Understanding Learning Styles of Secondary School Students in Relation to Certain Variables

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Abstract: The present study was designed to investigate the preferred learning style of secondary level students and its role in academic performance. The study also explored the differences in learning styles in relation to gender, residential background and type of institution. The sample of the study consisted of 510 secondary school students. Kolb’s (1999) learning style inventory (LSI) was used to assess the preferred learning style of 10th grade students of South Kashmir. The students’ previous examination scores were used to study the relationship between learning styles and academic achievement. The findings of the study reveal that majority of the students’ shows accommodator and assimilator as their most preferred learning styles. The analysis of data reveals that learning styles affect academic performance of students. The study also depicts that demographic variables like gender, place of living, don’t affect learning styles. However, the type of institution in which the learner studies (Govt. /Private) significantly affects the preference of learning style.

Keywords: Learning styles; secondary school students; academic performance; Gender; residential background; type of institution

Introduction

Education is the key to national development. It is the only panacea for the ills and evils of the country. The process of acquisition of knowledge continues from individual’s birth to death through different ways. One of the most important processes of one’s life is learning, which is a multi-sided phenomenon in nature. By providing purposeful education, we can easily raise the general level of intelligence of students and develop clear and sound thinking. Through education, we can enable them to appreciate new values and turn their acquisitive impulse to the direction of truth, as it enables the person to bring dynamic and constructive changes in society.

Teaching/learning situation directly or indirectly depends upon the learning styles of learners. Different theorists and educationists have defined learning styles in their own way. The concept of learning style helps to understand how do learners differ from each other in terms of learning. In the beginning the concept of “learning style” was introduced by Rita Dunn in 1960 and since then a number of psychologists have tried to define the concept in a number of ways. According to Kefee (1987) learning styles are, “characteristic cognitive, affective and physiological traits that serve as relatively stable indicators of how learners perceive, interact with and respond to the learning environment”. Kolb describes learning styles as an individual’s preferred ways which they use to process information (Johassen& Grabowski, 1993). According to Grasha (1996) learning styles are “personal qualities that influence a student’s ability to acquire information to interact with peers and teachers, and otherwise to take part in learning experiences”. In the view of Felder and Silverman (1988), learning style is an individual characteristic strengths and preferences that they prefer while processing information. On the basis of these definitions, it can be concluded that learning style is the way, which an individual prefers while acquiring, retaining and retrieving information.

Recently, in education, the concept of “learning style” has gained great importance. Several psychologists (Dunn and Dunn, 1978; Kaya 1990; Damavandi 2011; Farooq, 2011; Metin, 2011) have strong conviction regarding the potential of learning styles for academic success. They hold the view that learning styles can make a significant difference in academic performance. Realising the paramount significance of learning styles in the teaching-learning processes a number of researchers in western countries have conducted researches on learning styles of students at different levels of education and attempted to explore their relationship with many socio-psychological variables. However, in India, it is the most neglected domain of research. Only a few researchers (Aggarwal, 1982; 1983, Verma and Sharma, 1987; Verma and Tiku, 1989; Verma and Kumari, 1989; 1996; Verma, 1992; Akhtar, 2011; Sharma, 2011) have investigated learning styles in relation to various variables like academic performance, gender, residential background, and type of institution, but no study has employed Kolb’s learning style inventory. In view of the dearth of studies on learning styles in India, the investigators thought it the need of the hour to investigate the learning style (through Kolb’s learning style inventory) preferences of secondary
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school students in relation to their academic performance, gender, residential background and type of institution.

While scanning the researches it has been found that there are different models of learning styles, which depict that there are different learning styles and each learner may have preferred learning style or styles. In the present study, the investigators collected the data through Kolb’s learning style model, therefore, the brief description of the model is given below.

**Kolb’s Learning Style Model**

The concept of Kolb’s learning style model rooted back to the work of John Dewey, Jean Piaget, Carl Jung, Kurt Lewin, and Lev Vygotsky Hainer, et al (1990). Dewey believed in “learning by doing” and the acquisition of knowledge through engagement in lively experiences. To him, a learner is an active part in the learning process, where he connects his previous experiences in new situations and builds new knowledge. This philosophy provided the basis for Kolb’s experiential learning theory.

