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Gender, academic stream and learning styles

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Abstract
Learning styles refer to a range of competing and contested theories that aim to account for differences in individual's learning. Modern period of life also demands involvement in serious studies and better learning styles. A better learning style helps an individual to opt better career in his life. The present study was undertaken to investigate the relationship of gender, academic stream and learning style. Seven learning styles were regarded as dependent variables. Academic stream and gender were treated as independent variables. There was found no interaction effect of gender and academic stream on any learning style. Male students tended to rate themselves higher on visual, aural, logical and social learning style than females while female students rated themselves to be higher on solitary learning style than counterpart male students. Science students were found to show tendency to use aural as well as logical learning style more than both arts and commerce stream senior secondary school students.

Keywords: learning styles, gender, academic stream

Introduction
Education is the basic requirement for human development and survival of the society. It is necessary and a universal feature of society by which every generation transmits social heritage to the next generation. Education is the principal instrument in awakening the child to cultural values and thus is the strongest force in the development and growth of a child in preparing him to be responsible, intelligent, strong and healthy citizen also education is the key to national development.

Learning Styles
The term "learning styles" speaks to the understanding that every student learns differently. Many people recognize that each person prefers different learning styles and techniques. Technically, an individual's learning style refers to the preferential way in which the student absorbs processes, comprehends and retains information. For example, when learning how to build a modal of solar system, some students understand the process by following verbal instructions, while others have to physically manipulate the modal of solar system themselves. This notion of individualized learning styles has gained widespread recognition in education theory and classroom management strategy. Learning styles group common ways that people learn. Everyone has a mix of learning styles. Some people may find that they have a dominant style of learning, with far less use of the other styles. Individual learning styles depend on cognitive, emotional and environmental factors, as well as one's prior experience. In other words: everyone's different. It is important for educators to understand the differences in their students' learning styles, so that they can implement best practice strategies into their daily activities, curriculum and assessments.

Definitions of learning Styles
Keefe (1979) [5] defines Learning Styles as the "composite of characteristic cognitive, affective, and physiological factors that serve as relatively stable indicators of how a learner perceives, interact with, and responds to the learning environment."
Felder and Silverman (1988) [4] "Learning style is characterized as the preferences in process of an individual acquiring knowledge, holding and processing it".
Stewart and Felicetti (1992) define learning styles as those "educational conditions under which a student is most likely to learn."

Types of Learning Styles
Each of us is unique and different from each other. We see many of things differently. We have our own opinion sand thinking, our own personalities, even our own fingerprints. Just like our unique fingerprint, we all have a unique learning style. Learning styles refer to a range of competing and contested theories that aim to account for differences in individuals' learning. A learning style is a series of theories that explain the differences in our individual patterns of understanding information. We all learn differently, and we prefer information to be presented to us in a particular way - a way that makes it easiest for us to understand.
There are seven different types of learning styles. Each learning style is often referred to using different names. The seven learning styles include:

- **Visual learning style (spatial):** learners prefer using pictures, images, and spatial understanding.
- **Verbal learning style (linguistic):** learner prefers using words, both in speech and writing.

- **Aural learning style (auditory-musical):** learners prefer using sound and music.
- **Physical learning style (kinesthetic):** Learners prefer using your body, hands and sense of touch.
- **Logical learning style (mathematical):** learners prefer using logic, reasoning and systems.
- **Social learning style (interpersonal):** learners prefer to learn in groups or with other people.
- **Solitary learning style (intrapersonal):** learners prefer to work alone and use self-study.

While each of us learns in a combination of ways comprising of several different learning styles, we typically favor one style and may not use one or more styles at all. Each learning style is an individual way of learning with distinct characteristics that affect both learning and personality.

Review of Related Literature

Verma, B.P. and Sharma J. P. (1987) [8] in the study entitled "Relationship between Learning Style and Academic Achievement of High School Girls" found that as compared to female students of avoidant learning style group, female students belonging to participant learning styles groups are superior in their academic achievement in various subjects as well as total course of study.

Erica A. Wehrwein, Heidi L. Lujan, Stephen E. DiCarlo (2007) [3] in the study entitled "Gender differences in Learning Style Preferences Among Undergraduate Physiology Students" a majority of male students preferred multimodal instruction, specifically, four modes VARK i.e.(V; learning from graphs, charts, and flow diagrams), auditory (A; learning from speech), read-write (R; learning from reading and writing), and kinesthetic (K; learning from touch, hearing, smell, taste, and sight), whereas a majority of female students preferred single-mode instruction with a preference toward K. Thus, male and female students have significantly different learning styles. It is the responsibility of the instructor to address this diversity of learning styles and develop appropriate learning approaches.

