

Gender Differences in Learning Styles of Extension Trainees

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Introduction

Training is a crucial and continuous input for any efficient and effective transfer of technology system. Basically, training aims to improve the efficiency in performing the tasks by imparting new knowledge and skills besides inculcating new attitudes in the behavioural system of the learners. In the era of liberalization, the concept of training has undergone a sea change with its focus shift from 'knowledge transfer' to 'capacity building'. This approach demands a conscious effort from all the actors involved in the training process i.e. the trainer, trainee and sponsoring organization to plan and execute the learning exercise in the light of learner capacities and needs.

The individual differences of the trainees like gender, personality factors, cognitive and learning styles affect the way they receive, comprehend, internalize and transfer of new learning experiences. Among them, learning styles play a crucial role in effective training. Learning styles are cognitive, affective and physiological traits that serve as relatively stable indicators of how learners perceive, interact with and respond to the learning environment (Keefe, 1982). Diagnosing the learning styles helps the trainers to choose appropriate teaching method, which is compatible with trainees' abilities, experiences and interests.

Methodology

The Regional Centre of Central Tuber Crops Research Institute (RCCTCRI) organized two training courses to equip microbiology post-graduates on fermentation techniques used in tuber crops product development. Sixty Industrial Microbiology post-graduate trainees comprising 30 males and 30

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females, who participated in these programmes were purposively selected as respondents for the study. Dr. Jeffrey Barsch's Learning Style Inventory (Barsch 1996) was used for identifying the learning style preferences of trainees. This inventory measures learning styles in terms of specific sensory mode intake preference of the learners. This sensory modality theory assumes that each learner has a unique mode of receiving and storing information through one or more senses: visual, auditory, kinesthetic and tactile. According to this theory, the visual learners learn best from pictures or written text, auditory learners prefer the spoken word, kinesthetic learners think in terms of actions and body movements and tactile learners learn through hands-on experience. The Barsch's learning style inventory was chosen due to its simplicity, relevance to the study and its demonstrated validity i.e. it has been extensively used in various learning style research studies (Molek 1990; Button 1991; Burke 1993; Barnett-Queen and Zhu 1999). The observed reliability of this inventory expressed in Cronbach alpha values were 0.54 for visual, 0.56 for auditory, and 0.38 for combined tactile and kinesthetic items (Kratzig & Arbuthnott, 2006).

Dr. Barsch's inventory comprises of 32 learning style statements representing four dominant sensory modes, with each of eight statements representing one sensory mode. These statements describe a specific learner activity in a given learning situation, to which the respondents were asked to indicate the frequency of these actions they perform in the given conditions on a three-point scale i.e. often, sometimes and seldom. During the study, each respondent was supplied with an Inventory along with instructions for filling up. On completion, the responses were summed, classified and tabulated. The highest score among four categories was identified as respondents' dominant learning style. When the scores fell within 4 or 5 points of each other, the respondent was classified as multi-sensory learner.

The data was subjected to descriptive statistical analysis i.e. frequencies, percentages and other measures were calculated to obtain appropriate inferences. Independent *t* test was used to determine the significant mean differences between male and female learning style scores. In order to examine the patterns of the relationships across learning style scores, Karl Pearson's product moment correlation was computed. A standard correlation inference method prescribed by Davis (1971) was used for describing the magnitude of correlations. According to Davis, the correlations between 0.01 and 0.09 are

considered negligible, 0.10 and 0.29 are low, 0.30 and 0.49 are moderate, 0.50 and 0.69 are substantial, 0.70 and 0.99 are very high, and a correlation of 1.00 is a perfect correlation to determine the relationships between the variables.

Results and Discussion

Preferred Learning Styles

The respondents were grouped into different learning style categories based on their scores in respective mode. Data presented in table 1 indicates that majority of the respondents (87.00 %) preferred dominant visual style or combination of visual with other styles. Among them, visual-auditory style was found dominant (41.67 %) followed by visual style (26.67 %) and visual-auditory-tactile style (13.33 %). These results suggests that the learning strategies must provide wide visual experiences for the trainees to maximize learning effectiveness. This is consistent with the findings of the past studies conducted among secondary English language learners (Reid 1987 and Park 2000), and students of financial accounting (Becker and Dwyer, 1998), social work (Barnett-Queen and Zhu 1999), engineering (Dee and Livesay 2004) and computer science (Layman et al 2005).

