

Cognitive Styles and Quality of Learning: A Case of Language Learners

Muhammad Shahid Farooq*

Abstract

The purpose of this descriptive study was to identify the prevalent cognitive styles of language learners studying different languages at master level. The survey was conducted by using a Cognitive Style Questionnaire (CSQ) for identifying the students' demographics and cognitive styles respectively. The association between students' cognitive styles and their academic performance was also explored. The other research question was related to differences in students' cognitive styles with reference to their demographics. Data were collected from 218 Master level language students from a metropolitan university of Pakistan. Data analysis revealed that the most prevalent cognitive style for students from French Language, English Language, Arabic Language, and Persian Language is Focusing; for Urdu Language is Reflexive and for Punjabi Language is Auditory/Visual mixed. It was seen that there exist multiple cognitive styles for students in each one of the fields with a slightly higher concentration in one or two dimensions of styles. In the overall scenario the academic performance differs significantly in relation to only the Auditory/Visual cognitive style. There is no significant difference in performance of students at all other levels in relation to the other three cognitive styles. The results of the study lead to the fact that further exploration is needed on a large data to get more insight in the phenomenon.

Keywords: Cognitive styles, academic performance, students' cognitive profile, prevalent cognitive style, language learners.

* Assistant Professor, Institute of Education and Research, University of the Punjab, Lahore.
Email: ddrchaudry@gmail.com

Introduction

Education is an important catalyst for rejoicing change and prosperity in the society. This healthy change may occur in terms of one's mental, social, spiritual and economic well being. It inculcates the realization of right and wrong in the individuals. This process of learning about right and wrong is a lifelong process passing through formal and informal modes. It leads the society towards cultural enrichment and the self competencies for a successful living.

All levels of education, especially the higher education has a significant value in the economic development of the state. The professional and skilled labour force comes from the higher education institutions. It also provides the leadership to the society in different social, economic, scientific and political domains. It equips the youth with civic norms, societal values, ethical maturity, and technological competencies for a purposeful living. Particularly, higher education plays a fundamental role in the socio-economic uplift of a country. It helps young people in understanding the principles of life, socializing for momentous roles, making future decisions, and advancement to prestigious careers. It not only embarks for pursuit of one's goals through broadening experience, exposing to diversity of views, arousing critical thinking, and inculcating analytical skills but also provides leadership to society in all spheres of life. This uprising mechanism is for one's physical, social, psychological, mental spiritual and economic development. Learning is associated not only with children but it is a lifelong task necessary for personal and career development for all individuals of all age groups. It provides professional and skilled labour force to cope with the needs of society.

The concept of cognitive styles was originated in two dimensions in educational and vocational psychological research circles. Learners' different characteristics were explored because different individuals retain and organize information in different fashions. Some researchers applied cognitive styles in educational settings for observing the differences in academic performance of students whereas others focus on different other domains like teaching and learning processes, and introduced theories of learning and cognitive styles. The recognition of cognitive and learning styles leads to the adaptation of potential teaching strategies and ensures the quality of higher education (Neto, Oliveira & Miranda, 2009).

This diversity is the cause of differences in their performance at work and conduct. Different individuals react in different manners to a cognitive task even though have same cognitive competencies. This unconscious choice of reaction depends upon their gender, age, experiences, habits, and social culture (Dasen & Mishra, 2010). This leads researchers to focus on cognitive styles and learning styles of learners. The history of exploration of cognitive styles and learning styles rooted back to twentieth century. Cognitive style is an innate attribute of an individual (Riding & Smith, 1992). It affects the searching browsing behavior and the decision making process of an individual about the relevance of the materials and sources (Santos, Nguyen, Yu, Li & Wilkinson, 2010). Research evidenced that the compatibility of cognitive styles with the field of studies results in high performance of students in their grades (Drysdale, Ross & Schulz, 2001; Hattie, 1999).

Theorists of cognitive styles like Huteau (1985) and Sternberg (1997) acknowledged cognitive styles as a conjuncture of cognition and personality by exhibiting both cognitive and the affective characteristics. The concept of cognitive styles gained popularity among educators in 1970s (Sternberg, 2001). This concept of styles was originated in two dimensions in educational and vocational psychological research circles. Learners' different characteristics were explored because different individuals retain and organize information in different fashions. Some researchers applied cognitive styles in educational settings for observing the differences in academic performance of students whereas others focus on different other domains like teaching and learning processes, and introduced theories of learning styles (Dunn & Dunn, 1978; Gregorc, 1985).