According to Kolb Individual’s learning styles are like a circle, which contain four learning stages. These stages are: Concrete Experience (CE), Reflective Observation (RO), Abstract Conceptualization (AC) and Active Experimentation (AE). The process of learning has two main dimensions. First dimension is reaching from abstract conceptualization to concrete experience, and the second reaching from active experimentation to reflective observation. Kolb’s model demonstrates how knowledge is perceived by an individual through concrete experience and abstract conceptualization and how knowledge is integrated by an individual through reflective observation and active experimentation. An individual learns by “thinking” (abstract conceptualization), “feeling” (concrete experience), “doing” (active experimentation) and “watching” (reflective observation). Therefore, knowledge is perceived by an individual through thinking and feeling. Also, knowledge is integrated by an individual through watching and doing (Kolb, 1984).

The four learning styles, which are based on this learning cycle as identified by Kolb are: Diverger, Assimilator, Converge and Accommodator.

Converging Learning Style comprises of abstract conceptualization and active experimentation learning styles. The main features of the individuals who follow this learning style are, decision making, problem solving, analyzing the thoughts logically and systematic planning. Learning by doing is significant for such type of learners. These people choose jobs that need technological abilities such as medicine, engineering, economy, computer science etc.

Diverging Learning Style consists of concrete experience and reflective observation. The most important features of these individuals are thinking ability, being aware of values and concepts. These individuals modify or change concrete situations from many points of view and organize relations meaningfully. They are patient, objective and judge carefully but they do not attend to action. They take into consideration their thoughts and feelings while they form their thoughts. These people prefer jobs such as psychology, social practices, journalism, literature and art/theatre etc.

Assimilating Learning Style consists of abstract conceptualization and reflective observation learning styles. The most significant characteristics of these individuals is creating conceptual model. They focus on abstract concepts and thoughts while they learn something. These people prefer to become teacher, sociologist, educationist, advocate, law, librarian etc.

Accommodating learning Style consists of concrete and active experimentation. The chief characteristic of these people are making and carrying out plans and being in novel experimental situation. The individuals accommodate themselves without any trouble. They are open-minded while

![Fig. 1 Graphical Representation of Kolb’s Learning Style Model](image-url)
they learn something new. They prefer jobs such as educational administration, salesmanship, public administration, administration and banking.

Methodology

The following paragraphs describe the methodology adopted in the present investigation.

Objectives of the Study

The present study was aimed at achieving the following objectives:

i. To investigate the preferred learning styles of students studying at secondary school level.

ii. To investigate the differences in the level of academic achievement according to learning style among secondary school students.

iii. To find out the differences in learning styles of students studying at secondary school level in relation to specified demographic variables (gender, place of living and type of institution).

Method and Procedure

In the present study descriptive survey method has been used for investigation. The sample of the study comprised of 510 secondary school students currently enrolled in class 10th of different Govt/Private schools of South Kashmir of Jammu and Kashmir. This study was confined to students of class 10th only. The learning style was measured through Kolb’s Learning Style Inventory. The data was tabulated and analysed through SPSS 20. The following paragraphs present a detailed analysis and subsequent interpretation of the data in relation to objectives.

Results

Objective: 1. To investigate the preferred learning style of students studying at secondary school level

Table 1: Distribution of the sample according to learning style

<table>
<thead>
<tr>
<th>Learning styles</th>
<th>Frequency</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accommodator</td>
<td>152</td>
<td>29.8</td>
</tr>
<tr>
<td>Assimilator</td>
<td>136</td>
<td>26.7</td>
</tr>
<tr>
<td>Converger</td>
<td>94</td>
<td>18.4</td>
</tr>
<tr>
<td>Diverger</td>
<td>128</td>
<td>25.1</td>
</tr>
<tr>
<td>Total</td>
<td>510</td>
<td>100.0</td>
</tr>
</tbody>
</table>

According to table 1, the most preferred learning style of secondary school students was accommodator (29.8%), followed by assimilator (26.7%), diverger (25.1%) and converger (18.4%). The figure given below also presents the results through graphs.

Fig. 2 Graphical presentation of the total sample according to learning style preferences

![Bar chart showing the distribution of learning styles](image)

Objective: 2. To investigate the differences in the level of achievement according to learning style of secondary school students

In order to interpret the results of this objective, the data was analyzed with the help of descriptive statistics.

