Academic Disciplines and Learning Style Preferences of students in graduate level

***Nathu Ram Chaudhary**

Abstract : *Learning styles preference is the vital aspect for teaching learning process. This paper mainly focuses on determining the learning styles of first year graduate students of Tikapur Multiple Campus and examining the relationship between students' Learning style preferences (LSPs) and their faculty as well as gender. The instrument, Index of Learning Styles (ILS), is administered to 112 randomly selected students. As for the data analysis, descriptive statistics portrays the frequencies, percentages; the chi square test is conducted to see whether students' LSPs differ according to faculties and the Crosstabs procedure is conducted to investigate whether the LSPs of the students at TMC differ according to their gender. The results indicate that there is no significant difference between students' LSPs and faculty except understanding dimension. Revealing what the learning style preferences of the first year graduate students of TMC and through this research. Therefore, it will be helpful for further research and pedagogical implications for the teachers to match their teaching with their students.*

Key Words: *Learning Style Preferences, Index of Learning Styles, Faculty, Gender*

Introduction

Learning style of any student depends upon various factors. Personal and social factors play the key role in selecting the learning styles by the students. Many observe that these cultural differences among students have a significant impact on the learning process in various levels of education.

Learning styles can generally be defined as a group of attributes and behaviour that determine the way or approach of learning preferred by an individual (Honey & Mumford, 1992, cited in Ahmad Saat et. all, 2005). Thus it is a combination of factors characterized by cognitive, affective as well as psychological (Duff, 2000, cited in Ahmad Saat et. all, 2005). Normally, individuals differ in their views and attitudes towards a situation, thus the way or styles they learn are also different.

Various learning styles models have been forwarded by many researchers working in this field of research. Among them is by Kolb (1976) that was based on learning cycle. Kolb identifies four types of approaches preferred by many individuals; they are active experimentation, reflective observation, abstract conceptualization and concrete experience. The four approaches parallel to the levels of learning cycles that begins with taking action, followed by seeing results, thinking about results and finally planning for the next time.

**Lecturer, Tikapur Multiple Campus*

Richard Felder (1993) proposed a five dimension dichotomy learning style that is related to the information transfer process to an individual. The first dimension is on the most preferred types of information to be assumed, i.e. either sensory or intuitive information. The second dimension is on the most effective mode of senses to obtain information; either visual or verbal. Then, followed by the most preferred arrangement or organization of information; either inductive or deductive. The fourth dimension is about the most preferred approach to process information; either actively of reflectively. The final dimension is on the advances of understanding the information; either sequentially or globally.

Joy and Kolb (2008) found that it is culture and variables related to education, i.e., level of education and area of specialization that have the largest impact on learning styles. Fridland (2002), for example, suspects that academic specialization might have more influence on learning than culture. This would help explain results by Zualkernan, Allert, and Qadah (2006, as cited in joy and Kolb, 2008) who found no difference in learning styles of Middle Eastern and American computer programming students. Akhtar (2011) concluded that socio-economic status of the students directly affects the learning style preferences of the developed and undeveloped districts of Pakistan. At this time there is no specific quantitative study about Bachelor students' learning styles in Nepal, that's why this study is a critical piece.

Since preference of learning styles at various levels of study, relating the results to various academic variables and demographic profiles has been studied by the many researchers. Most of them used the Kolb's learning style. In the present study the respondents are Bachelor students of Tikapur Multiple Campus. Felder (1998) learning style model was adopted in this study. An Index of Learning Styles (ILS) questionnaire developed by Solomon and Felder in 1998 was used in the study to evaluate the respondents' preference on the four dimension of the model. The reliability of the ILS has been tested, and used by many researchers in the studies.

