

**STUDENT LEARNING STYLE AND ITS IMPACT ON THE ACADEMIC  
ACHIEVEMENT –A STUDY OF SENIOR SECONDARY SCHOOL STUDENTS OF  
BHOPAL**

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**Student Learning style and its impact on the Academic Achievement –A study of Senior  
Secondary School students of Bhopal**

**ABSTRACT:**

**Background:** Learning is a complex process and it is interpreted by many psychologist and behavioural science experts in different way. This study was carried out to know the impact of learning styles on academic performance among senior secondary school students in Bhopal (M.P.)

**Methods:** A total 240 students responded to questionnaire and out of these only 200 responses were considered as they are completely filled up. These questionnaires were randomly distributed into students of 11<sup>th</sup> and 12<sup>th</sup> class and their last examination result was taken as basis for academic achievement. Data were entered and analysed using SPSS version 20.0 ANOVA, Pearson correlation co-efficient, Chi-Square and Descriptive Statistics were used in this study.

**Results:** Most of students i.e. more than 50 percent preferred science stream. Male and female students of Government school equally preferred science stream whereas in private school male students preferred science stream more than female students. Male students who prefer science stream adopted constructive learning styles whereas science stream female students prefer reproducing learning styles. This information is quite useful to teachers as by understanding the preference for different learning styles they can design their teaching methodologies

**Keywords:** Learning Style, Academic Achievement

### **Student Learning style and its impact on the Academic Achievement –A study of Senior Secondary School students of Bhopal**

#### **INTRODUCTION:**

Students learn in diverse ways, each of them has their own different styles or preferences in the way they recognize and process information. Taking into consideration the different learning preferences of students which is of prevailing significant in the teaching – learning progression. The manner by which each student learns will create a landscape by which the students will either maintain or restrain their intentional cognition. Therefore, the educators' knowledge about the students learning style is extremely important. Alfonseca et. al. (2006) stress that if educator is conscious of the students' learning styles than that will facilitate the adaption of suitable techniques/ methods. Recognizing the students' learning style will definitely aid the teachers in becoming more sensitive towards students "in the class room. This will promote enhancement to teaching practices, best suited to the students learning styles. As stated by Cuthbert (2005), awareness of the learning styles is vital for allowing adjustment in the educators' pedagogic approaches. At this point of time it is very important to understand the concept of learning style and personality traits.

Our educational system is significantly influenced by quick divergence in the field of science, communication and information technology. In this competitive world, the explosion of science and technology create a need for a person to be more skilful for searching, analysing and applying the learnings to the research area undertaken. Cognitive skills are an essential

element along with intelligence and social skills to apply it in the area of educational research. According to Gardner, each and every one has different intelligence level and hence, in the process of learning they can able to interact and compete with one another.

### **Learning & Learning Style**

Learning is a complex process and it is interpreted by many psychologist and behavioral science experts in different way. According to Ormrod J.E., „Learning is the means through which we acquire not only skills and knowledge, but values, attitudes, and emotions as well.“

Now-a-days, it is believed that students“ learning style and his/her personality have a significant impact on their academic achievement. As every child follows unique way to learn and process information. Some of them learn by oral repetitions and some by writing it again and again. Some children learn through practical work. Individuals thus differ in the way they learn and acquire knowledge.

Different learning styles are related with each other and they have a deep impact on the performance of students academically as well as on other activities they perform in day today life. Some of the students would like to gather full information before working on any assignment and some would like to have prototype ways (they first initiate the assignment work with only symbolic information and then make significant change to the first prototype solution and so on they reached to final model/solution to the problems). Learning styles were concerned with how they prefer to learn and it is also considered an important factor for students“ academic achievement and attitudes.

