

Learning Styles and the Related Variables: A Study of Pre-service Teachers

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Abstract - *Learning style means to the capability of learners to identify and process information in learning situations. The knowledge of learning styles helps to the teacher to make their lessons or teaching pattern according to learning style of an individual.. There are various types of learning styles. This study was carried out to find the learning styles of pre-service teachers in terms of gender, academic discipline, and their habitat. Kolb's Inventory of Learning Styles was used. The study found that learning style of pre-service teachers was statistically significantly different in respect of their gender, academic discipline and habitat. It was also establish that the majority of pre-service teachers preferred divergent learning style (42.2%) followed by the assimilator learning style (30.5%) and that they least preferred the accommodative (12.6%) and convergent (14.7%) learning styles.*

Keywords: Pre-service teacher, Learning, Learning style, academic discipline

I. INTRODUCTION

Learning is a life- long process. It is in fact personal journey of discovery. People learn in many different ways. Every individual has a unique style of processing and digesting information. Recently, how students think and how they learn is an important topic of discussion in the educational system. Especially, in our modern age of "Information Society", the opinion that individuals should be able to know and implement several thinking methods such as the ability to conduct research, to solve problem, creative thinking, and critical thinking, and should be active in the process of learning has brought the subjects of how thinking and learning would be performed into prominence (Güven & Kürüm, 2006; Yenice 2012). Renzulli and Dai (2001) determined that the individual knows how to learn better or to be active in the process of learning. In this regard, an individual knowing how to learn might be defined as one who knows his own features, or in other words, his own "learning style".

Empirical evidences have considered that learning styles are tendencies and preferences (Dunn, 1983), while another considers learning styles are related to individual methods and strategies of information processing (Reid, 1995). McDermott and Beitman (1984) suggested that unique learning styles are learning methods that involve strategies of decision-making, and problem solving, etc. Keefe (1979), writes that learning styles are generally considered as "characteristic, cognitive, affective, and psychological behaviors that serve as relatively stable indicators of how learners perceive, interact with, and respond to a

learning environment"(p. 4). Kolb (1981) defined the learning style as the individual most preferred way in gaining and processing information. Dunn and Dunn (1993) viewed the Learning style as a way beginning with an individual, concentrating on new and challenging information and continuing with the process of gaining the information and allocating it in the memory. Furthermore, each individual has own learning style just like he has a distinct fingerprint.

Learning style is a concept indicating tendencies of the individual to learn or his preferences. Empirical evidences have shown that David Kolb's Model, Peter Honey and Alan Mumford's model, Anthony, Gregorc's model, Christopher Dovakhin's model, Neil Fleming's VAK/VAKR model have been developed. This paper focused on the Kolb's model to know the learning style of prospective teachers. Kolb's learning style, or so-called experiential learning model is based on learning model put forward by Jung 1923. Being inspired by Jung's learning model, Kolb put forward experiential learning model (In Mutlu and Aydogdu, 2003 Yenice 2012). Development by Kolb (1984), the "Experiential Learning Model" was built on the view that experiences had a significant role in learning process and the information was formed by form changes in the experiences.

Experience plays a vital role in the learning and development. Kolb clarifies that different people naturally prefer a certain single different learning style and theory set out four distinct learning styles which are based on four stages learning cycle. This model therefore works on two level- a four stage cycle:

Concrete Experience(CE) , reflective observation (RO), abstract conceptualization (AC) and active experimentation (AE) and a four type definition of learning styles (each representing the combination of two preferred style) are: Diverging(CE/RO), Assimilating (AC/RO), Converging (AC/AE) and Accommodating (CE/AE). Askar and Akkoyunlu (1993) noted that learning ways symbolizing each learning style were different from each other, and explained that these were “by feeling” for concrete experience, “by observing” for reflective observation, “by thinking” for abstract conceptualization, and “by doing” for an active experience, respectively.

On the basis of learning style adopted by individual learner can be classified as:

Convergent are characterized by abstract conceptualization and active experimentation. They are good at making practical application of ideas and using deductive reasoning to solve problems. Such individuals are trying to find the answer of “How”.

Divergent tends towards concrete experience and reflective observation. They are imaginative and are good at coming up with ideas and seeing things from a different perspective. These individuals are working in learning activities is “Why”.

Assimilators are characterized by abstract conceptualization and reflective observation. They are capable of creating theoretical models by means of inductive reasoning. Individuals with Assimilator learning style are very skillful in understanding, wide variety of information and building theoretical models by unifying them. They start their learning with “What” so; it is the base of learning for such students.