Statement of the Problem

The graduate students attend their studies in the morning time, interacting with the respective lecturers in the classroom. Traditional learning is adopted in education, management and humanities program. The classroom mainly composed of fresh students but different background. Hence, it is expected that they would prefer different learning styles. At the same time the adopted learning style can vary based on previous experience and current environment (Honey and Mumford, 1995, as cited in Ahmad Saat et. all, 2005).The course modules prepared for the graduate students most often produced without taking into account the students preferred learning styles, or somewhat bias towards one dichotomy dimension of learning styles. This could partly be attributed to the lack of data on students' preferred learning styles. Thus, there might be great possibility that the presentation style of the module is antagonistic to the learning style of the majority of students. The implication of this situation is very obvious.

Learning style studies are helpful for teachers and provide the means of understanding their own students' learning styles. With learning styles data teachers can match their teaching styles and classroom environment accordingly. In the literature, there are numerous quantitative studies demonstrating that teaching based on students' learning styles improves both classroom success and satisfaction (Dunn, Beadury, &Klavas, 1989; Griggs, 1992, Thomson &Mascazine, 1997 as cited in Kutay, 2006). Learning styles seems to be a critical framework for processing information effectively.

There are research studies focusing on learning styles in different cultures and levels of education. Currently there are no quantitative studies available that compare learning styles of Graduate students with their faculty. This study might explore how different faculty students process new and difficult information looking for similarities and differences among them. This seems to be a critical piece. Understanding the interrelationship between learning styles and faculty of the students was the focus of this research study.

Objectives of the Study

The main objectives of the present study are:

i. To identify the graduate students' learning styles preferences.
ii. To determine the correlation between academic disciplines and learning styles.
iii. To compare the learning style preferences of the students from different academic discipline.
iv. To suggest pedagogical implications.

Research Questions

The research questions are as follows:

1. What are the types of learning style preferences of the graduate students of Tikapur Multiple campus in terms of four dimensions suggested by Felder and Soloman (1998)?
2. What are the LSPs of graduate students according to their faculty?
2.1 What is the LSP of the students from Faculty of Education?
2.2 What is the LSP of the students from Faculty of humanities?
2.3 What is the LSP of the students from Faculty of management?
3. What are the LSPs of graduate students according to gender?
3.1 Are female students active or reflective, sensing or intuitive, visual or verbal and sequential or global?
3.2 Are male students active or reflective, sensing or intuitive, visual or verbal and sequential or global?
4. Is there any correlation between academic disciplines and learning style preferences of the graduate students of Tikapur Multiple campus?
5. What are the similarities and differences of learning style preferences of the students from different academic disciplines?

Hypothesis of the Study

H_0: There is no association between academic disciplines and LSPs of the students.

H_1: There is association between academic disciplines and LSPs of the students.

Conceptual Framework

The study was based on the following conceptual framework:

Independent Variables (Background disciplines) **Extraneous Variables** **Dependent Variables (Learning style preferences)**

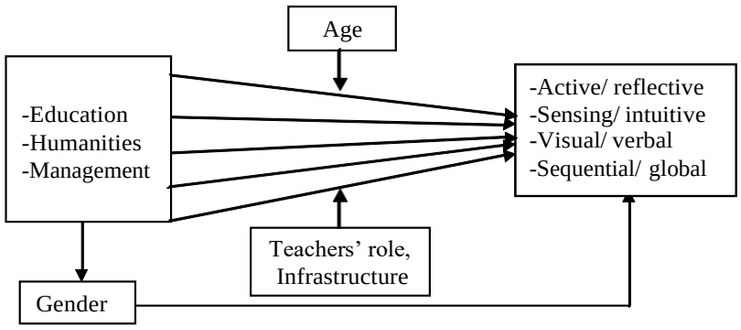

Fig.1: Conceptual framework of the study

Methodology

In this chapter the overall design of the study, description of the subjects of the study, data collection instrument, data collection procedure, data analysis techniques, and the limitations of the study are presented.

