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The Learning Style Preferences of the Undergraduate Computer Applications and IT Students

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Abstract - Learning Style Preferences can be an influential factor in determining the effectiveness of teaching – learning process for the learners. These are preferences of learner through which they can learn better. Studies have shown that by adopting learning strategies appropriate to the learning styles of the learners, the teaching – learning process can be made more effective. The learning styles are categorised according to the way the learners grasp and process the information during the teaching – learning process. Various learning styles models proposed by the researchers are reviewed in the current work. Amongst various learning styles models, the current study focuses to analyse the learning styles preferences of the learners in lieu of the VARK learning styles preference modal. The modal addresses the sensory modalities of the learners.

***Key Words*:** *learning preferences, Teaching – Learning, VARK Learning Style, Learning Styles*

1. INTRODUCTION

Currently, the teaching – learning paradigm is shifted from being teacher oriented to learner oriented. The primary purpose of teaching should be to enhance the learning experience of learners (Lawal Ibrahim Faruk Dutsinma, 2020). Learning styles are specific combinations or patterns of learning activities used by the learners during the learning process. The learning style is consistent way of an individual for perceiving, processing and retaining new information (Kharb P, 2013). The effectiveness of teaching – learning process can be increased considerably, when learners are taught according to their preferred learning style (Dunn R., 1990). According to (Becker, 2007), teachers should diversify their teaching styles so as to address the distinctive learning styles of different learners. So as to cater to the different learning preferences of the learners, teachers should combine different pedagogical strategies in the teaching – learning process. Thus, Teachers must adapt teaching strategies to accommodate diverse learning styles of the learners (Cox, 2008). Teachers can introduce diversity in teaching – learning by understanding and giving consideration to the diverse learning preferences of the learners.

2. RESEARCH OBJECTIVES

- Review different learning styles.
- Review the reasons for selecting VARK learning style for study.
- Review and analyse the preferred learning the styles of learners in undergraduate Computer applications & IT course.
- To identify the significance of learning preferences in teaching – learning process.

3. LEARNING STYLES: A REVIEW

Learning style can be termed as attitudes of gathering, processing, interpreting, organizing and thinking about information. There are a great diversity in the way different learners perceive information during teaching – learning process because learners have different learning styles. As per (Chen Y. Wu, 2013), the phrase 'learning style' was first coined in a group dynamics study by Thelan. (Kocinski, 1984) defined 'learning style' as person's preferred way to learn and the way that an individual learns best. Thus, a learner can learn more effectively if she/ he is taught using her/ his preferred learning style. (Keefe, 1979) suggested that learning styles are 'features of cognitive, affective, and physiological behaviours that serve as relatively stable indicators of how learners perceive, interact with, and respond to their learning environments'. (Sewall, 1986) defined 'learning style' as an individual's unique way of interacting with the environment. (Smith, 1982) Argued that 'learning style' incorporated individualised cognitive, affective, and environmental factors. The ways that we learn new information can be categorized according to our specific learning styles. (Coffield F, 2004).

Early studies document many learning styles through the years. Among them are models that emerged from researchers, such as learning styles models by (Silverman, 1988), (Dunn R. D., 1975, 1989), (Kolb, 2005), (Honey, 1982, 1989), (Entwistle, 1995), (Gregorc, 1979), (Fleming ND, 1992) (VARK, n.d.). Table 1 presents brief summary of different learning style models proposed by different academicians and researchers over the years.