Purnima (2008) [7] in the study entitled "A study of Learning Styles and Achievement Motivation of Senior Secondary Students in Relation to Gender and Type of Institution" found that gender difference existed in learning styles of senior secondary students. Female students showed stronger preference for learning through collaborative and participant style than their counterparts.

Babu, Ravi (2013) [1] in the study entitled "Learning Styles of Secondary School Students" The findings of the study revealed that students were found to be learning better through figures than verbal and also seem to be better in reproducing learning than constructive learning.

A small amount of research is available, still researcher remain engaged in exploring new dimensions in the concerned field. This period of life also demands involvement in serious studies and better learning styles. A better learning style helps an individual to opt better career in his life. There are so many factors which influence learning style of students. The present study will focus on finding the relationship between the learning styles, gender and academic stream.

Objectives

1. To find out the differences in learning styles of male and female senior secondary school students.
2. To find out the differences in learning styles of arts, science and commerce stream senior secondary school students.
3. To find out the interaction effect of gender and academic stream on learning styles of senior secondary school students.

Hypotheses

1. There would be significant difference in learning styles of male and female senior secondary school students.
2. There would be significant difference in learning styles of arts, science and commerce stream senior secondary school students.
3. There would be significant interaction between gender and academic stream on in learning styles of senior secondary school students.

Method and Procedure

The population of the present study consisted of all senior secondary school students studying in district Shimla of Himachal Pradesh.

Sample

The sample comprised 1500 students studying in senior secondary school located in district Shimla, Himachal Pradesh. The schools were selected through lottery method and students were drown through random sampling method. These students were of both sexes and from arts, science and commerce stream.

Variables

Seven learning styles were regarded as dependent variables. Academic stream and gender were treated as independent variables.

Tools Used

- Learning Styles Inventory-Memletics Learning Styles Inventory by Sean Whiteley (2003) adapted by the researcher to measure learning styles (visual learning style, aural learning style, verbal learning style, physical learning style, logical learning style, social learning style and solitary learning style) of Senior Secondary School Students was used. It consisted of 70 items, 10 items belonging to each dimension of the learning styles.

Research Design

In the present study a 2X3 factorial design was used for analyzing the data in respect of two level of gender (male and female) and three levels of academic stream (arts, science and commerce) in each cell of the design, there were 250 subjects. Thus 7 factorial designs of 2X3 natures were employed in the present investigation.

Statistical Techniques

Two-way ANOVA followed by t-test was employed in the study for analysis of data.

Results

The obtained results of two-way ANOVA in respect of learning style have been given in table 1. Mean scores of male and female students for those learning style where differences have been found are presented in table 2. Further significance of the differences in mean scores of arts, science and commerce stream students have been reported in tables 3(a) and 3(b).

Table 1: Summary of Two-way ANOVA in respect of 7 learning styles

S. No	Learning Styles	Source of Variation	Sum of Square	Df	Mean Square	f-ratio
1	Visual Learning Style	Gender (A)	64.84	1	64.89	7.71**
		Academic Stream (B)	35.86	2	17.93	2.13NS
		Gender*Academic Stream (A*B)	18.92	2	9.46	1.12NS
2	Verbal Learning Style	Gender (A)	21.84	1	21.84	2.56NS
		Academic Stream (B)	29.69	2	14.84	1.74NS
		Gender*Academic Stream (A*B)	14.81	2	7.40	0.86NS
3	Aural Learning Style	Gender (A)	114.81	1	114.81	12.31**
		Academic Stream (B)	89.12	2	44.56	4.77**
		Gender*Academic Stream (A*B)	41.70	2	20.85	2.23NS
4	Physical Learning Style	Gender (A)	9.26	1	9.28	1.11NS
		Academic Stream (B)	26.62	2	13.31	1.60NS
		Gender*Academic Stream (A*B)	14.23	2	7.11	0.85NS
5	Logical Learning Style	Gender (A)	42.33	1	42.33	6.42**
		Academic Stream (B)	237.88	2	118.94	18.04**
		Gender*Academic Stream (A*B)	6.6	2	3.31	0.50NS
6	Social Learning Style	Gender (A)	107.73	1	107.73	12.27**
		Academic Stream (B)	41.49	2	20.74	2.36NS
		Gender*Academic Stream (A*B)	16.94	2	8.47	0.96NS
7	Solitary Learning Style	Gender (A)	159.41	1	159.41	19.40**
		Academic Stream (B)	6.11	2	3.05	0.37NS
		Gender*Academic Stream (A*B)	10.04	2	5.02	0.61NS

*Significant at 0.05 level, ** Significant at 0.01 level, NS- Not Significant.

Table 2: Mean Scores of Learning Styles (on which the difference is found significant) of male and female senior secondary school students.