Overall Design of the Study

The overall design of this research study was descriptive research. In this research study, the researcher administered the questionnaire directly to the participants of the study who were 112 graduate students at TMC. In other words, randomly selected students were given a questionnaire, Index of Learning Styles (ILS) developed by Felder and Soloman, to complete in their classrooms at the same time and in the same place. The purpose of ILS was to determine students' learning style preferences. The aim was to find out whether there was any relationship between students' LSP in relation to faculty they were and gender.

Population and Sampling

The researcher has proposed to find out the LSP of the first year students of the graduate level at Tikapur Multiple Campus. For this, 72 students from B.Ed., 20 students from BBS first year and 20 students from BA first year were selected by random sampling method to fulfill the aforementioned objectives of the research.

The participants of the study were 112 Diploma students out of 612 students at Tikapur Multiple Campus. While determining the subjects of the research study, two steps were followed. Students at TMC have three different faculties - Education (Maths, Economics, English, Population, Nepali and Health), Management and Humanities and each Programme has two /three Sections.

Thus, first of all, the researcher listed the names of the Students in each section. then, the researcher administered the questionnaires (translated in Nepali) to the students that were randomly selected. The randomly selected students were good representatives of the whole group, TMC students. Participants were from three different faculties - Education, Management and Humanities (Table 1).

Table 1 : Distribution of Participants According to Disciplines (Faculties)

Faculty	Frequency	Percentage
Education (Eco)	12	10.7
Education (English)	12	10.7
Education (Health)	12	10.7
Education (MATH)	12	10.7
Education (Nepali)	12	10.7
Education (Population)	12	10.7
Management	20	17.9
Humanities	20	17.9
Total	112	100.0

The ILS instrument was administered to 112 graduate students. Table 1 shows that the distribution of participants according to their faculties. Out of 112 participants, 64.3% (n=72) of them were from education faculty i.e. 10.7% (n=12) from each specialization subjects like Economics, English, Health, Mathematics, Nepali and Population, whereas 17.9% (n= 20) from management and 17.9% (n=20) from Humanities.

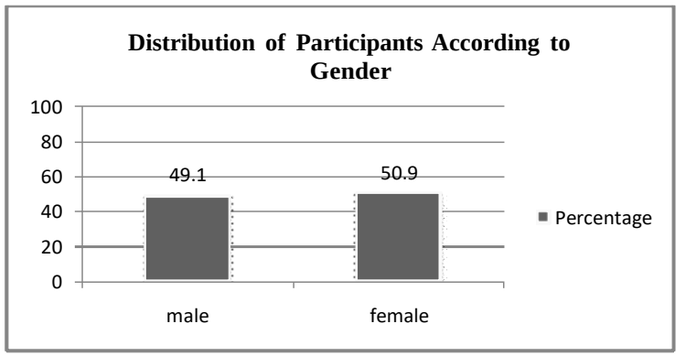

Fig.2 : Distribution of Participants According to Gender

This Fig.2 shows that the participants out of 112, 49.1% (n =55) were male students and 50.9% (n=57) were female students from the different faculties of the first year graduate students of TMC.

Data Collection Instrument and Procedure

In this research study, the Index of Learning Styles (ILS) developed by Felder and Soloman was used. The ILS questionnaire consists of 44 items that each comes with two possible answers, "a" or "b"."a" Responses represent active, sensing, visual, and sequential learners whereas "b" responses represent reflective, intuitive, verbal, and global ones (Felder and Silverman, 1988) (Table 2).