Accommodator learners use concrete experiences and active experimentation. They are good at actively engaging with the world and actually doing thing instead of merely reading about and studying them. Additionally, planning, implementing the decisions and participating in new experiences is obvious characteristics of the individuals with accommodating learning style. Such individual search answer of a question like “What will be if...”

According to Kolb (1985), preferences of an individual in learning process causes that individual to adopt a particular learning style in the long-term. An individual prefers one type of learning style does not mean that he/she does not successful in other learning style. In contrast, a student who is more flexible in passing from a learning style suitable for his own structure and features to another one can more efficiently utilize his learning potential than another student restricted himself with a particular thinking and

learning style (Yenice, 2012). The Kolb learning style model effectively used in classroom education, group activities, project preparing and planning the exams.

Yenice (2012) Review the studies using Kolb’s Learning Style Inventory and see that many experimental and relational studies have been carried out. Experimental studies on this topic tried to find out that whether the educational situation and learning styles had an impact on academic success. The relational studies looked at relationships between learning styles and several variables (Yoon, 2000; Ergür, 2000; Fowler, 2002; Kiliç, 2002; Loo, 2002; Mutlu and Aydogdu, 2003; Kiliç and Karadeniz, 2004; KafHasirci, 2006; Demirbas and Demirkan, 2007; Joy and Kolb, 2009; Ertekin, Dilmaç and Yazici, 2009; Pehlivan, 2010 cited by Yenice 2012). For example, the study by Bahar and Sülün (2011) examined learning style of the pre-service science teachers based on their sex and academic success. The study found that 39.7% of the students had diverging learning style, 34.2% had Assimilator learning style, 15.2% had convergent and 10.9% had accommodate learning style. It was found that there was no relationship between sex and learning style (cited by Yenice 2012).

II. IMPORTANCE OF THE STUDY

The current objectives of the schools are; what are the ways and means of learning of students as well as how they learn. Students not only memorize the concepts, but also look for the most suitable learning style for themselves among a wide variety of learning styles. As a result of this, such topics are more demanding as especially how the students think and how they learn has gained importance in recent years.

A good teacher improves success of his students and having latest, deep and wide field knowledge and practices the skills appropriately. Additionally, they effectively utilize these skills and knowledge in simplifying, making the learning process interesting and also provide an effective learning environment. Cognitive features of teachers are very important to utilize knowledge, skill and abilities in an educational environment. Learning styles of the students directly linked to the academic success. For an individual, knowing the optimum learning style helps improving learning power (Askar and Akkoyunlu, 1993). In this context, searching, learning styles of the pre-service teachers and find out there is any relationship with gender, academic discipline and habitat. It helps the teacher educators to plan their teaching style and fulfill the needs of pupil teacher.

III. OBJECTIVES OF THE STUDY

The present study was carried out in order to find out the learning styles of pre-service science and Humanities and Social Science teachers in terms of gender, discipline, and habitat. In this context, researcher tried to answers for the following questions: if the learning styles of the pre-service vary by their gender, academic discipline and locale; if the learning styles of the pre-service science and Humanities and Social Science teachers vary with their academic discipline; and if the learning styles of the pre-service science and Humanities and Social Science teachers vary with their habitat.

IV. METHOD

Descriptive method was used to conduct this study. The samples of this study consisted 190 B.Ed. students (76 female and 114 male) enrolled in Faculty of Education, Banaras Hindu University, Varanasi, India. "Inventory of Learning Styles" developed by Kolb (1985) was used to collect the data for this study. The inventory consists of 12 items with four options requesting the individuals to rank four learning styles best defining their own learning styles. Each of four options on each item in the inventory reflects one

learning style. These are, (1) Concrete Experience (CE), (2) Reflective Observation (RO), (3) Abstract conceptualization (AC), and (4) Active Experience (AE). The points from the inventory are grouped according to the experimental learning theory as divergent style based on reflective observation and concrete experiences, Assimilator learning style based on reflective observation and abstract conceptualization, a convergent learning style based on abstract conceptualization and active experience, and accommodate learning style based on active experience and concrete experience. As a consequence of the response for each option by the participants, total point for one option ranges between 12 and 48. Reliability coefficient of sub-scales of the Inventory of Learning Styles were founded by Askar and Akkoyunlu (1993) as 0.58 for an active experience, 0.70 for reflective observation, 0.71 for concrete conceptualization, 0.65 for active experience, 0.77 for concrete-abstract experience, and 0.76 for active-reflective (Yenice 2012)

V. RESULT AND DISCUSSION

Data from the present study were analyzed, and percentages and frequencies of the data were documented. Chi-square test was applied.

