Journal of Positive School Psychology http://journalppw.com
2023, Vol. 7, No. 7, 243-253

Indexing Learning Styles In Terms Of Gender And Discipline

Dr. Asfandeyar Fida[1] , Dr. Mushtaq Ahmad[2] , Ms. Fatima Shams[3] , Mr. Manzoor[4] , [5]Ms.Shaista Mumtaz , [6]Mr. Muhammad Usman

[1]Ph.D, Assistant Professor, Department of Education, Abasyn University, Peshawar,
[2]Assistant Professor, Department of Education, Abasyn University Peshawar,
[3]Lecturer Department of Education, Abasyn University Peshawar
[4]Ahmad Primary School Teacher,
[5]Headmistress
[6]Primary School Teacher.
*Correspondence Author *Asfandeyar Fida, Ph.D*

Abstract

Learning style is associated with the processes of learning and educating. Likewise, Individual differences is an imperative aspect of schooling as instructional procedures involve a range of activities and interacting with students of varied dispositions. Hence, it could be assumed that there may be distinction among students regarding their learning styles. This investigation is a venture to query the learning styles of the learners. This investigation attempted to highlight the disparities of learning style in term of gender. Further, it is inquired in terms of different course programs. The target of the study was the students of Abdul Wali Khan University, Mardan (AWKUM) enrolled under five major faculties. The theoretical conception for this study was taken from Felder-Silverman's Model (1988). The data were gathered through ILS (Index of Learning Styles). The statistical practices of average, t-test, ANOVA along with Tukey tests were employed for analyzing data. The outcomes provided that there were considerable variations on certain facets of learning styles with respect to gender and disciplines. The highly favoured mode of learning was 'visual' and then 'active.' The study proposed certain measures to improve curium and instructional activities in accordance with students' learning preferences. The researchers also pointed out venue for investigations in future.

Keywords: Felder-Sivlerman Model, ILS, AWKUM.

Introduction

Teaching-learning is a multifarious procedure involving multiple approaches, techniques and dealing individuals of diverse nature. It has been a concern for academicians and researchers from centuries. The researchers are constantly investigating the various aspects of educating and acquiring knowledge. These days, the researchers have diverted their attention from the earlier notions associated with learning like memory, attention, intelligence to emerging notions like cognitive styles, self-efficacy, meta-cognition and learning styles etc. Learning styles denote the fashion of approaching the learning stuff.

Individual difference is a known phenomenon of schooling and a teacher faces students of multiple natures in a class. From earlier classes, students show high interest for some subjects while low or no for others. It is assumed that there are differences among students in terms of approaching various learning activities. Manochehr (2007) and Zapalska and Dabb (2002) reported that identifying students' learning styles is of vital significance regarding teaching and learning.

Students will be confronted with obstructions in learning if there is no harmony between their learning mode and teachers' instructional techniques (Felder & Silverman, 1988; Felder & Spurlin, 2005). Hall and Fullick (2003) explored that lack of accord between students' learning modes and courses results in poor performance.

Various course programs are offered in a college or university. Each course need different requirements and approaches to be learned, for instance, learning Physics is quite different from learning English. The learning styles of learners studying diverse courses may be different.

This investigation is intended to locate the differences of learning styles of the learners from various programs. The gender difference has also been taken into account as the psycho-somatic nature of male and female learners may affect their learning modes. So, the interaction of gender and faculty is also judged. This inquiry is of worth as there is lack of research investigations on learning styles in the Pakistani perspective.