Individual's behaviour, way of thinking, learning, and perceptions are based on cognitive profile (Riding & Rayner, 1988). Better understanding of cognitive styles is not possible without defining cognition. Lucas-Stannard (2003) took the concept of cognition as a "collection of mental processes that includes awareness, perception, reasoning, and judgment" (p.2).

Cognitive styles are considered as immutable and their dimensions show specific processing functions that provide useful directions for classroom programming (Kagan & Kogan, 1970; Messick, 1984). Cognitive style is a particular cognitive processing characteristic associated with a certain individual. It illustrates the way an individual processes information and gains knowledge. It is a persistent and stable personality characteristic which influences the human behavior, attitude, social values, and interactions (Huteau, 1985a). These traits or mental behaviours are consistently utilized by individuals in problem solving. Cognitive style measures only

indicate the way, individual gains and processes information rather than the content of the information (Hansen, 1995). Generally cognitive styles may be defined as habitual individual differences in ways of experiencing situations, developing perceptions, organizing, retrieving, and processing information (Goldstein & Blackman, 1978; Messick, 1984), intellectual dispositions, approaching to decisions for problem solving (Messick, 1984; Sternberg & Grigorenko, 1997), ways for using the mind (Allinson & Hayes, 1996; Régnier, 1995a; Schultz, 1985), and as "preferred and habitual modes of perceiving, remembering, organizing, processing, representing information" (Dörnyei, 2005, p.125) and one's favorite or customary ways of information processing (Allport, 1937).

Cognitive styles are individual's different consistent preferences for processing and organization of information/experiences (Messick, 1984) while learning styles are considered as individual's skills and preferences how learner perceives, gathers, and processes learning materials for learning (Jonassen & Grabowski, 1993). The terms cognitive style and learning style seems to be similar in meaning and are sometimes used interchangeably (Mampadi, Chen, Ghinea & Chen, 2011) but studies showed that these are independent constructs and should be treated separately (Papanikolaou, Mabbott, Bull, & Grigoriadou, 2006; Sadler-Smith, 2001; Zarghani, 1988). Cognitive styles are stable characteristics while learning styles are changeable, and environmentally dependent characteristics (Peterson, Rayner, & Armstrong, 2009).

According to Shade (1989) there exists an overall consensus that "cognitive styles represent a super ordinate construct which accounts for individual differences in a variety of cognitive, perceptual, and personality variables which influence the method of perceiving, organizing, and interpreting information" (p.63).

Many studies have been conducted on cognitive styles with the orientation of student's subject majors and the duration of the program. A ten year longitudinal study conducted by Witkin, et al. (1977) revealed that the student's choice for the selection of subject major was influenced by their cognitive style. It was found that they selected their initial major subject of study and then ultimately changed that major and preferred a new one that complements or suits best with their cognitive style. This study also showed that students got better grades in the field of study which better matched with their cognitive styles (Hansen, 1995).

If the cognitive style of a pupil is similar as that of a teacher, then there are chances for positive improvement in the performance of the pupil. Similar is the case with the team members. If their cognitive style is same then there are more chances of success. The matching of cognitive styles makes the participants more comfortable at their work and guarantees the success of the project. Cognitive styles and abilities should not be confused with each other because cognitive styles are the way we prefer to use abilities. A good match between cognitive style profile and abilities of an individual provide a synergy for better outcomes (Sternberg, 1977).

Mostly learners are inclined not to use a single style but they use a combination of different styles. The choice of cognitive style and its effects on quality of students' personal and academic performance is complex in nature (Régnier, 1995a; Trice, 1985).

Cognitive styles of students and teachers affect the efficacy of learning process (Drummond & Stoddard, 1992; Gregorc & Butler, 1984; Nelson, Dunn, Griggs, Primavera, Fitzpatrick, Bacillos & Miller, 1993; O'Brien, 1990; Zhang & Sternberg, 2009). Dunn and Dunn (1978) gave a theory of cognitive styles based on 18 different styles. These styles were clustered in four basic groups: Emotional (motivation, responsibility, persistence, and structure), Environmental (design, sound, light, and temperature), Physical (perceptual, mobility, intake, and time) and Sociological (self, peers, team, pair, adult, and varied). They focused much on the elements that affects learner's ability of learning rather than the ways to learn.