Table 2 : Distribution of ILS Items According to Dimension

Dimension	Sub dimension	Related Items
Process	Active	1a 5a 9a 13a 17a 21a 25a 29a 33a 37a 41a
	Reflective	1b 5b 9b 13b 17b 21b 25b 29b 33b 37b 41b
Perception	Sensing	2a 6a 10a 14a 18a 22a 26a 30a 34a 38a 42a
	Intuitive	2b 6b 10b 14b 18b 22b 26b 30b 34b 38b 42b
Input	Visual	3a 7a 11a 15a 19a 23a 27a 31a 35a 39a 43a
	Verbal	3b 7b 11b 15b 19b 23b 27b 31b 35b 39b 43b
Understanding	Sequential	4a 8a 12a 16a 20a 24a 28a 32a 36a 40a 44a
	Global	4b 8b 12b 16b 20b 24b 28b 32b 36b 40b 44b

In order to find the dominant learning style of learners, the mean scores of each Dimension was found by summing total scale scores. "a" Responses were coded as a 1 and "b" responses were coded as a 2. Then, for each of the four scales, the smaller total was subtracted from the larger one. The mean scores range from 11 to 22, and 1-16 for active / sensing / visual / sequential and 17-22 for reflective / intuitive / verbal / global (Smalley, 2002). Eleven questions form the basis for determining each learning dimension. For example, if under Active/Reflective, the learner had 2 a and 9 b responses, the dominant learning style is 7b (9b-2a = 7b). That means the learner is a reflective learner (Felder & Soloman, 1998). For each dimension, if learner's score on a scale is 1-3, s/he has a mild preference for the one or other dimension. If the learner's score on a scale is 5-7, s/he has a moderate preference for one dimension of the scale and will learn more easily in a teaching environment which favors that dimension. If the score on a scale is 9-11, s/he has a strong preference for one dimension of the scale and may have difficulty learning in an environment which does not support that preference (Felder & Soloman, 1998).

The Nepali version was formed under the supervision of educational experts. The ILS instrument was used in this study because it was appropriate for university students. This instrument was designed for engineering students, but as it was also used in researches for students from various departments and the questions were not limited only to engineering students, the ILS was used in this study, too. It was easy to administer the ILS because it was available on the Internet. It was time saving, taking only 10-15 minutes to complete and easy to understand. Felder and Soloman (1998) also suggest that the questionnaire takes 15-20 minutes to complete.

Result

This chapter is concerned to the results of the study. It is mainly focused on the First year graduate students' learning style preferences at TMC, the relationship between the academic disciplines of the students and their learning style preferences, and whether the students' learning style preferences differ according to the faculty and gender. After a short description of the characteristics of the participants, findings are presented in the same sequence with the research questions.

Learning Style Preferences

The first question was set as 'What are the learning style preferences of the students at Tikapur Multiple Campus?' In order to find out the answer to this question, Felder's Index of Learning Styles (ILS) was applied to the students. The ILS assesses preferences on four dimensions: process (active vs. reflective), perception (sensing vs. intuitive), input (visual vs. verbal), and understanding (sequential vs. Global). The scales consist of 44 items. There are 11 items for each dimension. Each item has two options a and b and a represents active, sensing, visual, sequential learners whereas b represents reflective, intuitive, verbal, and global ones (Felder & Silverman, 1988). In order to find out the scores for each of these four learning style dimensions, 'a' responses were coded as a '1' and 'b' responses were coded as a '2'. Total scores were found for each of the learning style dimensions. The mean scores that range from 11 to 16 represent active, sensing, visual, sequential learners and the mean scores that range from 17 to 22 represent reflective, intuitive, verbal, and global learners for each dimension (process, perception, input and understanding). Descriptive statistics was used to portray the frequencies and percentages of the variables.

Table 4 : Learning Style Preferences of the Students

Dimension	Sub- dimension	Frequency	Percentage
Process	Active	93	83.0
	Reflective	19	17.0
Perception	Sensing	76	67.9
	Intuitive	36	32.1
Input	Visual	88	78.6
	Verbal	24	21.4
Understanding	Sequential	68	60.7
	Global	44	39.3

Table 4 shows, descriptive analyses indicated that in terms of process, among the 112 students involved in the study, 83.0% (n = 93) of the students are found active learners and 17.0% (n = 19) of them are reflective learners. In terms of perception, 67.9% (n = 76) of them are sensing and 32.1% (n = 36) of them are intuitive learners. In terms of input, 78.6% (n = 88) of them are visual learners and only 21.4% (n = 24) of them are verbal learners. Finally, in terms of understanding, 60.7% (n = 68) of them are sequential and 39.3% (n = 44) of them are global learners.