“Learning Style is defined as the characteristics, strengths and preferences in the way how people receive and process information.” (Felder & Silverman, 1988; Allinson & Hayes, 1996; Felder & Brent, 2005; Hsieh et al., 2011). “It also refers to the fact that every person has or her own method or set of strategies while learning.” (Schemeck 1988). “Learning styles generally operate on a continuous basis” (Erham, 1996; Dunn, 1983; Reid, 1995). Children and adults were not learning to their full potential. So with the objective of identifying how individuals learn four psychological forces were given by Gregorc (1982), which were: behavioral; psycho-analytic; humanistic; and transpersonal. Although people had preferred methods of learning, most were unaware of any preference or the existence of learning styles. “Learning experience

could be improved if the learner was more aware of learning styles.” (**Honey and Mumford 1992**). They developed the Kolb learning cycle (Kolb, 1984) and superimposed his four stages of learning on to it. Their research indicates that individuals favor particular stages of the learning cycle and that this preference can distort the learning process. A greater understanding of learning patterns and behaviors allows teachers to be more versatile in their instruction and use a wide range of methodologies in the classroom. The aim is not to align teaching style with learner preferences, but to help the learner construct their skills and abilities to learn well in both preferred and less preferred learning modes (meta-learning), thus creating successful and lifelong learners who can track their learning strategies and measure their outcomes or achievement. (**Sternberg 1997**). As per **Leaver 1998**, there are four learning style which are sensory modalities; personality types; cognitive styles; and environmental preferences. He further divided the visual learner into two sub-groups: verbalist and imagists. This is based on a combination of traits found in personality type domains such as: Introversion- Extraversion; Sensing- Intuitive; Thinking-Feeling; and judging – Perceiving. As the Indian education system is different from American, British, Japanese and other countries. More and more emphasis is given on the children’s ability to learn the content given in there course curriculum whereas in other educational system were based on more acquisition of skills. This study will be an attempt in understanding the linkage between learning style, personality traits and academic achievement of the senior secondary students. At the level of senior secondary school, they need proper guidance towards their further career so it is important not only to them to adopt a particular learning style which suits to his/her personality types and traits and helps them in better performance in academics.

## **RESEARCH METHODS**

### **Objectives**

The study is planned to achieve following objectives:

1. To study the different learning styles adopted by the senior secondary school students (male & female) during the preparation of their board examinations/class assignment/class test etc.

2. To study the overall relationship between learning styles and academic achievement of senior secondary schools.
3. To study the preference of different streams i.e. (Arts, Science & commerce) with respect to different learning styles.
- 4.

### **Hypotheses**

The following hypotheses are generated for the study:

1. There is no significant relationship between the learning styles and academic achievement of senior secondary school students.
2. Male & female students differ significantly with respect to their learning style preference"s.
3. There is significant difference in the selection of subject streams among senior secondary school students with respect to different learning styles.

### **Data collection methods& Tool**

The selection of a method and the specific design within that method appropriate in investigating a research problem depends upon the nature of the problem and the kind of data that the problem entails. In the study impact of learning styles was observed on academic achievement of senior secondary school students of Bhopal district. This research is descriptive in nature. Data is collected through standard questionnaire of K.S. Misra. By applying evaluation test for the study of learning styles of K.S. Misra, different learning styles were observed. After getting individuals learning style their relation was measured with academic achievement. For academic achievement last annual examination result will be taken as measure. As per **Karuna Shankar Misra (2005)** "Learning style refers to the way one internally represents experiences and recalls or processes information." According to him, there are six main learning styles namely-

- |                         |                          |                         |
|-------------------------|--------------------------|-------------------------|
| 1. Enactive Reproducing | 2. Enactive Constructive | 3. Figural Reproducing. |
| 4. Figural Constructive | 5. Verbal Reproducing    | 6. Verbal Constructive. |

These 6 further clubbed to get five more learning styles i.e. Enactive, Figural, Verbal, Reproducing and Constructive.

### **Sampling Plan:**

Data was collected from city of Bhopal. Six private school and 4 Govt. school were selected on the basis of simple random sampling. They were selected on the basis of the criteria that they (schools) must be 10 years old in their operations. Simple random sampling method was adopted to select students from eleventh and twelfth. 10 students of each class were taken to make a sample of 20 students from each school. So total sample size comes out to be 200.

### **Analysis and Interpretation**

From the survey conducted on 240 students who responded to questionnaire. Out of these 240 response 200 were considered for further analysis as they are completely filled up. Following demographic information resulted after analysis:

Table : 1 Demographic Information:

S.No.			Number	Percentage
1	Type of school	Government	04	40
		Private School	06	60
2.	Gender	Male	128	64
		Female	72	36
3.	Stream Selected	Science	105	52.5
		Commerce	61	30.5
		Arts	34	17

Sixty percent of the school surveyed were private school and forty percent of them were government school. 64 percent of the student surveyed were male where as 36 percent of the students were female students. 52.5 percent of the total 200 students selected science as their stream at senior secondary school level whereas 30.5 percent of the students selected commerce as their stream. Rest 17 percent select Arts subjects as their stream. This information clearly indicates that there is high level of preference for science stream among both the type of school.

