styles: A conversation with Pat Guild, Educational Leadership, 48(2),10-13.*
- Blackboard, Inc. (2002) *Blackboard Inc. announces charter release of Blackboard*
- Dunn, R. (1986) *Learning styles: Link between individual differences and effective instruction. North Carolina Educational Leadership, 2(1), 4 – 22.*
- De Bello, T. C. (1990) *Comparison of eleven major learning style models: 6, 203 – 222.*
- Dunn, R. (1990) Understanding the Dunn and Dunn learning styles model and the need for individual diagnosis and prescription. *Reading, Writing and Learning Disabilities, 6, 223 – 247.*
- Dunn, R., Bruno, J., Sklar, R. I., & Beaudry, J. (1990) Effects of matching and mismatching minority developmental college students' hemispheric preferences on mathematics scores. *Journal of Educational Research, 83(5), 283 – 288.*
- Felder, R. M., & Silverman, L. K. (1988) *Learning and teaching styles in engineering education. Engineering Education, 78(7), 674 – 681.*
- Gordon, R. B. (1993) (Doctoral dissertation, University of LaVerne). *Dissertation Abstracts International, 55(1),*
- Hein, T. L., & Zollman, D. A. (1997) *Investigating student understanding and the role that learning style plays in that process. AAPT Announcer (Addendum), 26(4), 3.*
- Kolb, D. A. (1984) *Experiential Learning: Experience as the Source of Learning and Development.* Englewood Cliffs: Prentice Hall.
- Lemmon, P. (1985) *A school where learning style makes a difference. Principal, 64(4), 26-28.*
- Meyers, C., & Jones, T. B. (1993) *Promoting active learning: Strategies for the college classroom.* San Francisco: Jossey-Bass Publishers.
- Phillips, G. & Santoro, G. (1997) *Teaching group discussion via computer-mediated communication. Communication Education, 38,*
- Sternburg, R. J. (1990) *Thinking styles: Keys to understanding student performance. Phi Delta Kappan, 71(5), 366 – 371.*
- Terregrossa, R., Englander, F., & Englander, V. (2009). *The Impact of Learning Styles on Achievement in Principles of Microeconomics: A Natural Experiment.*
- Tatarinceva, A. (2009) *Influence of the gender factor on a student's learning style and achievements in language learning.*
- Verma, J. (1992) 'A Study of Learning style.....of High School Students of Agra region' in 5th survey of educational research, NCERT(1988-92) p-89

Wilson, V. (1998) *Learning How They Learn: A Review of the Literature on Learning Styles*. Retrieved from ERIC database

(i) Websites with date of retrieval

www.scirp.org/journal, ID=37523 (dt.15/7/16)

www.acdowd-designs.com/sfsu_860_11/LS_OverView.pd(dt.5/7/16)

www.ilsa-learning-styles.com/. (dt.-3/7/16)

www.kalbos.lt/zurnalai/02_numeris/10.pdf.(dt.-3/7/16)

Chapter ii review of related literature, 2002(ii) Venkataraman's Style of learning and thinking (NPC, Agra,India)with dimensions: verbal, content preference, class preference, learning preference and