According to these results, in process, perception, input, and understanding most of the students are found active, sensing, visual, and global learners. Students' being active, sensing, visual and global are not surprising because most people and presumably most students prefer facts, procedures, visual representations and freedom while learning.

Faculty and Learning Style Preferences

The second research question was stated as '. What are the LSPs of graduate students according to their faculty? In order to answer this question, four sub-questions were formulated. The results were reported according to the four dimensions and their relationship with the faculties students were admitted in. The Crosstabs procedure was used to find out the LSPs of the students at TMC according to faculty they will study in. Results were examined for each dimension separately and reported in the following paragraphs.

In terms of process dimension, 87.5% (n = 63) of the students from Faculty of Education are found active learners whereas only 12.5% (n= 9) of the students are reflective learners. It is interesting that 75.0% (n = 15) of the students from Faculty of Management and 75.0% (n = 15) of the students from Humanities are active learners. However, in sum, the number of active learners is much bigger (83.0%, n = 93) than the number of reflective students (17.0%, n = 19).

Table 5 : Distribution of Learning Style Preferences by Faculty and Process Dimension

Faculty	Active/Reflective				Total
	Active		Reflective		
	N	%	N	%	
Education	63	87.5	9	12.5	72
Management	15	75	5	25	20
Humanities	15	75	5	25	20
Total	93	83.0	19	17.0	112
$\chi^2_{0.05,\,2}$ = 2.852	**p= 0.240**		**not significant**		

Finally, education, Management, and Humanities student does not statistically differ in terms of being active or reflective learners (Table 5). However, related studies claims that social subject, i.e. education, learners are more active rather than reflective. Active learners do not learn much in passive environments and prefer to be engaged in physical activity and discussion (Felder, 1993).

Table 6 : Distribution of Learning Style Preferences by Faculty and Perception Dimension

Faculty	Sensing/Intuitive				Total
	Sensing		Intuitive		
	N	%	N	%	
Education	50	69.4	22	30.6	72
Management	16	80.0	4	20.0	20
Humanities	10	50.0	10	50.0	20
Total	76	67.8	36	32.2	112
$\chi^2_{0.05,\,2}$ = 4.359	**p = 0.113**		**not significant**		

In terms of perception dimension, results indicates that the preferred learning style for Education and Management faculties is sensing whereas the preferred learning style for Humanities faculty is both equal and same. The percentages of the sensing students from different faculties are distributed as the following: Education-69.4% (n = 50), Management-80.0% (n = 16), and Humanities- 50.0% (n = 10). Finally, results indicates that there is no difference among the students from different faculties and their LSPs (Table 6). Most of the students except Humanities faculty are sensors because they like to learn facts, solve problems and make connections with real world because they feel more confident when they learn directly from examples. But, courses may present more abstract material and involve memorization.

Table 7: Distribution of Learning Style Preferences by Faculty and Input Dimension

Faculty	Visual/Verbal				Total
	Visual		Verbal		
	N	%	N	%	
Education	58	80.6	14	19.4	72
Management	13	65.0	7	35.0	20
Humanities	17	85.0	3	15.0	20
Total	88	78.6	24	21.4	112
$\chi^2_{0.05,\,2}$ = 2.847	**p = 0.241**			**not significant**	

In terms of input dimension, most of the students are found to be visual learners (78.6%) rather than verbal learners (21.4%), 80.6% (n = 58) of the students from Faculty of Education, 65.0% (n = 13) of the students from Faculty of Management, 85.0% (n = 17) of the students from Faculty of Humanities are visual learners. Finally, result indicates that all students regardless of their faculties tend to prefer visual learning styles (Table 7). The result also indicates that there is no difference among the students from different faculties and their LSPs.