Experiential learning theory defines cognitive process of learning and emphasizes on the significance of critical reflections in learning. Kolb's model is based on various information processing models such as Lewin's model of active participation in learning process, Piaget's theory that intelligence is environmental dependent rather than so much innate, and Dewey's belief of learning by doing (Teixeira, 2002).

Cognitive styles have been given less attention than they deserve, keeping in view their significance towards the performance of individuals in daily tasks. Relatively little research has been conducted on cognitive styles in relation to their contribution to academic and professional performance. Some of these studies showed that students secured higher grades in fields that are compatible with their preferred cognitive styles (Drysdale, Ross, & Schulz, 2001; Hattie, 1999; Matthews, 1995). Cognitive styles have also a significant role in selection of teaching method by teachers because their preferred teaching method represents their own cognitive style (Dunn & Dunn, 1979; Gregorc, 1979; Raven, Cano, Carton, & Shelhamer, 1993; Witkin, 1973).

In the present study only the following cognitive styles were surveyed: Auditory vs. Visual, Reflexivity vs. Impulsivity, Focusing vs. Scanning, and Field Dependent vs. Field Independent because the Cognitive Style Questionnaire was meant to assess only these styles.

There was a need to study the cognitive styles of university students and to facilitate the important areas associated with the teaching and learning. This study therefore strived to explore and analyze the differences of cognitive styles of university students in different fields of study. It was an attempt to determine the relationship of students' cognitive styles with their academic performance. This will be an aid in addressing the important concerns relating to the learning of students in different fields of study to meet the future challenges of the country. It will enable the higher educators in encouraging the right persons to be in their right discipline. This study evaluated different cognitive styles to determine the fact that which of them are the good predictors for the better academic performance in specific fields of study.

Objectives of the Study

The main objectives of this study were to:

- a. explore the prevalent cognitive styles of language students studying different languages at university level.
- b. correlate language students' cognitive styles and their quality of learning in terms of academic performance.

Research Questions

This study answered the following questions:

- a. What are the prevalent cognitive styles of language students studying at university level?
- b. Do language students' cognitive styles affect their quality of learning?

Method and Procedure

This study was conducted on a sample of 218 language students enrolled in 2nd year of Master Programs in six different language departments of the University of the Punjab, Pakistan. All the students present in the class at the time of data collection were surveyed.

The delimitations of this study were three folded. Firstly the survey was conducted for only 2nd year Master Program students from six departments. Secondly the Cognitive styles were measured by using Régnier's Cognitive Style Questionnaire based on four groups of cognitive styles (Auditory/Visual, Focusing/Scanning, Reflexive/Impulsive, and Field Dependent/Field Independent). Thirdly the achievement scores obtained by the students in previous examinations conducted by different Boards of Intermediate and Secondary Education, and Universities were taken as their academic performance.

Data were collected by using the Cognitive Style Questionnaire (CSQ). The Demographic Profile Questionnaire was consisting of variables to collect information such as: gender, age, family size, academic background, field of specialization, residential region, marital status, and academic score in the previous examinations.

Data were arranged and analyzed by using descriptive and inferential statistical measures through SPSS 16, Excel 2007 and CHIC (Cohesive Hierarchical Implicative Classification). Cross Tabulation and Chi-square were used to study the differences/relationships. The associations and relationships were studied between demographic variables and academic performance at three levels: secondary, intermediary and university level.

Cognitive styles were determined by using the Cognitive Style Questionnaire (CSQ) that consisted of four groups of nine questions with two types of answers (Régnier, 1995). The order of presentation of 36 questions and the coding of A or B terms were random. Each question was designed as a characteristic of a trend in style. This choice was primarily driven by a desire to simplify this investigation and the desire to make it effective under normal conditions. Participants were given the questionnaire in the classes and asked to answer all questions, leaving none blank, by choosing one of two options A or B. The questions were related to auditory/visual, reflexive/impulsive, focusing/scanning, and field dependent/field independent cognitive styles.