Table 2: Mean difference of learning styles according to students academic performance

<table>
<thead>
<tr>
<th>Learning style</th>
<th>N</th>
<th>Mean</th>
<th>Std. D</th>
<th>Std. Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accommodators</td>
<td>152</td>
<td>74.77</td>
<td>11.13</td>
<td>.90</td>
</tr>
<tr>
<td>Assimilator</td>
<td>136</td>
<td>81.66</td>
<td>8.83</td>
<td>.76</td>
</tr>
<tr>
<td>Converger</td>
<td>94</td>
<td>73.96</td>
<td>10.43</td>
<td>1.07</td>
</tr>
<tr>
<td>Diverger</td>
<td>128</td>
<td>79.33</td>
<td>10.10</td>
<td>.90</td>
</tr>
<tr>
<td>Total</td>
<td>510</td>
<td>77.60</td>
<td>10.62</td>
<td>.47</td>
</tr>
</tbody>
</table>

A perusal of the table 2 revealed that students with assimilator learning style had best academic performance, because their mean value is (81.66) followed by diverger (79.33), accommodator (74.77) and converger (73.96). The mean difference of learning styles according to their academic performance is represented graphically in figure 3.

Fig. 3 Graphical presentation of achievement means according to students learning style preference

![Bar chart showing the mean difference of learning styles](image)
In order to know whether the differences among the learning styles in relation to academic performance is actual or just by chance, one-way ANOVA was applied.

Table 3: Showing effect of learning styles on students academic performance

<table>
<thead>
<tr>
<th>Source of Variance</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Level of sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>5086.94</td>
<td>3</td>
<td>1695.64</td>
<td>16.40</td>
<td>.01</td>
</tr>
<tr>
<td>Within Groups</td>
<td>52296.84</td>
<td>506</td>
<td>103.35</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>57383.78</td>
<td>509</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The table 3 depicts that, ‘f’ value (16.40) is significant at 0.01 level. Therefore, it can be concluded that there exists significant difference in different learning styles in relation to their academic performance. It may, therefore be concluded that learning style influences the academic performance of secondary school students.

Objective: 3. To find out preferences of learning styles of secondary school level students’ in relation to demographic variables like- gender, type of school and residential background.

The data has been analyzed in terms of various demographic variables to find out whether the variables like gender, living place and type of institution have any influence on the learning styles of students. In order to analyze the data chi square and percentage were calculated. The tables given below present the analysis of the data in relation to specified demographic variables.

Objective: 3.1. To investigate learning style preferences of secondary level students according to their gender

Table 4: Preferences of boys and girls in learning styles

<table>
<thead>
<tr>
<th>Gender</th>
<th>Accommodator</th>
<th>Assimilator</th>
<th>Converger</th>
<th>Diverger</th>
<th>chi</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boys</td>
<td>84 (30.11%)</td>
<td>77 (27.60%)</td>
<td>50 (17.92%)</td>
<td>68 (24.37%)</td>
<td>.44</td>
<td>.93*</td>
</tr>
<tr>
<td>Girls</td>
<td>68 (29.44%)</td>
<td>59 (25.54%)</td>
<td>44 (19.05%)</td>
<td>60 (25.97%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>152 (29.80%)</td>
<td>136 (26.67%)</td>
<td>94 (18.43%)</td>
<td>128 (25.10%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Not significant

It is evident from the table 4 that boys prefer to learn through accommodating learning style (30.11%), followed by assimilator (27.60%), diverger (24.37%) and converger(17.92%). However, girls prefer to learn more accommodating learning style (29.44%), followed by diverger (25.97%), assimilator (54.54%) and converger (19.05%). The above table also depicts the chi-square value (.436) which is not significant. Therefore, it can be concluded that difference in learning styles between boys and girls is just by chance.

Objective: 3.2. To investigate the learning styles preferences of secondary level students according to their residential background.