Learning Styles	Male (N=750)	Female (N=750)
	Mean	Mean
Visual Learning Style	9.85	9.43
Aural learning Style	9.31	8.76
Logical Learning Style	10.05	9.72
Social Learning Style	11.40	10.80
Solitary learning Style	10.44	11.09

Table 3(a): Significance of difference in mean scores of Aural Learning Style of Arts, Science and Commerce Stream Students.

Academic Stream	N	Mean	SD	Comparison Groups	t-value
Arts	500	9.20	2.97	Arts vs. Science	0.05NS
Science	500	9.21	3.04	Arts vs. Commerce	3.00**
Commerce	500	8.69	3.18	Science vs. Commerce	3.05**

Table 3(b): Significance of the difference in Mean scores of Logical Learning Style of Arts, Science and Commerce and Senior Secondary School Students.

Academic Stream	N	Mean	SD	Comparison Group	t-value
Arts	500	9.55	2.63	Arts vs. Science	6.42**
Science	500	10.45	2.66	Arts vs. Commerce	0.78 NS
Commerce	500	9.66	2.40	Science vs. Commerce	5.64**

It may be observed from table 1 that gender had main effect on visual, aural, logical, social and solitary learning style. Table 1 further shows that academic stream had main effect on aural and logical learning styles. However, there was no interaction effect of gender and academic stream on any learning style.

As regards gender difference, it was observed (vide table 2) that male senior secondary school students tended to rate them higher on visual, aural, logical and social learning style than female counterpart while female senior secondary school students rated themselves to be higher on solitary learning style than counterpart male students.

On rest of the learning styles male and female senior secondary school students did not exhibit any significant differences.

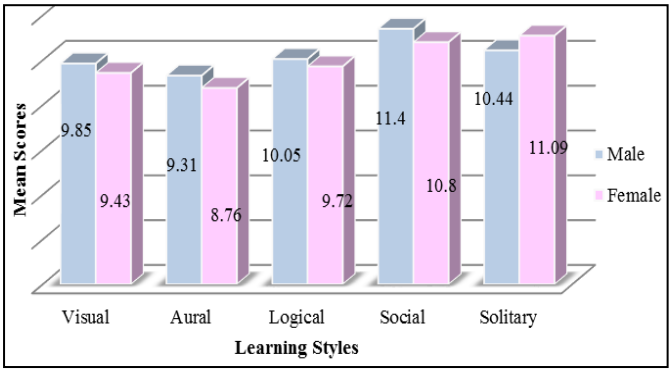

Fig 1: Gender wise Mean scores on Visual, Aural, Logical, Social and Solitary Learning Style.

The 't' test [vide table 3(a)] disclosed that on aural learning style, arts and science stream students tended to score higher than commerce stream senior secondary school students. Whereas in case of logical [vide table 3(b)] learning style, science students exhibited more preference as compared to arts and commerce stream senior secondary school students. But arts and commerce stream students were at par on this learning style.

Discussion

Hypothesis 1 stated that there would be significant differences in learning styles of male and female senior secondary school students. This was retained with reference to five learning styles viz. visual, aural, logical, social and solitary. The findings revealed that male senior secondary school students were more inclined towards the use of visual, aural, logical and social learning style than female senior secondary school students. This finding did not get empirical support due to lack of similar studies. The second research hypothesis anticipated significant differences in the learning style of the students studying in arts, science and commerce stream of senior secondary school. This was retained with regard to two learning styles namely aural and logical learning style. Science students were found to show tendency to use aural as well as logical learning style more than both arts and commerce stream senior secondary school students. Arts and commerce stream students were at par in the use logical learning style but arts students were found to be superior with respect to use of aural learning style commerce stream senior secondary school students.

The result of interaction of gender and academic stream did not emerge out to be significant. Hence research hypothesis 3 was rejected. Since so far no study has been conducted on the theme of present investigation, empirical support could not be extended with reference to insignificant interaction effect of gender and academic stream on learning style. Further research in the concerned area may highlight this aspect.

Educational implications

The findings of the study suggest that gender differences in certain learning styles should be given proper attention so that the students of both the gender may feel comfortable in learning activities. In addition to the above, on two learning style namely aural and logical, the science stream students were found superior to arts and commerce stream senior secondary school students. This implies that some appropriate intervention programmes be used to develop these two learning style among arts and commerce stream students.

Further such instructional procedures may be used with senior secondary school students which match aural and logical learning style. Assessment of the performance of these students should also focus on tasks concerning these two learning styles.

It is further recommended that there is an urgent need to undertake studies for exploring the relationships of academic stream and learning styles so that broader generalizations may be formulated in this context.

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