Objectives

- To ascertain the learning styles of the overall university students
- To locate disparities of learning styles on gender basis
- To establish divergence of learning styles on discipline basis
- To explore the meaningful variation of learning styles

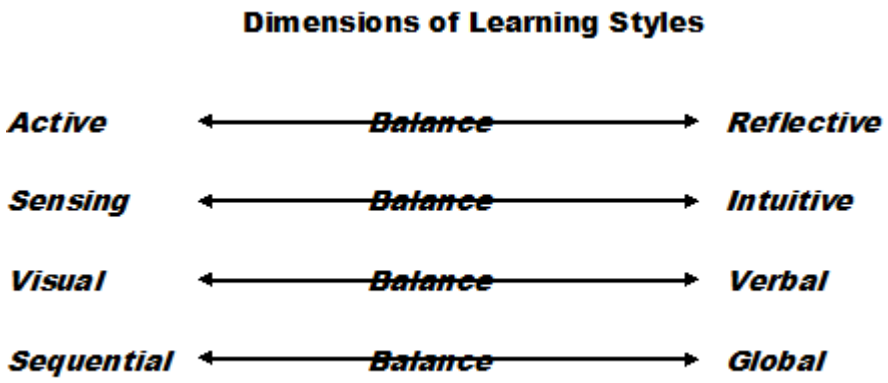
Review of the Related Literature

From early years of schooling, it becomes evident that some students perform in certain subject exceptionally well while poor in other. Likewise, some students are found to be highly interested in carrying out activities while others shows liking for theatrical paradigm. Kanninen (2009) supports it and viewed that a student likes note taking to grab a notion but his friend shows interest in videos to learn the like. Similarly, Pritchard (2009) holds that students espouse learning approaches that facilitate best of their learning and decline the techniques which are not highly facilitating in acquiring concepts. The particular approach to acquire concepts is termed as learning styles. Sadler-Smith (1996) defined that learning styles is a sole and uniform mode to attain and transmit information by way of studying, exercising or instructing.

Learning style is significant to learn. Rice (2007) noticed a positive relation between modes of learning and learners' accomplishments. She further added that a learner can overcome his deficiencies in learning through recognizing his learning modes. Likewise, Din (2009) and Cagiltay (2008) explored that students with certain learning modes showed superior performance. Coffield (2004) is of the opinion that recognizing learning styles assist students to enhance their capacity to consider their strengths and deficiencies.

The well-known notions of learning styles have been put forward by Kolb (1984), Honey and Mumford (1992), Fleming (1995) and Felder-Silverman (1988) etc. The early three models conceptualize learning styles as human trait which depict certain human qualities like reflector, activists and kinesthetic etc. These models attribute learners into exclusive categories. On the contrary, the Felder-Silverman's Model (1988) expresses learning modes on continuums. A learner could be positioned at any point between two extremes. Another, unique feature of this model is that a learner could be attributed at 'balanced' level between two categories (Graf, Viola Kinshuk & Leo, 2006; Kanninen, 2009). The conceptual design of this model is shown in the Figure 1.

Figure 1



As revealed in the Figure 1, the Felder-Sivlerman notion contains four dimensions. The active – reflective dimension considers execution of data. Active students like to perform and learning by way of exercise, experimenting and fulfilling learning assignments. They also favour study in groups (Bacon, 2004; Filippidis & Tsoukalas, 2009; Mestre, 2010). In contrast, reflective scholars prefer thinking for a longer duration prior to conceptualize notions (Din, 2009; Mestre, 2010; Leithner, 2011).

The sensing-intuitive element is associated with the kind of information that a learner wants to grasp (Leithner, 2011). Learners with sensing preferences like originality, reality, fact and viable ideas and show aversion to intricacy, novelty and ambiguity (Din, 2009; Leithner, 2011; Mestre, 2010). In opposite, intuitive students are fond to learn from theoretical explanations, principles, concepts and laws. They also like to extract basic gist and postulations (Bacon, 2004; Filippidis & Tsoukalas, 2009; Ultanir, Ultanir & Temel, 2012).

Attaining information is subsumed under the visual – verbal category ((Leithner, 2011). Visual students have sharp in observation (Din, 2009) and they acquire better through viewing charts, maps, table, diagrams, models, picture and videos (Bacon, 2004; Filippidis & Tsoukalas, 2009; Leithner, 2011; Mestre, 2010; Ultanir, et al., 2012). In opposite, the verbal learners concern oral information and textual data and prefer learning through listing or reading (Bacon, 2004; Mestre, 2010).