Table 8 : Distribution of Learning Style Preferences by Faculty and Understanding Dimension

Faculty	Sequential/ Global				Total
	Sequential		Global		
	N	%	N	%	
Education	51	70.8	21	29.2	72
Management	11	55.0	9	45.0	20
Humanities	6	30.0	14	70.0	20
Total	68	60.7	44	39.3	112
$\chi^2_{0.05,\,2}$ = 11.275	**p = 0.004**			**significant**	

The table 8 indicates that in terms of understanding dimension, 60.7% (n = 68) of the students are found global learners while 39.3% (n = 44) of them are sequential learners. 70.8% (n = 51) of the students from Faculty of Education, 55.0% (n = 11) of the students from Faculty of Management, and 30.0% (n = 6) of the students from the students from Faculty of Humanities are sequential learners whereas 29.2% (n = 21) of the students from Faculty of Education, 45.0% (n = 9) of the students from Faculty of Management, 70.0% (n = 14) of the students from Faculty of Humanities are global learners. That is, in terms of understanding dimension, the percentage of global learners

of the students from the faculty of Humanities is higher than sequential learners. Finally, the results indicates that there was association among the students from different faculties and their LSPs.

Gender and Learning Style Preferences

The third question was stated as 'What are the LSPs of graduate students according to gender?' To answer this question, the Crosstabs procedure was used

Table 9 : Process Dimension and Gender

Gender	Active/Reflective				Total
	Active		Reflective		
	N	%	N	%	
Male	46	83.6	9	16.4	55
Female	47	82.5	10	17.5	57
Total	93	83.0	19	17.0	112

In terms of process dimension, results of table 9 indicates that 83.0% of male and female students are active learners while 17.0% of them are reflective. When gender is considered, 83.6% of males are active and 16.4% of them are reflective, but the same results are just the similar for the female students. 82.5% of them are active learners and 17.5% of them are reflective learners. Results indicates that students' being active or reflective does not change much according to their gender.

Table 10 : Perception Dimension and Gender

Gender	Sensing/Intuitive				Total
	Sensing		Intuitive		
	N	%	N	%	
Male	34	61.8	21	38.2	55
Female	42	73.7	15	26.3	57
Total	76	67.9	36	32.1	112

In terms of perception dimension, results in table 10 indicates that both male (61.8%) and female (73.7%) students are mainly sensing learners. Results indicates that 61.8% of male and 73.7% of female students are sensing while 38.2% of male and 26.3% of female students are intuitive. That is, in terms of perception both male and female students appear to prefer sensing learning style.

Table 11 : Input Dimension and Gender

Gender	Visual/Verbal				Total
	Visual		Verbal		
	N	%	N	%	
Male	42	76.4	13	23.6	55
Female	46	80.7	11	19.3	57
Total	88	78.6	24	21.4	112

This table 11 indicates that similar results are obtained in terms of input dimension. Both male and female students are slightly different from each other and prefer the visual learning. Results indicatesthat 76.4% of the male students and 80.7% of the female students preferred visual learning while 23.6% of male and 19.3% of female students are verbal. That is, in terms of input dimension both male and female students appear to prefer visual learning.

Table 12 : Understanding Dimension and Gender

Gender	Sequential/ Global				Total
	Sequential		Global		
	N	%	N	%	
Male	33	60.0	22	40.0	55
Female	35	61.4	22	38.6	57
Total	68	60.8	44	39.2	112

The results of understanding dimension are similar to the results of process dimension. Both male and female students are not different from each other and prefer the sequential learning. Results indicates that 60.0% of the male students and 61.4% of the female students preferred visual learning while 40.0% of male and 38.6% of female students are global. That is, in terms of understanding dimension both male and female students appear to prefer sequential learning.