Table 1: Statistics of VARK studies in literature works

Study	Sample Size	Unimodal Learning Preferences (Bifurcated)				Multimodal Learning Preferences (Bifurcated)			Unimodal	Multimodal
		V	A	R	K	Bi – Modal	Tri – Modal	Quad – Modal	(Overall)	(Overall)
(Baykan Z, 2007)	155	3.2	7.7	1.9	23.3	30.3	20.7	12.9	36.1	63.9
(BU., 2011; BU., 2011)	312	32	31	38	45	31.3	9.1	40.5	68.9	31.1
(Breckler J, 2009)	151	4	5	15	16	19	10	31	40	60
(Lujan HL, 2006)	166	5.4	4.8	7.8	18.1	24.5	32.1	43.4	36.1	63.9
(Whillier S, 2014)	407	50.6	52.6	51.6	65.4	-	-	-	44	56
(Turner DA, 2011)	50	90	76	66	62	-	-	-	20	80
(Shenoy N, 2013)	200	4.08	49.2	11.1	36.5	25	24.3	50.66	29.3	70.7
(Tantawi, 2009)	57	0	10.5	5.3	10.5	22.8	19.3	31.6	26.3	73.7
(Sabiha M. Haq, 2012)	192	18.2	28.6	24	29.2	-	-	-	85.1	14.9
	153	17	27.4	24.5	31.1	-	-	-	69.3	30.7

The current work presents a review of the VARK learning style model because the inventory provides a meaningful measure for learning styles because it directly assesses how students prefer to learn (Yeghiazarian, 2015). According to (Malaysia Education Ministry, 2008), VARK is one of the most commonly used learning style besides Dunn & Dunn. (Fleming ND, 1992) expressed that multimedia courseware strengths are based on VARK model.

4. THE VARK LEARNING STYLE

The learning preferences of learners can be used to devise teaching – learning strategies. As teachers explores different teaching methods and approaches, learners can focus their attention on study skills suggested for their preference modality (Jessica Li, 2018). The learning experiences of the learners can be improved when learners get increased awareness of their learning styles (Jessica Lia, 2018). Many of the studies have focused on the sensory modality used by students to learn and have used the VARK questionnaire to assess it (Barman A, 2009) (Baykan Z, 2007) (Breckler J, 2009) (JL, 2010) (Foster N, 2010) (French G, 2007) (Lujan HL, 2006) (TA, 2009) (Murphy RJ, 2004) (Slater JA, 2007) (Wehrwein EA, 2007). Study done by (V., 2001) amongst first year Physical Assistant students showed that after the intervention of VARK, it could increase the student's learning.

The VARK learning style model was developed by Neil D. Fleming in 1987 (Fleming ND, 1992) (Fleming N, 2006) (Fleming, 2001). Popularly known as the VARK inventory, it was developed in order to improve faculty development and to help students become better learners. VARK is an acronym representing four distinct learning styles of the learners. These include:

- **Visual (V) learners** – these learners process information best if they can see it. Graphs, flow charts, pictures etc. are more effective ways of presenting information to such learners.
- **Aural (A) learners** – these learners learn by hearing the information. Usually, they process the information best by listening to lectures, attending tutorials and using tape recorders to play back learning sessions.
- **Read/Write (R/w) learners** – these learners like to see the written words. They like to read text and take notes verbatim and reread these over and over again.
- **Kinesthetic (K) learners** – these learners like to acquire information through experiences and practice. They prefer to learn information that has a connection to reality (Fleming N, 2006).

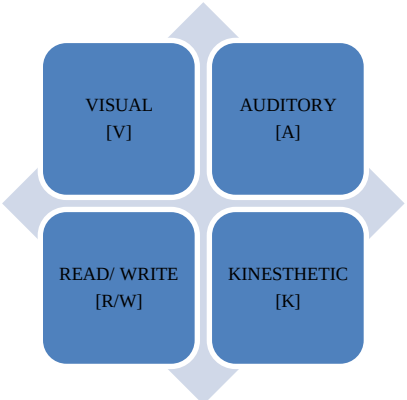


Figure 1: VARK Learning Styles

As depicted in figure 2, the additional "multimodal" categories encompasses the students who fall into more than one sensory modality of any combination (Bi – modal, Tri – modal or Quad – modal) (Laxman Khanal, 2014) (Fleming N, 2006).