In the sequential – global category, students concentrate on minute details and learn in linear steps while global learners like to grasp in big bound and random manner and hurry to get conclusions (Bacon, 2004; Din, 2009; Filippidis & Tsoukalas, 2009; Leithner, 2011). They disregard the relations among concept and ideas (Din, 2009; Mestre, 2010).

Index of learning Styles (ILS)

Like other theorists, Felder and Soloman (n.d.) have also launched an instrument for identifying modes of learning known as Index of Learning Styles (ILS). The model of Felder-Silverman (1988) contains four continuums and an individual may be rated at any position between two ends or near to or on one end (Felder & Spurlin, 2005; Clarke, Lesh, Trocchio & Wolman, 2010; Zywno, 2003).

It is a 44-forced items scale. Each description has got two responses where options ‘a’ stand for one end like active while options ‘b’ represent the other end like ‘reflective’ (Graf et al., 2006; Green & Sammons, 2014).

ILS fulfills the psychometric conditions as Alumran (2008) reported that the test-retest consistency was .7 while Felder and Suprlin (2005) found it in the range .7 - .9. Similarly, various studies have established the reliability of this instrument in the limits of (.41 -.76) (see, e.g. (See for instance, Felder & Spurlin, 2005; Ultanir et al., 2012; Zywno, 2003).

It is considered valid under the Tuckman (1999) postulation who alleged that a reliability of .5 is ample for the instrument measuring attitudes and a reliability of .7 level is satisfactory for achievement measures.

ILS was put to pilot investigation prior to actual administration. The reliability of this tool in the study context was found to be .63, which is acceptable in terms of Tuckman's (1999) assumptions.

Method and Procedure

It was a descriptive expedition involving a survey of learners of Abdul Wali Khan University Mardan. There are 30 various departments at Abdul Wali Khan University Mardan. There courses could be grouped under five major faculties. Cluster approach was employed for sample selection. The final year students of 3 departments under each faculty were chosen for investigation. The number of students associated with each faculty are represented in the Table 1.

Table 1 Sample Distribution

Faculty	Male	Female	Total
Arts & Humanities	67	99	166
Business & Economics	110	48	158
Chemical & Life Sciences	105	54	159
Physical & Numerical Sciences	146	49	195
Social Sciences	84	66	150
Total	**512**	**316**	**828**

Data Analysis

The statistical techniques of Mean and t-test were employed to explore distributions of the various elements of learning styles in relation to gender.

Table 2 Mean and t-test for Learning Styles

	Gender	Mean	Std. Deviation	t	df	Sig. (2-tailed)
Active – Reflective	Male	3.19	.823	.943	826	.346
	Female	3.13	.786	.954	690.765	.341
Sensing – Intuitive	Male	3.21	.700	.763	826	.446
	Female	3.17	.752	.750	630.491	.453
Visual - Verbal	Male	3.32	.908	-2.135	826	.033
	Female	3.46	.906	-2.136	668.485	.033
Sequential – Global	Male	3.10	.803	.768	826	.443
	Female	3.06	.768	.776	689.803	.438