Results

After reviewing the different cognitive styles, this study focused upon four cognitive styles namely:

[STY1] Cognitive style "Auditory/Visual"

[STY2] Cognitive style "Reflexive/Impulsive"

[STY3] Cognitive style "Focusing/Scanning"

[STY4] Cognitive style "Field Dependent/ Field Independent"

This choice was primarily driven by a desire to simplify the investigation consisting of the primary cognitive styles. For identification of cognitive styles of students a questionnaire was used which consisted of four groups of nine questions to be answered by choosing one of two options. The order of presentation of the 36 questions as well as the coding of A or B was random. Each item was designed as a characteristic of a trend in a style. At the time of administration, participants were asked to choose one of two options A or B and that no question be left unanswered. Analysis of responses to the questionnaire produced four pair of integers from 0 to 9 for each individual representing his/her cognitive style. Each pair (p_i, q_i) for $i=1$ to 4 is such that $p_i+q_i=9$. The number p_i is the number of terms describing the component No. 1 of the cognitive style No. 1, the number q_i is the number of terms describing component No. 2 of cognitive style No. 1. The diagram below provides the 10 pairs of possible outcomes.



The rule of decision on the identification of the dominant trend of the cognitive style was based on numbers (p_i, q_i) . For the cognitive style No. 1, a scale can be considered at three levels:

- A student shows a trend towards the pole No. 1 if p_i is greater than or equal to 6, meaning that more than $2/3$ of the rules relating to Pole No. 1 have been chosen by the individual.
- A student shows a lack of trend and is in a mixed or atypical if $(p_i=4$ and $q_i=5)$ or $(p_i=5$ and $q_i=4)$.
- A student shows a trend towards the pole No. 2 if q_i is greater than or equal to 6, which is more than $2/3$ of the rules relating to Pole No. 2 were chosen by the individual.

A scale was adopted up to ten levels. An individual is characterized in the cognitive style No. 1 by its tendency of pi for the pole No. 1 and tendency of qi for the pole No. 2. An individual is placed on either pole in cognitive style No. 1 only if numbers pi or qi is approaching to 9. If the values of pi, qi falls on 4 and 5 then the dimension of cognitive styles becomes mixed of the two extreme poles of the respective cognitive style. Following this rule 80 cognitive profiles were identified with four digits. These digits represent the three dimensions of the cognitive style (Pole 1, Pole 2 or Mixed) and their position indicates the respective cognitive style from the above mentioned four styles (Régnier, 1995).

For example:

In cognitive profile **Pr01 (1111)**

First			Second			Third			Fourth		
1			1			1			1		
[STY1]			[STY2]			[STY3]			[STY4]		
1	2	3	1	2	3	1	2	3	1	2	3

From left to right;

First **1** stands for Pole 1 dimension of [SYT1] that is δ Auditory

Second **1** stands for Pole 1 dimension of [STY2] that is δ Reflexive

Third **1** stands for Pole 1 dimension of [STY3] that is δ Focusing, and

Fourth **1** stands for pole 1 dimension of [STY4] that is δ Field Dependent

Table1

Cognitive Styles of Students from Different Fields

Sr. Field of study	[STY1]			[STY2]			[STY3]			[STY4]		
	Aud.	Vis.	Mix	Ref.	Imp.	Mix	Foc.	Sca.	Mix	FD	FI	Mix
	%	%	%	%	%	%	%	%	%	%	%	%
1. French Language	10.7	53.6	35.7	7.1	25.0	67.9	75.0	3.6	21.4	28.6	17.9	53.6
2. English Language	10.0	40.0	50.0	20.0	15.0	65.0	67.5	15.0	17.5	47.5	12.5	40.0
3. Arabic Language	11.1	50.0	38.9	22.2	30.6	47.2	66.7	5.6	27.8	50.0	11.1	38.9
4. Urdu Language	22.8	28.1	49.1	49.1	12.3	38.6	43.9	15.8	40.4	31.6	21.1	47.4
5. Persian Language	9.4	31.2	59.4	9.4	37.5	53.1	71.9	3.1	25.0	43.8	21.9	34.4
6. Punjabi Language	16.0	8.0	76.0	24.0	24.0	52.0	64.0	8.0	28.0	52.0	16.0	32.0