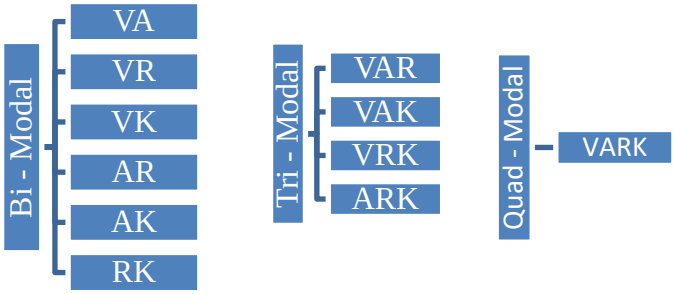


Figure 2: Multi - Modal Learning Styles

The questions in the questionnaire as developed by (Fleming ND, 1992), enable to understand the modal preferences of the learners. Each question presents a scenario that are likely to be within the respondent's experience and/or understanding and asks her/him to choose from given alternative actions. Each answer represents a particular style preference of the respondents. Respondents may select multiple answers, and all of the answers are counted. Thus, respondents can be placed in multiple areas. The total score of answers indicate the preferred learning style of these learner. Individuals may have preferences that range from single mode to multiple modes that may include all four modes. Thus, VARK learning style model can be effectively used to identify learning preferences of learners. This can further enable teachers to adapt teaching strategies and /or approaches that effectively address the learning preferences of the learners. This in turn can help enhance the teaching – learning experiences of the learners.

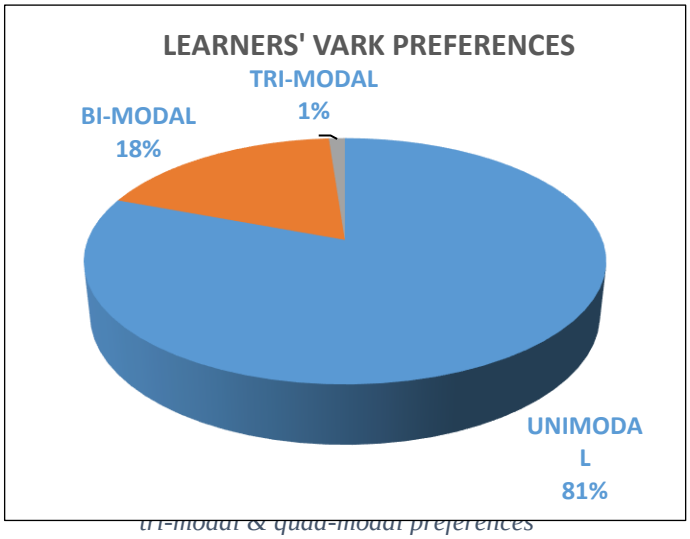
5. MATERIALS & METHOD

This work attempts to document the study conducted on the first year computer science learners. This study aims to identify the VARK learning preferences of the learners. A total of 176 learners voluntarily participated in the study. The questionnaire aimed to capture the VARK preferences identified by the learners. The purpose of the study was explained to the students and the questionnaire were distributed as online form to the learners who volunteered to take the analysis. The completed responses were evaluated by using previously validated scoring instructions available on the VARK website (VARK, n.d.). Descriptive statistics was used to analyse the students' preferences of the various VARK components, as well as their preferences of the various teaching-learning methods. Out of 200 students, 176 learners responded from which 164 learners completed full questionnaire. Thus, the response rate of the survey was 82%.

6. RESULTS & DISCUSSIONS

The significance of understanding of the learners' different learning style preferences and their eminence in achieving academic success is acknowledged by the academic community (TA, 2009) (Williamson MF, 2007). In the current work learning preferences of learners were identified by the VARK Learning style inventory questions. According to the VARK model, the students' learning styles are dependent on how they preferred to perceive/receive information. They could prefer three modes (tri-modal) or all four modes (quad-modal) of the information presentation.

Figure 3 represents the distribution of VARK Modalities of the learners at the Undergraduate computer applications and IT. It was found that 81% of learners had unimodal (single) learning style preferences. Around 18% of learners had bi-modal learning preferences and only 1% of learners had tri-modal learning preferences.



tri-modal & quad-modal preferences

Further, Figure 4 represents distribution of each unimodal preference of the learners. Kinesthetic was highest preferred mode followed by Read/ Write mode and Aural mode respectively. While visual was least preferred mode of learning preference.