### Stream Selected by the Students

Stream selection information on the basis of gender of the senior secondary school students is given in the following table

Table 2 Type of Stream selected by students of Senior Secondary school of Bhopal

Type of stream selected by student \* Gender \* School Type Crosstabulation

School Type			Gender		Total	
			Male	Female		
Govt School	Type of stream by stu	Science	Count	22	20	42
			% within Type of stream selected by student	52.4%	47.6%	100.0%
			% within Gender	50.0%	55.6%	52.5%
		Arts	Count	8	4	12
			% within Type of stream selected by student	66.7%	33.3%	100.0%
			% within Gender	18.18%	11.11%	15.0%
	Commerce	Count	14	12	26	
		% within Type of stream selected by student	53.85%	46.15%	100.0%	
		% within Gender	31.8%	33.33%	32.5%	
	Total	Count	44	36	80	
		% within Type of stream selected by student	55.0%	45.0%	100.0%	
		% within Gender	100.0%	100.0%	100.0%	
Private School	Type of stream by stu	Science	Count	50	13	63
			% within Type of stream selected by student	79.37%	20.63%	100.0%
			% within Gender	59.52%	36.11%	52.5%
	Arts	Count	12	10	22	
		% within Type of stream selected by student	66.7%	33.3%	100.0%	
		% within Gender	18.18%	11.11%	15.0%	

		% within Type of stream selected	54.5%	45.5%	100.0%
		by student		27.78%	
		% within Gender	14.29%		18.33%
		Count	22	13	35
	Commerce	% within Type of stream selected	62.86%	37.14%	100.0%
		by student		36.11%	
		% within Gender	26.19%		29.17%
		Count	84	36	120
Total		% within Type of stream selected	70.0%	30.0%	100.0%
		by student			
		% within Gender	100.0%	100.0%	100.0%
		Count	72	33	105
		% within Type of stream selected	68.57%	31.43%	100.0%
		by student			
	Science	% within Gender	56.25%	45.83%	52.5%
		Count	20	14	34
		% within Type of stream selected	58.82%		100.0%
		by student			
Type of stream		% within Gender	15.63%	19.44%	17.0%
selected by student	Arts	Count	36	25	61
		% within Type of stream selected	59.02%		100.0%
		by student			
		% within Gender	28.13%	34.72%	30.5%
	Commerce	Count	128	72	200
		% within Type of stream selected	64.0%	36.0%	100.0%
		by student			
Total	Total	% within Gender	100.0%	100.0%	100.0%

**\*Chi-Square Value is 2.1886 at the significance level is 0.3348**

Most of the students (52.5 percent) of the senior secondary school of the Bhopal district of Madhya Pradesh preferred Science stream. Out of the total students who selected science stream, 56.25 percent of the students were male students which shows the very high preference for science stream by male students even female students also prefer science stream other than arts and commerce. While comparing with government vs private school, 40 percent of the students of government school selected science stream whereas 60 percent of the students of private senior secondary school selected science stream. It was also observed that amongst the government school students who selected science stream, 52.4 percent of them are male whereas amongst private school students who selected science stream, 79.37 percent of them are male. This shows the very high preference by male students towards science stream. Similarly, there is significant difference in the selection of science stream amongst female students as 47.6 percent of the government school and 20.63 percent of private school female students selected science stream.

Only 30.5 percent of the total students were preferred for Commerce as a stream. Out of these 30.5 percent, 59.02 percent students were male rest were female students. Out those who selected commerce as a stream 42.62 percent belongs to Government Senior secondary school. Where as 57.38 percent of them were from the private senior secondary school of Bhopal. Out of these students who selected commerce as a stream in government school, 53.85 percent are male students & amongst private school 62.86 percent of them are male students. Where as 46.15 percent females from government school and 37.62 percent females from private school selected commerce as a stream.

Only 17 percent of the total students were preferred for arts stream, 58.82 percent students were male and 41.77 percent were female students. 35.29 percent of the students who selected arts stream belongs to Government Senior secondary school. Where as 64.71 percent of them were from the private senior secondary school of Bhopal. Out of these students who selected arts as a stream in government school, 66.7 percent are male students & amongst private school 54.5 percent of them are male students. Similar pattern was observed amongst female students.