Table 1. Gender-wise Learning Styles of the Pre-service Teachers

Learning Style	Divergent		Convergent		Assimilator		Accommodative		Total	
	No.	%	No.	%	No.	%	No.	%		
Sex										
Male	44 (48)	38.59	22 (16.8)	19.29	30(34.8)	26.31	18(14.4)	15.78	114	χ^2
Female	36 (32)	47.38	6(11.2)	7.89	28(23.2)	36.84	6(9.6)	7.89	76	8.74
Total	80		28		58		24		190	9

As can be seen from the table 1 the obtained χ^2 value was found to be significant at 0.05 level of confidence with degrees of freedom (df) of 188. Accordingly, one may consider that points of learning styles have varied with respect to gender of the pre-service teachers. As a consequence of percentage and frequency analysis of average sub-scale points of learning styles of the pre-service teachers, it was found that 80 (42.2%) pre-service teachers had diverging learning style, 28 (14.7%) pre-service teachers had convergent learning styles, 58 pre-service teachers (30.5%) had an Assimilator learning style, and 24 pre-service teachers (12.6%) had accommodate learning style. It was found that the ratio of the pre-service teachers with divergent and Assimilator learning style was higher and the ratio of those with accommodative and convergent learning style was low. The above table also reveals that more (47.38 %) female pre service teachers prefer diverging learning style followed by Assimilator (36.84%). They

give least preference to convergent and divergent i.e. 07.89%. On the other hand male pre-service teachers' preference towards learning style also have the same pattern as female pre-service teachers but the percentages are differ. Only 38.59 male pre-service teachers prefer divergent whereas in case of female it is 47.38%. The percentage of learning style priority of male pre- service teachers for convergent and accommodator is high in comparison to female. But in case of preferences given to assimilator more female prefer this i.e. 36.84% the counterpart only 26.31% preferred this learning style. When the percentage and frequency of data were analyzed it was found that predominant learning style of the pre service teacher by their sex was divergent and assimilator learning style. Based on these findings, one may comment that female and male pre-service teachers usually had diverging learning style containing concrete experience and reflective observation. Knowledge of student learning

style can help in implementing different teaching strategies. Gender differences exist: female strongly preferred the feeling dimension while male preferred the thinking (Allen J. Young, Patty Bedker 1997). The fact that there was a difference between the pre-service teachers in sex indicates that preferences and privileges in learning vary by sex. The result of this study corroborates to some extent the findings obtained by Wynd and Bozman (1996), Matthews (1996), Ergür (2000), Heffler (2001), and Güven and Kürüm (2007) indicate that there is a significant difference between learning style and sex with the students.

It is also observed from the Table no. 1 that pre-service male and female teachers' preferred Assimilator learning style. The observed frequency (28) is more than expected value (23.2) in case of female pre-service teachers. But in the case of preference of convergent and accommodate learning style observed value is lower than expected value. Assimilator learners prefer focusing on abstract ideas and concepts rather than people, and thus they focus on the logic, validity of such a theory instead of its practical value in learning style.

Table 2. Academic Discipline-wise Learning Styles of the Pre-service Teachers

Learning Style	Divergent		Convergent		Assimilator		Accommodative		Total	χ^2
	No.	%	No.	%	No.	%	No.	%		
Academic Discipline	No.	%	No.	%	No.	%	No.	%		
Science	50 (58.1)	37.87	28 (20.3)	21.21	36 (42.1)	27.27	24 (17.4)	18.18	132	27.129
Humanities and Social Science	30 (21.8)	51.72	(7.66)	-	22 (15.8)	37.9	(6.56)	-	58	
Total	80		28		58		24		190	

Table 2 shows; it was found that the points of learning styles of pre-service teachers vary significantly from their academic discipline. ($X^2 = 27.129$; $p > 0.01$). Based on this finding, one may conclude that points of learning styles of pre-service teachers are dependent of academic discipline. Most of the humanities and social science group pre-service teachers prefer divergent i.e. 51.72% on the other hand only 37.87% of pre-service science teachers prefer Divergent learning style. None of the students likely to prefer learning through active experimentation when Humanities and social studies, and likely to prefer learning through active experimentation when learning science (convergent 21.21% and accommodator 18.18 %). The findings of the study by Bahar and Sülün (2011) on pre-service science teachers that the pre-

service teachers usually had divergent (39.7%) and Assimilator (34.2%) learning style while ratio of those with convergent (15.2) and accommodative (10.2%) learning style was lower. Similarly, it was determined in a study by Bahar, Özen and Gulaçti (2009) that learning style of the students didn't vary by their sex while the pre-service teacher most frequently preferred the divergent learning style (43.6%) followed by assimilator (29.3%) learning style and that rate of preferring accommodative (16.3%) and convergent (10.8%) learning styles was lower (cited by Yenice 2012) Finding of the present study also supported by the study of Denizoglu (2008), it was found that the pre-service science teacher most frequently preferred the divergent learning style.