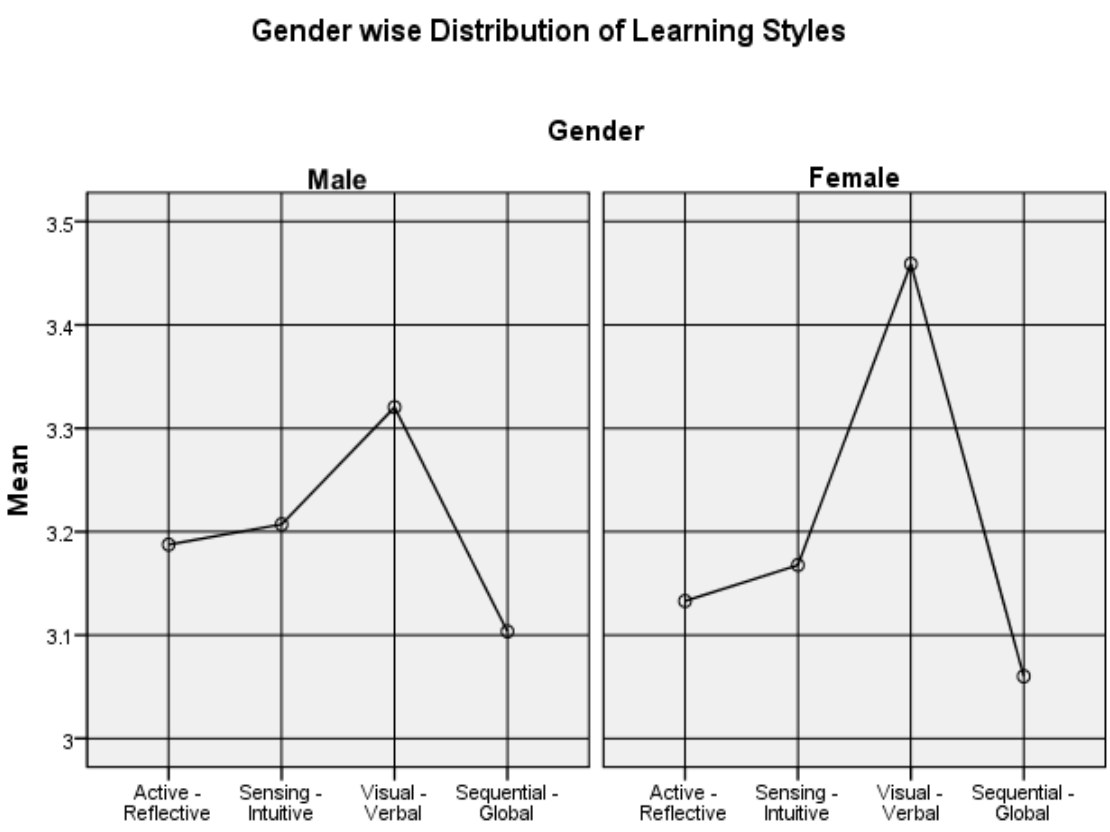
*. The mean difference is significant at the 0.05 level.

The outcomes form mean analysis hihglith that male students have expressed higher favourtism for three aspect of learning styles. Female have shown dominace only the visual-verbal aspect. Of all, the visaul mode is highley perferend by both male and female learners (Male, M =3.32; Female, M = 3.46) than other aspects. The study outcomes are further elaborated in the subsequent Figure 2.

The t-test was employed to locate the significant variation of learning modes in gender perspective using one sample t-test technique. The outcomes from t-test showed

that the meaningful variation of learning styles was found only on the visual –verbal element (t (826) = -2.135, p = .033 < .05). The negative number (-2.135) exposes that female students were ahead of male students in dealing with visual information and material. There were no considerably disparities on other elements.

Figure 2



Note: 3.2 is the mean line

The Figure 2 shows that both male and female students' scores on visual – verbal factor is quite above the mean line. Similarly, the score of both genders were found to be fairly lower on the sequential – global factor. The rest of scores are lying close the mean line. The peaks of graphs indicate higher preferences for visual mode of learning.