To see whether stream selection and gender is having any association, a null hypothesis is considered that „there is no significant difference in the stream selection amongst male and

female", chi-square test was conducted. As the significance level is 0.3348 which is more than 0.01 and 0.05, which means there is no significant difference in the stream selection amongst male and female. This accepted our null hypothesis. So male and female are similar in approach when it comes to matter of stream selections.

Table: 3 Descriptive Statistics of different learning styles of all the Students surveyed

**Descriptive Statistics**

	N	Mean	Std. Deviation	Correlation with AA*
<b>Enactive Reproducing</b>	200	28.1000	5.30651	0.221
<b>Figural Reproducing</b>	200	23.8328	5.09182	0.132
<b>Verbal Reproducing</b>	200	19.7172	4.64344	0.051
<b>Verbal Constructive</b>	200	18.1984	5.08424	0.036
<b>Enactive Constructive</b>	200	17.2531	5.21989	0.052
<b>Figural Constructive</b>	200	27.8656	4.63106	0.147
<b>Enactive</b>	200	45.3531	9.14260	0.173
<b>Figural</b>	200	51.6984	8.54362	0.079
<b>Verbal</b>	200	37.9156	9.11236	0.218
<b>Reproducing</b>	200	70.6500	12.73822	0.210
<b>Constructive</b>	200	62.3172	13.83870	0.06

\*AA Stands for Academic Achievement

Table 3., gives mean and standard deviation values of the learning variables mentioned above. Mean value of Verbal Reproducing, Verbal Constructing and Enactive Constructive is lesser than the other three learning variables which shows these learning styles were less preferred than Enactive reproducing, figural reproducing & figural constructive learning styles of students of senior secondary school in Bhopal district of Madhya Pradesh. Figural and reproducing learning style was preferred by students.

Where as the relation between learning styles and the academic achievement is weak. Correlation between different learning styles and academic achievement varies a lot but the values of the coefficients were positive and low which means that there is a low degree relation between learning styles such as Enactive Reproducing, Figural reproducing, figural constructive and overall learning styles of Enactive, Figural and Verbal etc. For Verbal reproducing, Verbal constructive and Enactive constructive learning styles where the correlation values are near to zero, it seems there is no relationship between these learning styles and academic achievement. This is in line with the hypothesis that there is a relationship between learning styles and academic achievement but this relationship is not very strong and significant.

**Table: 4 Relation between Overall learning style and academic achievement**

Correlations			
		Marks	Sum
Marks	Pearson Correlation	1	0.190
	Sig. (2-tailed)		0.071
	N	200	200
Sum	Pearson Correlation	0.190	1
	Sig. (2-tailed)	0.071	
	N	200	200

This table shows that that there is low degree relationship between academic achievement and overall score of the learning style. This value of the correlation is low and not significant at either 5 percent or 1 percent level of significance. As the correlation coefficient is positive but low so this indicates learning styles have a low degree relationship and impact on the academic achievement.

Table 5 Analysis of Variance for the comparison of Mean score of learning styles with gender

**ANOVA**

		Sum of Squares	Df	Mean Square	F	Sig.
ER	Between Groups	9.978	1	9.978	0.9122	0.482
	Within Groups	2165.724	198	10.938		
	Total	2175.702	199			
FR	Between Groups	21.905	1	21.905	2.938*	0.018
	Within Groups	1475.7534	198	7.4533		
	Total	1497.6584	199			
VR	Between Groups	17.388	1 198	17.388	2.9627*	.0016
	Within Groups	1162.062		5.869		
	Total	1179.45	199			
VC	Between Groups	6.604	1 198	6.604	0.649	0.589
	Within Groups	2014.65		10.175		
	Total	2021.254	199			