Table 1. Distribution of respondents based on their learning styles

S.No.	Learning style	Male**	Female**	Combined
1.	Visual	9 (30.00)	7 (23.33)	16 (26.67)
2.	Auditory	0 (0.00)	1 (3.33)	1 (1.67)
3.	Tactile	0 (0.00)	1 (3.33)	1 (1.67)
	Multi-sensory			
4.	Visual-Auditory	13 (43.33)	12 (40.00)	25 (41.67)
5.	Visual-Auditory-Tactile	7 (23.33)	1 (3.33)	8 (13.33)
6.	Visual-Auditory-Kinesthetic	1 (5.33)	0 (0.00)	1 (1.67)
7.	Visual-Tactile	0 (0.00)	2 (6.67)	2 (3.33)
8.	Auditory-Tactile	0 (0.00)	2 (6.67)	2 (3.33)
9.	Auditory-Kinesthetic-Tactile	0 (0.00)	2 (6.67)	2 (3.33)
10.	Auditory-Kinesthetic	0 (0.00)	2 (6.67)	2 (3.33)

* Figures in parenthesis indicate percentage

** Total N = 60 representing 30 each for both male and female

The visual learners learn best through seeing charts, graphs, drawings, photographs, slide shows and other visual material. They acquire knowledge through surveillance, selection of appropriate visual symbols, transferring them as written notes and/ or store them as visual images in their memory. In the present study, the reasons for visual style preference of the respondents may be their prior exposure to the subject, teaching methods and their expressed need for more demonstrative explanations fermentation techniques during the pre-training interaction. Since majority of the trainees had visual-auditory learning style, an intelligent presentation of audio with visual teaching methods could help them to acquire and retain knowledge and skills effectively. Further analysis revealed that secondary styles like tactile and kinesthetic were mostly preferred in combination with visual or auditory styles (28.33 %). These styles, though not dominant, may exert their influence on major learning modes.

Learning Style Differences

Dominant learning style

The main focus of this study is to ascertain gender differences, if any, exist among the learning style preferences of the trainees. Careful analysis of data presented in Table 1 reveals that there are no differences in the learning style preferences of male and female trainees. Both the groups preferred visual-auditory style, i.e. 43.33 % for males and 40.00 % for females respectively. The only striking difference was observed in auditory multi-modal styles, where 20 % of the female trainees were equally distributed among three distinct categories i.e. auditory-tactile, auditory-kinesthetic-tactile and auditory-kinesthetic and no male trainee preferred these styles. This result indicates that females are slightly more auditory than males due to better hearing ability. Study conducted by Karp (2003) among female aviation pilot trainees also confirms this fact.

Learning Style Profile

To assess whether any differences exist among learning style scores of male and female trainees, a learning style profile was generated (Fig. 1). The learning style profile is a graphical depiction of the mean learning style scores

obtained for each mode of the learning style inventory. From the profile graph, it is evident that both groups scored almost equally in auditory mode (male = 30.79, female = 30.93) and moved closer in visual (male = 34.33, female = 33.73) and tactile modes (male = 24.43, female = 25.03). However, the female trainees scored higher than males in the kinesthetic mode (male = 23.83, female = 28.63).