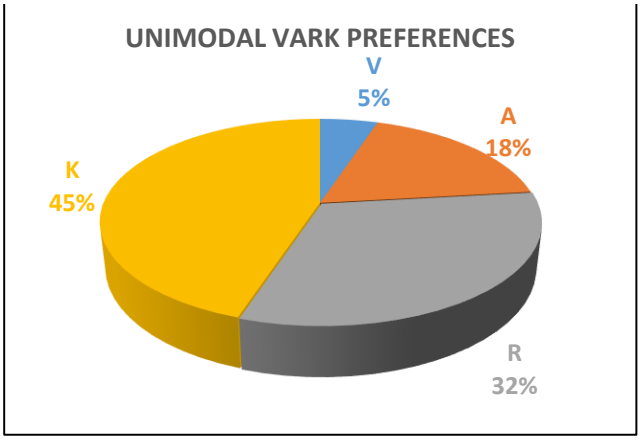


Figure 4: Uni-Modal Learning Style Preferences of the Learners

Figure 5 represents Bi-modal preferences of the learners. The highest preferred bi-modal preference is Read/Write and Kinesthetic followed by Aural and Read/Write bi-modal learning preference. Aural and kinesthetic bi-modal preferences are least preferred amongst three modes as "RK", "AR" and "AK".

Table 2 represents detailed distribution of learner's preferences for all learning modes.

Table 2: Statistics of VARK Learning Style Preferences of learners under study

LEARNING PREFERENCES	UNI-MODAL				BI-MODAL						TRI-MODAL			QUAD-MODAL
	V	A	R	K	VA	VR	VK	AK	RK	AR	VAR	VRK	ARK	VARK
N	7	25	44	62	2	0	0	6	14	9	0	1	1	0
%	4.09	14.62	25.73	36.26	1.17	-	-	3.51	8.19	5.26	0.00	0.58	0.58	-

The findings of distribution are similar to findings by (Breckler J, 2009) (Lujan HL, 2006) (Shenoy N, 2013) (Tantawi, 2009) (Sabiha M. Haq, 2012) whereby the learners with visual learning mode preferences are least. Also it should be noted here that no learners have bi-modal modes "VR" and "VK" as learning preferences. Also, no learner had quad-modal mode as learning preference.

The current study focusses to ascertain the learning preferences of learners from first year of computer science and IT courses. The results of the studies depict that learners can have different learning styles. Thus, teachers are suggested to cater to the multiple learning styles of learners when preparing the lesson plans as well adopting to various teaching strategies. This is because selecting a teaching method that addresses the learners' learning style can enhance teaching – learning experience, which can further influence their academic achievement.

The above discussions led to identify the prospective applications for which learning style preferences of the learners can play crucial role in the teaching – learning process. Identifying the learning preferences of the learners can enable teachers to design effective learning materials. Designing learning material taking into consideration the preferences of learners can enable teachers to represent the learning content in ways that appeal the learning preferences of the learners. For example learners with visual preferences can be presented with the contents represented through different graphics and annotations. The learners with kinesthetic preferences can be presented with different formats of experiments and demonstrations. Similarly, identifying the learning preferences of the learners can enable teachers to identify and implement teaching strategies that can become effective. For example the learners with read/ write learning preferences can be taught with teaching strategies involving larger contents as textual notes, case studies and other forms of written materials. Learners with aural learning preferences can be presented with audio clips and class recordings that become effective in teaching – learning process.

7. SCOPE & CONCLUSION

The accuracy of responses are influenced because of the self-report method used to collect data in the current study. Further, in the current study, the learning style preferences of individual learners are collected, hence, can also influence the generalizability of the results.

Learning styles are important factors that determine learner's preferences for learning. Teaching learning process can be more effective when it is modified to suit the learning preferences of the learners. Amongst the various learning style models proposed by the researchers, the VARK model is based on the sensory modalities of the learners which makes it easier for teachers to analyse as well as easier for learners to relate and respond to the inventory questions. The current work reviews the work based on VARK of various researchers. The work justifies the selection and suitability of the VARK model through theoretical and empirical reviews. The work thus enables to identify the learning preferences of the undergraduate students of the computer science course.

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