EC	Between Groups	5.562	1 198	5.562	0.4898	0.681
	Within Groups	2248.488		11.356		
	Total	2254.05	199			
FC	Between Groups	14.757	1 198	14.757	1.5148	0.074
	Within Groups	1928.8764		9.7418		
	Total	1943.6334	199			
E	Between Groups	28.595	1 198	28.595	1.364	0.091
	Within Groups	4149.882		20.959		
	Total	4178.477	199			
F	Between Groups	31.825	1 198	31.825	1.2283	0.116
	Within Groups	5129.982		25.909		
	Total	5161.807	199			
V	Between Groups	27.833	1 198	27.833	0.7872	0.4818
	Within Groups	7119.882		35.959		
	Total	7147.715	199			
R	Between Groups	38.416	1 198	38.416	0.6153	0.585
	Within Groups	12363.318		62.441		
	Total	12401.734	199			
C	Between Groups	34.438	1	34.438	0.4842	0.6912
	Within Groups	14083.542	198	71.129		
	Total	14117.98	199			

\*Significant at 5% and 1% level of significance, ER stands for enactive reproducing, EC- enactive constructive, FR- figural reproducing, FC- figural constructive, VR- Verbal reproducing, VC- Verbal constructive, E- enactive, F- Figural, V- verbal, R- reproducing, C- constructive.

Table 5 shows the comparison of the mean through the one way ANOVA method. From the table it can be interpreted that F value at 1 and 198 degree of freedom, for Figural reproducing and verbal reproducing found to be significant. This shows that male and female were differing significantly on these two learning styles. The value of F for other learning styles found to be significantly low. This shows that both male and female were not significantly differing on other learning styles. This means their mean is almost similar or differing slightly and this difference is not significant to be reported for any further comparison.

Male students show significant preference towards figural and constructive learning styles while female students prefer verbal and reproducing learning styles. The results are in line with the findings of previous studies done by Nudzejma, Obralic and Azamat, Akbarov (2012), Maubach and Morgan (2001) and Matthews (1991). Matthews (1991) came with the findings that female learned best with social and independent/applied styles i.e. similar to reproducing learning style. However, males learned best with social/applied and social conceptual styles i.e. similar to constructive learning style. Maubach and Morgan (2001) found that females were having advantage over males with regard to verbal ability. Results show that enactive reproducing, enactive constructive, figural reproducing, figural constructive, verbal reproducing, verbal constructive and enactive learning styles are not significantly different which leads to conclude that male and female students show similar preference towards these learning styles. Hong et al. (2000) found similarities in learning styles of male and female students.

**Table: 6** Descriptive statistics of learning styles of Government senior secondary school students Surveyed on the basis of different Genders

Factors	Government School (80)											
	Science (42)				Arts (12)				Commerce (26)			
	Male (22)		Female(20)		Male (8)		Female (4)		Male (14)		Female (12)	
	Mean	S.D	Mean	S.D.	Mean	S.D.	Mean	S.D	Mean	S.D.	Mean	S.D.
<b>Enactive Reproducing</b>	18.17	4.72	23.65	5.17	17.64	5.84	24.51	5.03	19.09	5.07	21.87	5.92
<b>Figural Reproducing</b>	24.41	4.81	22.91	4.85	25.44	4.86	18.16	4.79	25.73	5.80	25.69	5.15
<b>Verbal Reproducing</b>	12.92	5.19	25.72	4.91	17.26	5.19	19.31	5.68	16.33	5.15	25.42	5.63
<b>Verbal Constructive</b>	23.56	5.36	21.63	5.34	19.51	5.10	21.64	5.01	24.41	5.91	20.95	4.92
<b>Enactive Constructive</b>	25.89	5.81	14.73	5.29	21.44	5.61	24.92	5.63	26.62	5.30	24.86	5.81
<b>Figural Constructive</b>	31.17	4.88	16.97	4.71	30.83	5.92	16.54	4.94	30.96	4.62	21.84	4.82

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<b>Enactive</b>	38.28	9.07	38.35	8.89	38.11	9.11	40.25	8.73	40.13	8.66	39.52	8.72
<b>Figural</b>	45.12	8.78	43.82	8.58	43.71	8.77	43.96	8.62	43.72	9.16	44.92	9.09
<b>Verbal</b>	31.19	9.72	32.19	9.11	35.78	9.63	33.18	8.96	34.93	9.63	37.67	8.92
<b>Reproducing</b>	62.51	12.63	65.93	12.62	62.18	12.15	62.73	13.43	66.79	12.08	66.17	12.03
<b>Constructive</b>	67.09	14.86	61.03	14.48	68.19	13.93	60.97	14.21	68.18	14.72	60.78	13.07

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Table 6 explained the mean and standard deviation values of the different learning styles of male and female students of different streams such as Science, Arts and Commerce. Mean value of the all learning styles of the constructive group such as enactive constructive, figural constructive and verbal constructive is higher than the other learning styles of reproducing group for male students of science stream. This shows that the science stream students prefer constructive learning styles and believe in the experiential learning based on processing of information. Whereas those female students who prefer science stream chose reproducing learning styles more over the other constructive learning styles. It seems that female students from the government senior secondary school prefer reproducing style more as this style emphasize more on imitation and practice.