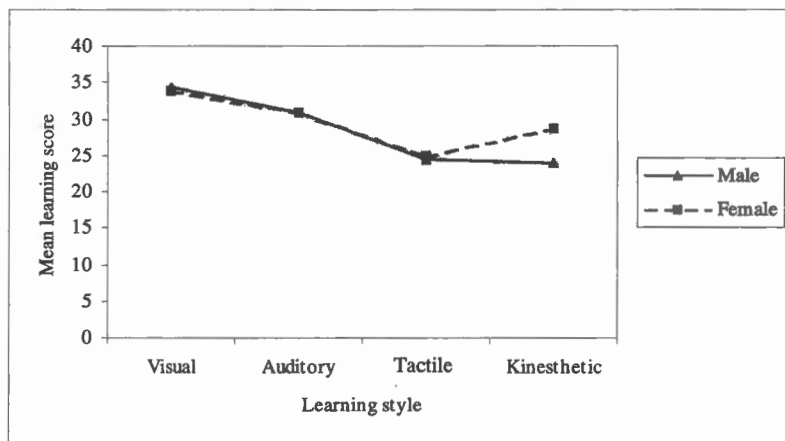


Fig. 1. Learning style profile

Learning style differences

To examine whether this difference is statistically significant, the independent *t* test was performed. This test yielded positive *t* values for visual and auditory styles, whereas tactile and kinesthetic modes produced negative *t* values. Significantly, the female trainees scored high in these categories (Table 2). The learning style profile depicted in Fig. 1 too indicates this difference. Among them, the kinesthetic style was highly significant indicating that females are slightly more kinesthetic than male trainees. This result is consistent with findings of Karp (2003) and Layman *et al* (2005). According to the Barsch LSI, higher score in kinesthetic mode indicates that the females desire active involvement in the learning process through physically touching and manipulating things and events. They learn motor skills through imitation and continuous practice.

Table 2. Differences in mean learning style scores by gender

Learning style		Male		Female	Mean difference	t
Visual	Mean	34.33	Mean	33.73	0.60	0.63
	SD	4.00	SD	3.31		
Auditory	Mean	30.97	Mean	30.93	0.04	0.03
	SD	3.46	SD	6.03		
Tactile	Mean	24.43	Mean	25.03	-0.60	-0.36
	SD	6.28	SD	6.49		
Kinesthetic	Mean	23.87	Mean	28.63	-4.76	-3.42**
	SD	5.79	SD	4.99		

** Significant at 0.01 level

Association among Learning Styles

Intercorrelations of learning style scores were obtained to examine the nature of association, if any, exist among the learning styles. The data given in Table 3 reveals that all the four learning style scores of male trainees were positively correlated with each other. Statistically significant, substantial positive correlation was obtained between auditory and tactile modes. This indicates that auditory and tactile modes are complementary to each other and tend to influence each other during the learning process. Therefore, males can enjoy learning when training is imparted through hands-on experiences combined

Table 3. Intercorrelations among learning styles of trainees

S.No	Learning style	Visual	Auditory	Tactile	Kinesthetic
Male (N = 30)					
1.	Visual	-	.081	.224	.142
2.	Auditory		-	.586**	.181
3.	Tactile			-	.078
4.	Kinesthetic				-
Female (N = 30)					
1.	Visual	-	.186.	-.022	.207
2.	Auditory		-	-.004	.780**
3.	Tactile			-	.435*
4.	Kinesthetic				-
N = 30					

**Significant at 0.01 level ; *Significant at 0.05 level

with auditory instruction. However, other learning styles exhibited low to very low positive correlation among them.

The intercorrelation among learning style scores of female trainees exhibited very high positive significant correlation between auditory and kinesthetic modes as well as moderate significant correlation between tactile and kinesthetic scores. It implies that the auditory, tactile and kinesthetic styles of females are interrelated and tend to influence each other in a positive direction. So, it may be interpreted that females learn faster through hands-on, manipulative, real life exercises supplemented by auditory instruction.

Conclusion

The present study yielded significant results on gender differences in learning styles. Though, the male and female trainees preferred dominant visual style, some significant differences were observed in kinesthetic and tactile styles. In females, these minor styles combined with auditory style were found to influence the learning process. So the trainers should consider kinesthetic and tactile learning modes while designing learning experiences for diversified trainee groups. The learning style scores also help the trainees to strengthen their minor styles in order to improve their overall learning capacity. Finally this study indicated the presence of gender differences in learning styles which has far reaching implications in the area of extension training and human resource development.

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