Table 1 shows the classification of cognitive styles of students from different fields of study. It shows that on [STY1], students of Urdu Language (22.8%) in comparison to other fields of study, show a higher percentage of auditory cognitive style, French language students (53.6%) are of Visual, and students of Punjabi Language (76%), are of Auditory/Visual mixed cognitive style. For [STY2], students of Urdu Language (49.1%) show higher percentage, in comparison to those in other areas of Reflexive cognitive style, students of Persian Language (37.5%) are of Impulsive cognitive style, and students of French Language (67.9%) are of Reflexive/Impulsive cognitive style. For [STY3], students of French Language (75.0%) show the highest percentage on Focusing cognitive style, students of Urdu Language (15.8%) on Scanning cognitive style and also students of Urdu Language (40.4%) on Focusing/Scanning mixed cognitive style. For [STY4], it is clear that students of Punjabi Language (52.0%) has the highest percentage on Field Dependent cognitive style, Persian Language (21.9%) on Field Independent, and French Language students (53.6%) on Field Dependent/Field Independent mixed show highest score. It is also evident from data analysis that students of English Language, and Arabic Language fall in the category of Focusing cognitive style.

From another dimension Table 1 shows that the most prevalent cognitive style for students from French Language (75.0%), English Language (67.5%), Arabic Language (66.7%), Persian Language (71.9%) field is Focusing style; for Urdu Language (49.1%) is Reflexive and for Punjabi Language (76%) is Auditory/Visual mixed.

Table 1 also shows that there exist multiple cognitive styles for students in each one of the fields with a slightly higher concentration in one or two dimensions of styles. So the cognitive profiles based on these high percentage dimensions were identified as in the following Tables.

Table 2
Cognitive Profile of French Language Students (N=28)

No.	Cognitive Profile	f	%	No.	Cognitive Profile	f	%
Pr03	1113	1	3.6	Pr51	2331	2	7.1
Pr19	1311	1	3.6	Pr54	2333	1	3.6
Pr21	1313	1	3.6	Pr62	3133	1	3.6
Pr36	2211	1	3.6	Pr65	3213	1	3.6
Pr38	2213	3	10.7	Pr71	3233	1	3.6
Pr44	2233	1	3.6	Pr72	3311	3	10.7
Pr45	2311	1	3.6	Pr73	3312	2	7.1
Pr46	2312	2	7.1	Pr74	3313	1	3.6
Pr47	2313	4	14.3	Pr76	3322	1	3.6

The overall answers of French Language students on cognitive profile more frequently (14.3%) reveal a Pr47 (2313) profile. It shows that from this field of study the most prevalent style is a combination of Visual, Reflexive/Impulsive mixed, Focusing, and Field Dependent/Field Independent mixed style (Table 2).

Table 3

Cognitive Profile of English Language Students (N= 40)

No.	Cognitive Profile	f	%	No.	Cognitive Profile	f	%
Pr03	1113	1	2.5	Pr50	2323	1	2.5
Pr10	1211	1	2.5	Pr51	2331	1	2.5
Pr17	1232	1	2.5	Pr54	3111	2	5.0
Pr18	1233	1	2.5	Pr60	3131	1	2.5
Pr28	2111	1	2.5	Pr63	3211	2	5.0
Pr30	2113	1	2.5	Pr65	3213	1	2.5
Pr32	2123	1	2.5	Pr72	3311	4	10.0
Pr34	2132	1	2.5	Pr73	3312	1	2.5
Pr45	2311	4	10.0	Pr74	3313	6	15.0
Pr47	2313	3	7.5	Pr75	3321	1	2.5
Pr48	2321	1	2.5	Pr78	3331	1	2.5
Pr49	2322	2	5.0	Pr80	3333	1	2.5

The prominent cognitive profile for students of English Language is Pr74 (3313). This style consists of Auditory/Visual mixed, Reflexive/Impulsive mixed, Focusing, and Field Dependent/Field Independent mixed cognitive styles (Table 3).