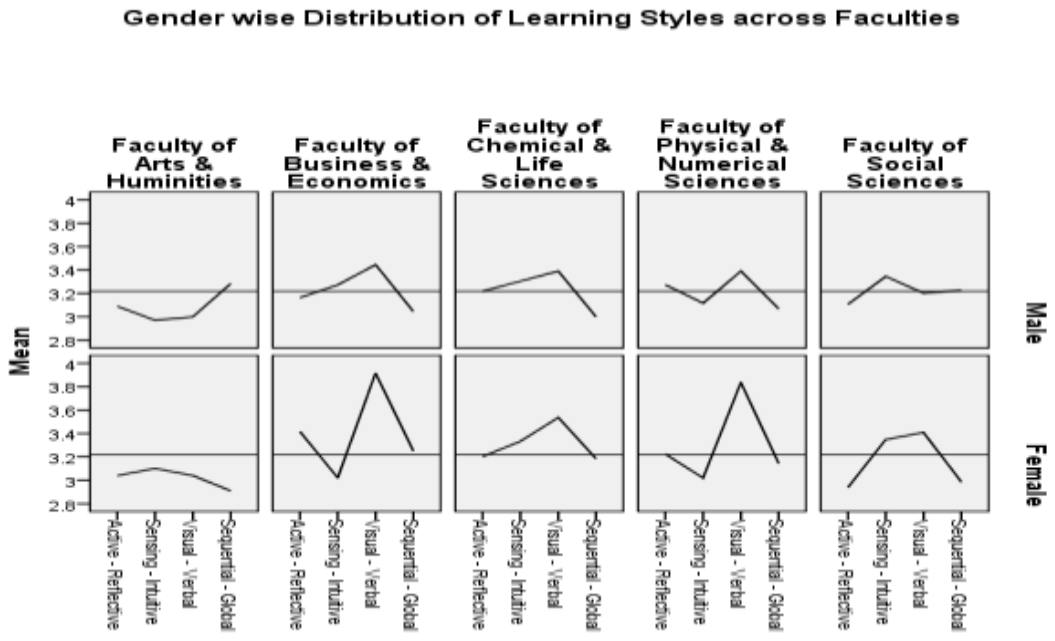
Table 3 Gender wise Mean Score of Learning Styles across Faculties

	Faculty	Active – Reflective	Sensing – Intuitive	Visual - Verbal	Sequential - Global
Male	Arts & Humanities	3.09	2.97	3.00	**3.28**
	Business & Economics	3.16	3.27	3.45	3.05
	Chemical & Life Sciences	3.22	3.30	3.39	3.00

	Physical & Numerical Sciences	3.27	3.12	3.39	3.07
	Social Sciences	3.11	**3.35**	3.20	3.23
Female	Arts & Humanities	3.04	3.10	3.04	2.91
	Business & Economics	**3.42**	3.02	**3.92**	3.25
	Chemical & Life Sciences	3.20	3.33	3.54	3.19
	Physical & Numerical Sciences	3.22	3.02	3.84	3.14
	Social Sciences	2.94	**3.35**	3.41	2.98

The Table 3 represents the faculty wise comparison of learning styles in gender perspective. The female students of Business and Economics have higher mean value (M = 3.42) on active – reflective aspect. Similarly, on sensing-intuitive factor, the social science students, both male and female have shown supremacy with equal average value (M = 3.35). Likewise, on visual-verbal aspect, the female student of Business and Economics have dominated with average value (M = 3.92). Finally, on sequential- global factor, the male students of faculty of Art and Humanity have shown preeminence with mean (M = 3.28). There could also seen notable variations of learning styles of male and female students of the sample faculty. For instance, on sequential – global aspect the male learners of Art and Humanities have highest mean value (M = 3.28,) and female carries the lowest score (M = 2.91). The outcomes are further elaborate in the Figure 3.

Figure 3



Note: The horizontal line represents the mean scores.

The Figure 3 elaborates that learning preferences of female apprentice of the Physical and Numerical Sciences, Social Sciences, Chemical and Life and Sciences and Business and Economics are lying above the mean line. It is apparent that female students have higher inclination for their particular learning modes. Conversely, majority of the average score of both boys and girls of Arts and Humanity fells below the mean line. It means that most of them have no sharp incitation for any particular mode of learning and hence remained on balanced preference. The peaks of the graph exposed the superior liking for visual data.