Discussion and Conclusions

This study aimed to determine the learning style of First year graduate students from different faculties at Tikapur Multiple Campus and to examine whether there was any relationship between students' LSPs according to faculty. In order to determine the LSPs of the First year graduate students at TMC, descriptive statistics was used to portray the frequencies, percentages for each of the learning style dimensions. Then, an independent-samples chi square test was conducted to see whether students' LSPs differ according to their faculty. Finally, the Crosstabs procedure was conducted to find out whether the LSP of the students at Tikapur Multiple Campus differ according to faculty and gender.

The data collection instrument used in the study was the Index of Learning Styles (ILS) that classifies students on four learning style dimensions– process, perception, input and understanding – according to Felder and Silverman's Learning Style Model (1988) and is developed by Felder and Soloman (1998). In this study ILS was administered to 112 students out of 612 First year graduate students from Tikapur Multiple Campus. These students were coming from four different faculties (Education, Management and Humanities).

In this study, regardless of faculty and gender most of the students were Active (83.0%), sensing (67.9%), visual (78.6%) and sequential (60.7%). The first learning style dimension mentioned in this research is process dimension (active/ reflective). Active learners do not learn much in situations that require them to be passive (such as most lectures) and they tend to be experimentalists, but reflective learners learn in situations that provide opportunity to think about the information being presented (such as most lectures) and they tend to be theoreticians (Felder & Silverman, 1988). In this study, all the students regardless of their faculty and gender were more active than reflective. So it might be concluded that students are experimentalist i.e. they prefer to learn in groups and do it first. Most of them are extravert i.e. concerned more with practical realities than with inner thoughts and feelings but 17% students prefer reflective learning styles that mean they learn by working alone and think it first i.e. introvert. Most of the classes of TMC in which all students are relegated to passive roles, listening to and observing the instructor and taking notes, do little to promote learning for either active or reflective learners. So the situation is mismatching in TMC.

In terms of the second dimension, perception dimension (sensing/intuitive), 67.9% students prefer sensing. According to Fedler and Silverman (1998) Sensing learners learn best when given facts and procedures whereas intuitive learners prefer to learn conceptual things and innovative. Moreover, sensors are not successful with symbols like intuitors. Results obtained in this research study show that most of the First year graduate students at TMC were sensing learners regardless of faculty they studied and gender, but the Humanities courses taught at TMC favored both sensing and intuitive learners equally. In terms of gender female students favoured sensing than male students, therefore it can be concluded that management students were learnt best when the courses were presented in concrete and practical way. But the humanities students preferred concrete and practical as well as conceptual and innovative way. Education students were favoured for facts and procedure learning rather than oriented towards theories and meanings.

Input dimension classifies the ways people receive information as visual and verbal. Visual learners prefer visual representations, such as pictures, diagrams, flow charts, films, and demonstrations. Verbal learners, on the other hand, prefer spoken or written explanations. Most people and presumably most students are visual learners

while the information presented in almost every course is verbal, such as written words and formulas in texts and on the board, spoken words in lectures (Felder, 1993). In this research study, regardless of faculty and gender most of the students were visual learners (78.6%). The results of this research study indicated that there was significantly no difference between the faculties and students' being visual or verbal learners.

The last dimension is understanding dimension which classifies the ways people receive information as sequential and global. Sequential learners absorb information and acquire understanding of material in small connected chunks whereas global learners absorb information in unconnected fragments i.e. holistic in nature. Most formal education is more suitable for sequential learners because in formal education the material is presented in a logically ordered progression. When a body of material is covered, the students are tested on their mastery and then move to the next stage (Felder & Silverman, 1988). In this research study, only in understanding dimension, there were slightly different results. Students from Faculty of Management were both sequential and global learners. However, majority of the students from Faculty of Education were sequential learners. They preferred to present the lessons in step by step rather than holistic way. In terms of Humanities, the majority of the Students (70%) were global learners. Thus, it might be concluded that they learned in more field-experienced and might determine their own learning ways. In terms of gender, the students were equally sequential and global learners

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