Table 4

Cognitive Profile of Students of Arabic Language (N=36)

No.	Cognitive Profile	f	%	No.	Cognitive Profile	f	%
Pr01	1111	1	2.8	Pr50	2323	1	2.8
Pr13	1221	1	2.8	Pr51	2331	1	2.8
Pr21	1313	2	5.6	Pr53	2333	1	2.8
Pr33	2131	2	5.6	Pr54	3111	1	2.8
Pr35	2133	1	2.8	Pr56	3113	2	5.6
Pr36	2211	5	13.9	Pr61	3132	1	2.8
Pr42	2231	1	2.8	Pr63	3211	1	2.8
Pr43	2232	1	2.8	Pr64	3212	1	2.8
Pr44	2233	1	2.8	Pr72	3311	4	11.1
Pr45	2311	1	2.8	Pr74	3313	3	8.3
Pr46	2312	1	2.8	Pr80	3333	1	2.8
Pr47	2313	2	5.6				

Table 4 highlights that Pr36 (2211) is cognitive profile with the highest percentage for students (13.9%) of Arabic Language. This profile is a combination of Visual, Impulsive, Focusing, and Field Dependent cognitive styles.

Table 5

Cognitive Profile of Students of Urdu Language (N=57)

No.	Cognitive Profile	f	%	No.	Cognitive Profile	f	%
Pr01	1111	1	1.8	Pr47	2313	1	1.8
Pr04	1121	1	1.8	Pr52	2332	1	1.8
Pr06	1123	1	1.8	Pr53	2333	1	1.8
Pr08	1132	1	1.8	Pr54	3111	4	7.0
Pr09	1133	2	3.5	Pr56	3113	1	1.8
Pr18	1233	1	1.8	Pr57	3121	1	1.8
Pr19	1311	1	1.8	Pr59	3123	1	1.8
Pr20	1312	1	1.8	Pr61	3132	1	1.8
Pr21	1313	1	1.8	Pr62	3133	2	3.5
Pr24	1323	1	1.8	Pr70	3232	3	5.3
Pr26	1332	1	1.8	Pr71	3233	2	3.5
Pr27	1333	1	1.8	Pr72	3311	3	5.3
Pr28	2111	1	1.8	Pr73	3312	3	5.3
Pr29	2112	1	1.8	Pr74	3313	1	1.8
Pr30	2113	6	10.5	Pr75	3321	2	3.5
Pr31	2121	2	3.5	Pr78	3331	2	3.5
Pr35	2133	2	3.5	Pr80	3333	2	3.5
Pr44	2233	1	1.8				

Students (10.5%) of Urdu Language showed a highest percentage for Pr30 (2113) cognitive profile (Table 5). It is a blend of Visual, Reflexive, Focusing, and Field Dependent/Field Independent mixed cognitive styles.

Table 6*Cognitive Profile of Students of Persian Language (N=32)*

No.	Cognitive Profile	f	%	No.	Cognitive Profile	f	%
Pr02	1112	1	3.1	Pr54	3111	1	3.1
Pr19	1311	1	3.1	Pr63	3211	5	15.6
Pr23	1322	1	3.1	Pr65	3213	2	6.2
Pr28	2111	1	3.1	Pr71	3233	2	6.2
Pr36	2211	1	3.1	Pr72	3311	2	6.2
Pr38	2213	2	6.2	Pr74	3313	3	9.4
Pr45	2311	2	6.2	Pr78	3331	1	3.1
Pr46	2312	1	3.1	Pr79	3332	2	6.2
Pr47	2313	1	3.1	Pr80	3333	1	3.1
Pr52	2332	2	6.2				

Table 6 shows that Pr63 (3211) is the cognitive profile with the highest percentage for the students (15.6%) of Persian Language. This profile is a group of Auditory/Visual mixed, Impulsive, Focusing, and Field Dependent cognitive styles.

Table 7*Cognitive Profile of Students of Punjabi Language (N=25)*

No.	Cognitive Profile	f	%	No.	Cognitive Profile	f	%
Pr07	1131	1	4.0	Pr65	3213	1	4.0
Pr16	1231	1	4.0	Pr67	3222	1	4.0
Pr19	1311	1	4.0	Pr68	3223	1	4.0
Pr25	1331	1	4.0	Pr70	3232	1	4.0
Pr45	2311	1	4.0	Pr72	3311	4	16.0
Pr47	2313	1	4.0	Pr74	3313	2	8.0
Pr54	3111	2	8.0	Pr78	3331	1	4.0
Pr56	3113	3	12.0	Pr79	3332	2	8.0
Pr63	3211	1	4.0				

Pr72 (3311) is the cognitive profile with the highest percentage for the students (16%) of Punjabi Language (Table 7). It is a blend of Auditory/Visual mixed, Reflexive/Impulsive mixed, Focusing and Field Dependent cognitive styles.