Table 4 Subject wise Mean Distribution of Learning Styles in terms of Gender

	Subjects	Active - Reflective	Sensing - Intuitive	Visual - Verbal	Sequential - Global
Male	Islamic Studies	2.86	3.18	3.05	3.41
	English	2.90	2.97	2.97	3.23
	Fine Arts	3.80	2.67	3.00	3.20
	Economics	3.14	3.31	3.24	3.14
	Management Science	3.14	3.40	3.40	3.23
	Tourism & Hospitality	3.21	3.11	3.66	2.76
	Biotechnology	3.03	3.29	3.62	3.06
	Chemistry	3.19	3.47	2.97	2.72
	Pharmacy	3.41	3.18	3.54	3.18
	Computer Science	3.48	3.00	3.83	3.12
	Mathematics	3.45	3.20	3.27	3.02
	Physics	3.00	3.13	3.17	3.07
	Law	2.97	3.53	3.44	3.19
	Physical Education & Sports	3.29	3.25	3.18	3.21
	Political Science	3.10	3.15	2.80	3.30
Female	Islamic Studies	2.80	2.83	3.14	2.83
	English	3.07	3.52	3.10	2.95
	Fine Arts	3.36	2.73	2.77	2.95
	Economics	**4.00**	2.88	**4.62**	2.94
	Management Science	3.06	3.18	3.00	3.24
	Tourism & Hospitality	3.20	3.00	4.20	**3.60**
	Biotechnology	3.11	3.05	3.58	3.32
	Chemistry	3.55	3.30	3.45	3.00
	Pharmacy	2.87	**3.73**	3.60	3.27
	Computer Science	3.41	3.12	3.94	2.82
	Mathematics	3.00	2.93	3.80	**3.60**
	Physics	3.24	3.00	3.76	3.06
	Law	2.80	3.33	3.13	3.33
	Physical Education & Sports	3.06	3.62	3.94	2.62
	Political Science	2.94	3.23	3.29	3.00

Note: The highest values are showed in bold and underline figures while the lowest values are represented only through underlining them.

The distribution of data in Table 4 points the Subjects wise mean distribution of learning styles in relation to gender. It is evident that on the overall ground, the female students of Economics showed highest mean value (M = 4.00) while the female scholars of Law and Islamic Studies were identified with lowest mean scores (M = 2.80). In male group, the apprentices of Fine Arts provide upmost mean score (M = 3.80) and scholars from Islamic studies were found with bottom average score (2.86).

On sensing – intuitive component, on entire level, the female students of Pharmacy provided topmost average value (M = 3.62). Conversely, the male learners from department of were found with bottommost average score (M = 2.67). In male population, the students of Law presented highest average mark (M = 3.53).

On visual – verbal element, the highest mean value (M = 4.62) and lowermost values (M = 2.77) were provided by the female learners of Economics and Find Arts respectively. While considering only male students, the Tourism and Hospitality is identified with upmost value (M = 3.66), while Political Science has lowermost figures (M = 2.80).

On the element of sequential – global, the female learners of Tourism and Hospitality and Mathematics showed equivalent highest values bearing mean (M = 3.60). To the contrary, the female apprentices of Physical Education and Sports offered the bottommost mean (2.62). On male side only, the students of Islamic studies achieved the highest score (M = 3.41).

The entire analysis indicate that there were higher inclination towards various learning styles on the part of female students. Only the other hand, the male students were directed toward the mid balance between learning dimensions were more inclined to the aspects of learning styles as compared to male learners. Besides, there is diversity in gender wise learning styles across subjects.