Table 3. Habitat-wise Learning Styles of the Pre-service Teachers

Learning Style	Divergent		Convergent		Assimilator		Accommodator		Total	χ^2
	No.	%	No.	%	No.	%	No.	%		
Habitat	No.	%	No.	%	No.	%	No.	%		
Rural	44(35.36)	52.38	12(12.3)	14.28	20(25.64)	23.81	8(10.6)	09.52	84	8.0711
Urban	36(44.63)	33.96	16(15.6)	15.09	38(32.35)	35.84	16(13.3)	15.09	106	
Total	80		28		58		24		190	

According to the results of the chi - square test in the Table 3, it was concluded that points of the learning style of the pre-service teachers vary statistically significantly by their habitat ($X^2=8.0711$, $P > 0.05$). Accordingly, it may be said that there is a significant relationship between learning style and habitat of the pre-service teachers. It was found that pre-service

teachers in the urban areas prefer 33.96 % divergent learning style followed by assimilator 35.84%, convergent 15.09% and accommodator 15.09%. When we go through the data for pre-service teachers belong to rural areas 52.38 % divergent, 23.81% assimilator and 14.28% convergent. There is least preference given to accommodator i.e. 09.52 %. It is observed from the

above table that the value of observed frequency is higher than expected, but in case of rural condition is just reversed. It may be due to the differences in academic environment of rural and urban areas as well as the level of aspirations.

VI. CONCLUSIONS

The knowledge of students' learning style plays a crucial role in the all-round development of students. Learning styles help the teacher to plan their activity in the classroom. The result of the present study shows that learning style of the pre-service teachers varies by gender. It may be due to the females are facing so many social problems and want to get away from that problem. In this process, they can think about many ways to overcome those situations. In schools female students are sense different academic environment than male. It is easily seen in Indian academic institutions that behavior of teachers varies by sex. This situation also plays an important role to develop the abilities. More resources provide more opportunities. It also observed that in Indian situations, females are treated as a liability by parents and get less chance for concrete and active experimentation. This is one of the reason females pre-service teachers preferred assimilating learning style more rather than accommodator or convergent. In case of male, our society considers as an asset of the family and they give more chance for active experimentation. Therefore the observed value is more than expected value for accommodator and the convergent learning style of male pre-service teachers.

According to their academic discipline the pre service teacher either science or humanities or social science major learning style was divergent and Assimilator. The result also shows that none the humanities and social pre service teacher give preferences to accommodator and convergent learning style. Certainly one would think that science and "experimentation" would be linked. We can easily see that there is no provision for experimentation in Humanities and social science curriculum. It may be one of the reason that none of students fall in the category of convergent and accommodator. So we can say that pre-service science teachers are active experimenters and practical application of ideas.

Pre-service teacher either belongs to urban or rural, divergent and assimilator learning style was dominant. In urban areas individuals have more expose and chance to active experimentation but in rural areas there are so many institutions where there are no modern facilities. They have less chance to prove their ideas through experimentation due to unavailable of

infrastructures. It was also observed that in India a common curriculum for rural and urban schools. There are so many local resources are available for experimentation in rural areas but due to the deformities in our curriculum, students did not approach it in a proper way. So this may be one of the reasons in difference of learning style of pre-service teachers belongs to rural and urban areas. The pre-service teachers belong to rural areas bound to accept ideas without any concrete experiences. They get less chance for practical application. It may be the reason for expected value is greater than observed value for accommodator and convergent learning style in those pre-service teachers belong rural areas.

Increasing student awareness of their own learning styles may be quite helpful in increasing control of their learning habits and strategies; which should in term influence their academic performance. Because students bring diverse personal experience, knowledge base and learning style to the classroom, their learning needs may require a mix of teaching and advising strategies. Recent research on teacher effectiveness has shown that successful teacher tend to be those who are able to use a range of teaching strategies and interaction style, rather than one using single, rigid approach to teaching and learning (Hammond, 2000 cited by Yenice 2012). As understanding of our students learning and cognition increases so does the need for professional development for those of us who teach and admire students. We must take into consideration the research advances that enable us to create a learning environment aimed at promoting student motivation and engagement.

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