Mean value of male students from arts stream of government senior secondary school is more for the figural reproducing and figural constructive learning style. Even the mean of overall figural learning style is also more than the other overall learning styles. Mean value of female students from this arts stream of government senior secondary school is more in case of enactive reproducing and enactive constructive learning style. This learning style refers to the learning best by doing or when learning involves their hands or other parts of body. Mean value of the male students of the commerce stream of the government senior secondary school of Bhopal district of Madhya Pradesh is more for the constructive group of learning styles i.e. enactive constructive, figural constructive and verbal constructive. Even the mean value of the overall constructive leaning style is also coming out to be significantly higher than other overall

learning styles. This is similar to the science stream male students of similar kinds of school students i.e. government senior secondary schools of Bhopal district of Madhya Pradesh. Whereas mean value of the female students of commerce stream of government schools is significantly higher for reproducing learning style groups i.e. enactive reproducing, verbal reproducing and figural reproducing. As this type of learning styles emphasizes on imitation and practice so the female prefers this type of learning styles. They (female) students good at imitation and practice.

Table: 7 Descriptive statistics of different learning styles of Private senior secondary school students Surveyed on the basis of different Genders and different streams selected

S. No.	Factors	Private School (120)											
		Science (63)				Arts (22)				Commerce (35)			
		Male (50)		Female (13)		Male (12)		Female (10)		Male (22)		Female (13)	
		Mean	S.D	Mean	S.D.	Mean	S.D.	Mean	S.D	Mean	S.D.	Mean	S.D.
1.	<b>Enactive Reproducing</b>	22.12	4.38	29.23	5.21	23.78	5.10	24.17	5.09	31.82	4.23	21.23	4.14
2.	<b>Figural Reproducing</b>	17.21	5.34	29.43	5.22	19.62	5.91	17.21	5.34	30.13	5.19	19.62	5.91
3	<b>Verbal Reproducing</b>	15.67	4.17	28.13	4.35	28.97	4.34	15.67	4.17	28.76	4.31	28.97	4.34
4	<b>Verbal Constructive</b>	29.14	5.76	18.65	5.15	31.06	4.18	29.14	4.76	19.65	5.15	31.06	4.18
5	<b>Enactive Constructive</b>	26.82	5.19	20.92	5.63	18.77	5.04	26.82	5.19	20.92	5.63	18.77	5.04
6	<b>Figural Constructive</b>	27.95	4.37	22.82	4.18	27.19	4.68	27.95	4.37	22.82	4.18	27.19	4.68

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7	<b>Enactive</b>	43.96	8.19	49.71	8.16	53.81	8.92	43.96	8.19	49.71	8.16	53.81	8.92
8	<b>Figural</b>	41.33	8.05	50.16	8.21	46.72	8.24	41.33	8.05	50.16	8.21	56.72	8.24
9	<b>Verbal</b>	33.64	9.71	45.66	8.18	60.46	8.76	33.64	9.71	45.66	8.18	43.51	8.76
10	<b>Reproducing</b>	71.02	12.43	69.17	12.12	70.64	12.36	71.02	12.43	69.17	12.12	72.61	12.36
11	<b>Constructive</b>	61.83	13.18	60.42	13.03	78.23	13.42	61.83	13.18	60.42	13.03	61.23	13.42

Table 7 explained the mean and standard deviation values of the different learning styles of male and female students of different streams such as Science, Arts and Commerce. Mean value of the all learning styles of the constructive group such as enactive constructive, figural constructive and verbal constructive is higher than the other learning styles of reproducing group for male students of science stream. This shows that the science stream students prefer constructive learning styles and believe in the experiential learning based on processing of information. Whereas those female students who prefer science stream chose reproducing learning styles more over the other constructive learning styles. It seems that female students from the private senior secondary school prefer reproducing style more as this style emphasize more on imitation and practice.