Table 5 Subject wise ANOVA of Learning Styles

Learning Styles		Sum of Squares	df	Mean Square	F	Sig.
Active – Reflective	Between Groups	32.409	14	2.315	3.700	.000
	Within Groups	508.591	813	.626		
	Total	541.000	827			
Sensing – Intuitive	Between Groups	25.800	14	1.843	3.721	.000
	Within Groups	402.667	813	.495		
	Total	428.467	827			
Visual – Verbal	Between Groups	64.055	14	4.575	6.003	.000
	Within Groups	619.630	813	.762		
	Total	683.685	827			
Sequential – Global	Between Groups	8.390	14	.599	.960	.493
	Within Groups	507.349	813	.624		
	Total	515.739	827			

Analysis of variance (ANOVA) was carried to estimate the different facets of learning styles in relation to subjects. The 5 reveals ANOVA for the all four elements of learning styles. On active – reflective aspect, the results of ANOVA ($F(14, 813) = 3.700$, $p = 0.000 < .05$)

indicate a substantial variation of learning styles across subjects. Likewise, the ANOVA value ($F(14, 813) = 3.721$, $p = 0.000 < 0.05$) on sensing-intuitive dimension designate extensive variations among subjects. Again, the ANOVA calculation for visual-verbal direction ($F(14, 813) = 6.003$, $p = 0.000 < .05$) determine a meaningful disparities on subjects bases. Only, on the sequential-global aspect, the results of ANOVA ($F(14, 813) = 0.960$, $p = 0.493 > .05$) direct that there were no meaningful differences of values among subjects. The entire analysis indicate that students studying different courses have differences in their approach to learning.

Discussion and Conclusions

The mean outcomes provided that male students showed higher inclination to certain modes of learning styles than female learners. The female showed superiority to male students only on the visual – verbal component. It is seconded by Farooq and Regnier (2011) but gainsaying to Din (2009) who found no worthy differences regarding gender on any aspect. Although, the visual mode was highly preferred by students of both genders. Similarly, the results from t-test indicated that the only notable differences were on the visual – verbal component where female learners showed superiority.

Further, in gender perspective the female students of Business and Economics provided the highest mean scores on active-reflective and visual – verbal dimensions. Likewise, both males and female students of Social Sciences showed highest mean values on sensing-intuitive component. The male learners of Arts and Humanity dominated the sequential – global aspect.

In gender viewpoint, the significant variation was only found on the visual – verbal facet. While, in terms of faculties the meaningful variations were found on three elements. To a greater extent, these findings are upheld by Farid et al. (2014). It can be concluded that course program are more acute in determining learning flairs than gender.

The highly preferred styles of the students are visual and active. The reasons may be that learners usually favour visual information and like instructions involving pictures, maps, diagrams and tables etc. Further, science courses are mostly dominant with activities so most their students preferred active mode of learning. The course material of Arts and Humanity mostly involved with theoretical data so their students found considerably lower on visual and sensing modes of learning.

It can be further drawn that male and female students approach learning stuff in different manners. These differences are more evident when analyzed in the subject perspective because different subjects involve different learning stuff, activities and pedagogical practices.

Recommendations

Majority of the learners preferred the visual and active facets of learning modes. It is proposed that curriculum developer may consider this point and enrich the curricula of various programs with visual data like charts, tables, diagram, models etc. Similarly, an adequate amount of practical tasks and projects may be introduced in courses. Similarly, the instructors may also supplement their teaching with activities and visual material.

Further, researches may undertake investigation to grab the strategies for enriching the curricula with experimental tasks and visual material for different courses and levels of studies. The researchers may also replicate this study in new settings. They may also devise new instrument using the aspects of Felder-Silverman's model.

References

Alumran, J. I. A. (2008). Learning styles in relation to gender, field of study, and academic for Bahraini university students. Individual difference research, 6(4), 303-316.

Bacon, D. R. (2004). An examination of two learning style measures and their association

with business learning, Journal of Education for Business, 79(4), 205-208. doi:10.3200/JOEB.79.4.205-208

Cassidy, S. (2004). Learning style: an overview of theories, models and measures. Education Psychology, 24(4), 419-444.

Clarke, T. A., Lesh, J. J., Trocchio, J. S. & Wolman, C. (2010). Thinking styles: teaching and learning styles in graduate education students, Educational Psychology, An International Journal of Experimental Educational Psychology, 30 (7), 837-848.