Table 8

Cross Tabulation of High Achiever, Average Achiever, and Low Achiever Students' Cognitive Styles with their Academic Performance at Intermediary Level (N=218)

Cognitive Style		Grades			Total	
		High Achiever	Average	Low Achiever		
[STY 1]	Auditory/ visual	Count	12	78	20	110
	Mix	Expected Count	18.2	73.7	18.2	110.0
	Visual	Count	21	45	11	77
		Expected Count	12.7	51.6	12.7	77.0
	Auditory	Count	3	23	5	31
		Expected Count	5.1	20.8	5.1	31.0
		Total	36	146	36	218
[STY2]	Reflexive/	Count	20	75	19	114
	Impulsive Mix	Expected Count	18.8	76.3	18.8	114.0
	Impulsive	Count	9	33	7	49
		Expected Count	8.1	32.8	8.1	49.0
	Reflexive	Count	7	38	10	55
		Expected Count	9.1	36.8	9.1	55.0
		Total	36	146	36	218
[STY3]	Focusing/	Count	7	40	14	61
	Scanning Mix	Expected Count	10.1	40.9	10.1	61.0
	Scanning	Count	4	15	2	21
		Expected Count	3.5	14.1	3.5	21.0
	Focusing	Count	25	91	20	136
		Expected Count	22.5	91.1	22.5	136.0
		Total	36	146	36	218
[STY4]	FD/FI Mix	Count	16	59	16	91
		Expected Count	15.0	60.9	15.0	91.0
	Field independent	Count	5	28	4	37
		Expected Count	6.1	24.8	6.1	37.0
	Field dependent	Count	15	59	16	90
		Expected Count	14.9	60.3	14.9	90.0
		Total	36	146	36	218
	[STY1]	[STY2]	[STY3]	[STY4]		
2=	10.12	.956	3.80	1.652		
df=	4	4	4	4		
p-value=	.038	.916	.433	.799		

Table 8 shows that the [STY1] (Auditory, Visual, Auditory/ visual Mix) has a significant association with the academic achievement of the language students ($\chi^2=10.12$, $P=0.038$) at intermediary/higher secondary school level. The Auditory style shows a significant association with the high achievement and visual style shows a significant association with the average achievement of the language learners. The other cognitive styles do not show any significant association with the academic performance of language learners. It may be concluded that the [STY1] is a good contributor towards quality performance of language learners. It may be due to the fact that generally in the context of Pakistan the language teachers from early years teach language courses by using the visual and verbal teaching methods.

Discussion

Individual's behaviour, way of thinking, learning, and perceptions are based on cognitive profile (Riding & Rayner, 1998). Cognitive styles have also a significant role in selection of teaching method by teachers because their preferred teaching method represents their own cognitive style (Dunn & Dunn, 1979; Gregorc, 1979; Raven, Cano, Carton, & Shelhamer, 1993; Witkin, 1973). Cognitive styles affect the nature of decision making that in turn enhances the quality of behavioral changes, ability to perform better in day to day functions and make the individual efficient thinkers. The language learners have some unique and some other common cognitive profiles. The relationship of cognitive styles with students performance facilitates the learners to perform in such a way that the desired quality of learning can be attained and maintained. It is concluded from the findings of study that there is no such single dominant cognitive style for the language learners. They have different cognitive profiles concurrently. The average and the high performance of language learners have a positive association with their cognitive styles. It shows that the prevalent cognitive styles of language learners are one of the determinants of quality performance. Different studies evidenced that the compatibility of cognitive styles with the field of study results in high performance of students in their grades (Drysdale, Ross & Schulz, 2001; Hattie, 1999).

It is therefore recommended that this study should be replicated on a larger sample at national level to get more insight in the relationship of cognitive styles and academic performance. It may be replicated with the language students and their current academic performance at master level instead of their performance at previous levels. The cognitive styles of students should be assessed earlier so that the teachers can help them accordingly.

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