Mean value of male students from arts stream of private senior secondary school is more for the verbal reproducing and verbal constructive learning style. Even the mean of overall constructive learning style is also more than the other overall learning styles. Mean value of female students from this arts stream of private senior secondary school is more in case of enactive reproducing and enactive constructive learning style. This learning style refers to the learning best by doing or when learning involves their hands or other parts of body.

Mean value of the male students of the commerce stream of the private senior secondary school of Bhopal district of Madhya Pradesh is more for the reproducing group of learning styles i.e. enactive reproducing, figural reproducing and verbal reproducing. Even the mean value of the overall reproducing leaning style is also coming out to be significantly higher than other overall learning styles. Whereas mean value of the female students of commerce stream of private schools is significantly higher for verbal learning style groups i.e. verbal reproducing and verbal constructive. As this type of learning styles prefer teacher to provide verbal instruction in order to gain information in the classrooms during the teaching.

**Discussion:** As per table 1; 52.5 percent of the total 200 students selected science as their stream at senior secondary school level whereas 30.5 percent of the students selected commerce as their stream. Rest 17 percent select Arts subjects as their stream. Results from Table 2 shows

the very high preference by male students towards science stream. Similarly, there is significant difference in the selection of science stream amongst female students as 47.6 percent of the government school and 20.63 percent of private school female students selected science stream.

As per table 3 observations, Chi square value is low and the significance level is 0.3348 which is more than 0.01 and 0.05. This signifies that null hypothesis, „there is no significant difference in the stream selection amongst male and female“ was accepted. Male and female are similar in approach when it comes to matter of stream selections. Table-4 provides information that learning style enactive reproducing, figural reproducing and figural constructive were more preferred by all the students who surveyed and Verbal reproducing, Verbal Constructive and Enactive Constructive learning style less preferred. This table provides information about the all the learning styles adopted by the students of senior secondary school of Bhopal district of Madhya Pradesh. This information fulfils the requirement of first objective. Whereas the relation between learning styles and the academic achievement is weak. Correlation between different learning styles and academic achievement varies a lot but the values of the coefficients were positive and low which means that there is a low degree relation between learning styles and academic achievement. As per Table-5, The relationship between all the learning style score combined together and academic achievement is very weak as the correlation co-efficient value is very low but positive. This satisfy the second objective. Table 7 & 8 provides the information as per requirement of third objective. Government school male students from science stream prefer constructive learning styles and believe in the experiential learning based on processing of information. Whereas female students who prefer science stream chose reproducing learning styles more over the other constructive learning styles. Male students of arts stream from Govt. school prefer figural reproducing and figural constructive learning style and female students from the same stream prefer enactive reproducing and enactive constructive learning style. Male students of the commerce stream of government senior secondary school prefer constructive group of learning styles i.e. enactive constructive, figural constructive and verbal constructive whereas female students from the same stream prefer

reproducing learning style groups i.e. enactive reproducing, verbal reproducing and figural reproducing.

Male students from science from private senior secondary school of Bhopal prefer constructive learning styles and believe in the experiential learning based on processing of information. Whereas female students from same stream prefer reproducing learning styles more over the other constructive learning styles. Male students from arts stream prefer verbal reproducing and verbal constructive learning style. Where as female students from arts stream prefer enactive reproducing and enactive constructive learning style. Male students of the commerce stream prefer reproducing group of learning styles i.e. enactive reproducing, figural reproducing and verbal reproducing. Whereas female students from same stream prefer verbal learning style groups i.e. verbal reproducing and verbal constructive.

**CONCLUSION:** This study points out that most of the students prefer science stream followed by commerce stream and arts stream. overall relationship of students learning styles and academic achievement is very weak. When the relationship was seen w.r.t different learning styles, it again points out that almost all the learning styles were having a weak positive relationship with all the learning styles covered under the ambit of K.S. Misra Inventory which was applied to identify the different learning styles of students of senior secondary school of Bhopal city. When the results were seen w.r.t. to different stream and gender, significant result obtained. Male students of government and private school differ significantly over the choice of science stream. Male students of private school select science stream in significantly high number than female students. Male students who prefer science stream adopted constructive learning styles whereas science stream female students prefer reproducing learning styles. This information is quite useful to teachers as by understanding the preference for different learning styles they can design their teaching methodologies.

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