Coffield, F., Moseley, D. Hall, E. &Ecclestone, K.(2004). Learning styles and pedagogy inpost-16 learning: A systematic and critical review. London: Learning & Skills ResearchCentre.

Din, M. (2009). A study in indices of discrepancy between students' learning styles and their actual grade achievement at masters' level. (Unpublished Doctoral dissertation). Numl University, Islamabad, Pakistan

Farid, S., Luqman, M., Tariq, S., & Warraich, I. A. (2014). An analysis of learning behavior and academic achievement: A case study of Bahauddin Zakariya University Multan. Pakistan Journal of Social Sciences (PJSS), 34(1), 193-204.

Farooq, M. S., & Regnier, J. (2011). Role of learning styles in the quality of learning at different levels. Informatica Economică, 15(3), 28 – 45.

Felder, R.M., & Silverman, L.K. (1988). Learning and teaching styles in engineering education [Electronic Version]. Engr. Education, 78(7), 674-681.

Felder, R.M., & Soloman, B.A. (n.d.). Index of Learning Styles. Retrieved from http://www.ncsu.edu/felder-public/ILSpage.html

Felder, R.M. & Spurlin, J. (2005). Applications, reliability, and validity of the index of learning styles. International Journal of Engineering Education, 21(1), 103-112.

Filippidis, S.K. & Tsoukalas, I. A. (2009). On the use of adaptive instructional images based on the sequential– global dimension of the Felder–Silverman learning style theory. Interactive Learning Environments, 17 (2), 135–150. doi:10.1080/10494820701869524

Graf, S., Viola, S. R., Kinshuk, & Leo, T. (2006). Representative characteristics of Felder-Silverman learning styles: An empirical model, J.M. Spector and P. Isaías (Eds.), Proceedings of IADIS International Conference on Cognition and Exploratory Learning in the Digital Age, (CELDA, 2006)(235-242). Barcelona, Spain: IADIS Press.

Green, A. J. & Sammons, G. E. (2014). Student learning styles: Assessing active learning in the hospitality learners model. Journal of Hospitality & Tourism Education, 26(1), 29-38. doi. 10.1080/10963758.2014.880617

Honey, P., & Mumford, A. (1992). The manual of learning styles. Maidenhead: Peter Honey Publications.

Kanninen, E. (2009). Learning styles and E-learning. (Unpublished Master dissertation). Degree Program in Electrical engineering. Tampere University of Technology, Tampere. Available at evicab.aalto.fi/outcomes/delivera/wp4style.pdf

Kolb, D. A. (1984). Experiential learning: Experience as the source of learning and development. Englewood Cliffs: Prentice Hall.

Leithner, A. (2011). Do student learning styles translate to different "testing styles"? Journal of Political Science Education, 7(4), 416-433. doi:10.1080/15512169.2011.615195

Manochehr, N. (2007). The Influence of Learning Styles on Learners in E-Learning Environments: An Empirical Study. Computers in Higher Education and Economics Review, 18. Retrieved from

http://www.economicsnetwork.ac.uk/cheer.htm

Mestre, L. S. (2010). Matching Up learning styles with learning objects: What's effective? Journal of Library Administration, 50(7-8), 808-829. doi: 10.1080/01930826.2010.488975

Pritchard, A. (2009). Ways of learning: learning theories and learning styles in the classroom (2nd Ed). New York: Routledge.

Sadler-Smith, E. (1996). Learning styles and instructional design. Innovations in Education and Teaching International, 33, 185–193.

Tuckman, B.W. (1999). Conducting educational research (5th Ed.). Belmont, CA: Wadsworth Group.

Ultanir, E., Ultanir, Y. G. & Temel, O. G. (2012). The examination of university students' learning styles by means of Felder-Silverman Index, Eğitimve Bilim, Education and Science, 37(163), 29-42.

Zywno, M.S. (2003). A contribution to validation of score meaning for Felder–Soloman's index of learning styles. In proceedings of the 2003 American Society for Engineering Education Annual Conference & Exposition. Washington, DC: ASEE.