Table 5: Preferences of Learning Styles of secondary level students belonging to rural and urban background

<table>
<thead>
<tr>
<th>Residential background</th>
<th>Accommodator</th>
<th>Assimilator</th>
<th>Converger</th>
<th>Diverger</th>
<th>Chi</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rural</td>
<td>84(31.11%)</td>
<td>74(27.41%)</td>
<td>43(15.93%)</td>
<td>69 (25.55%)</td>
<td>2.45</td>
<td>.48*</td>
</tr>
<tr>
<td>Urban</td>
<td>68(28.33%)</td>
<td>62(25.83%)</td>
<td>51(21.25%)</td>
<td>59(24.58%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>152(29.80%)</td>
<td>136(27.07%)</td>
<td>94(18.43%)</td>
<td>128(25.10%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Not significant

It is evident from the table 5 that rural students prefer to learn through accommodating learning style (31.11%), followed by assimilator (27.41%), diverger (25.55%) and converger(15.93%). However, urban students prefer to learn more through accommodating learning style (28.33%), followed by assimilator (25.83%), diverger (24.58%), and converger (21.25%). The above table also depicts the chi-square value (2.45) which is not significant. Therefore, it can be concluded that there is no significant difference in the learning styles of students belonging to rural and urban areas.

Objective: 3.3. To investigate the learning style preferences of secondary level students according to the type of institution in which they study.
The data was further analyzed to explore the impact of different learning styles on the academic performance of the students. It was found that there is significant difference in the academic achievement of students with converging, diverging, accommodating and assimilating learning styles. On the basis of the results of the study it may be stated that individual differences in learning styles affect the academic performance of the students in varied manner. Thus, it is necessary that educational psychologists need to develop insights into the specific learning styles, which are favoured by the educational system. If students can be enabled to become more aware of themselves and the ways in which they are likely to achieve better, they can be encouraged to develop more useful and more flexible learning styles. On the other hand, two major strategies have been proposed for enhancing students' achievement. One is through providing such a learning environment that matches students' learning styles and the second is through teaching for a balanced use of styles or flexibility (Damavandi, 2011). In this regard, the basic principle is that students must be benefited from instructions. However, elasticity is crucial for students as well as for teachers.

The findings of the study also revealed that there is no gender difference in learning style preferences. A number of researchers have made attempts to explore the gender differences in learning styles. The findings of the studies also confirm the results of the present study. For instance, Smedely (1984), Pederson (1984), Grun (1986), Fer (2003), Kabaday (2004) found no significant differences in learning styles of boys and girls, while there are studies revealing significant differences between learning styles and gender (Davis, 1985; Cohen, 1986 and Daiz, 1986).

The study also revealed that there is no impact of living place in the preferences of learning styles of secondary school students. The obtained findings with regard to rural-urban differences in learning styles of the students do not get direct support from any study because the investigators could not find any study related to differences in learning styles of rural and urban students by using Kolb learning style instrument. However, some studies, employing different tools of learning styles have shown significant differences in learning styles of students belonging to rural and urban background (Tappenden, 1983; Clyne, 1984; Atchison, 1988; Neh, 1989; Verma, 1991-92)

Table 6: Preferences of learning styles of secondary level students studying in government and private schools

<table>
<thead>
<tr>
<th>Type of School</th>
<th>Accommodator</th>
<th>Assimilator</th>
<th>Converger</th>
<th>Diverger</th>
<th>chi</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>Govt.</td>
<td>98 (30.03%)</td>
<td>64 (23.53%)</td>
<td>65 (23.90%)</td>
<td>45 (16.54%)</td>
<td>36.17</td>
<td>.01*</td>
</tr>
<tr>
<td>Private</td>
<td>54 (22.69%)</td>
<td>72 (30.25%)</td>
<td>29 (12.18%)</td>
<td>83 (34.87%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>152 (29.80%)</td>
<td>136 (26.67%)</td>
<td>94 (18.43%)</td>
<td>128 (25.08%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Significant at 0.01 level
The investigators could not find any study on institutional impact on learning style preferences, but some studies using different tools of learning styles have reported significant differences in learning styles of students belonging to different types of institutions (Aggarwal, 1982; Campbell 1988; Jackman, 1987; Verma 1995, Akhtar, 2011). These studies indirectly support the findings of the present study pertaining to institutional differences in learning styles.

In the light of the above findings of the study it is recommended that the classroom environment of schools must be attractive, activity based and should suit the learning style of learners. Each learner must get something, which is captivating for him. To provide such environment at schools, training of teachers is necessary. Through in-service and pre-service training programmes teachers should be mentally prepared to provide different kinds of opportunities to suit the learning style of learners.

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**Acknowledgment:** The authors gratefully acknowledge all participating students, and teachers for their collaboration.

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