NCR, India Vaking Up! - Andragogical Recommendations

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ABSTRACT

Quite a lot of research has been conducted on learning styles. This includes introduction of the concept of different learning styles as well as their application in various fields. Surprisingly, not much research has taken place on learning styles of students in the field of engineering and management and that too, in India. This research paper addresses this gap. A study was conducted on learning styles of students in private Universities and institutions of NCR imparting engineering and management education. It was also observed that though faculty and students associated with these institutions have a fair idea about learning styles however they are unaware of their own learning styles. Self-awareness on learning styles will act like a guiding torch. When students find difficulty in understanding any topic, they may request the faculty to switch to a teaching style that caters to their learning style. This will maximize the outcome of teaching-learning process. This research paper makes use of VAK inventory developed by Alan Chapman. Reliability of this questionnaire was established using Croanbach Alpha.

Introduction

"For him who has conquered the mind, the mind is the best of friends; but for one who has failed to do so, his mind will remain the greatest enemy" - Bhagavad Gita 6.6

"We are only now on the threshold of knowing the range of the educability of man - the perfectibility of man. We have never addressed ourselves to this problem before." Dr. Jerome Bruner, Harvard University

Neuro Linguistic Programming(NLP), the term coined by Bandler and Grinder relates to mind, language and behavior. It is a technology as well as a model. NLP has valuable therapeutical applications in the field of clinical therapy, counseling, coaching, and healing. It has gained widespread recognition in the field of marketing, sales and even education and training. Techniques of NLP also cover a wide

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range. Learning submodalities/preferences/styles(these terms are used synonymously in literature) is one of them.VAK(visual-auditory-kinaesthetic) learning styles were categorized by Walter Burke Barbe and team(1979). An individual can learn in different ways provided the instructional methodologies used suit his learning preferences.

According to Whittington and Ravens(1995), learning styles can be defined as 'a predominant and preferred manner in which individuals take in, retain, process, internalize, and recall information and can represent both inherited characteristics and environmental influences'. This is because of human luxury organ- the brain. This 'luxury organ' is able to process information only if the required information reaches it. As per the psychologists, human beings use only 4%-10% of their brains. Rest 90%-96% of the brain remains unused. Imagine how much value addition human beings will be able to do; provided their brains can get used optimally. This is how evaluation of one's learning style is important.If preferred learning submodalities are evaluated, learners would be keenly interested in learning in general. Claxton and Murrell(1987) suggested that different approaches to learning styles can be evaluated at four levels: personality, information processing and instructional methods. The research done through VARK/VAK learning style inventories falls under the last category: evaluation of instructional methods.

In higher education, students have already reached after 10+2 years of learning. They have been taught by several teachers with different teaching styles. This fact has made them stretch themselves in terms of learning styles. Where engineering subjects deliver complex technical curriculum; management education expects students to be theoretically sound and practically prudent. And a transition from annual evaluation system to semester system also brings changes. Degree of freedom also undergoes an elastic change in professional life. All this adds to confusion in the life of students. Drop-outs, hostile environment and poor attendance add to the misery. On one hand, these students are partly confused and on the other hand, teachers are busy downloading a lot of information on a daily basis in their stipulated lecture classes since clock is ticking for them against completion of syllabus. Overall, it's a high pace tough environment to learn, perform, behave and build relationships. Amidst all this, it is considered important to get to know the learning preferences of the students so that instructional methodologies can be matched with these. If this is given emphasis, rote-learning that Indian education system is usually blamed for, can be eradicated to some extent and country would produce better engineers and managers rather than just high-scorers who are products of rote-learning. This way, teachers' teachings and students' learning can display a win-win scenario.

The above introduction brings home a point that efficiency in learning is of paramount importance, given the high-end dimensions of exuberant costs of education and time constraints(Rumble 2001).

Research on learning styles has taken place in various parts of the world and in India it has recently gained momentum. Since such a research has not been conducted in private professional Universities and Institutions of NCR, this research paper addresses this gap.

Literature Review

Learning styles have had rich, extensive and elaborative history and this history works as a backbone for any new research. Various researchers and academicians have given their viewpoints on how humans learn. Different learning style inventories have also been formulated and implemented for research purposes. Among NLP related learning style research, several researchers have conducted research using VARK inventory. VARK questionnaire was developed by Fleming and Mills (1992).Table A shows latest research conducted on students using VARK inventory.

Table A - VARK based latest research from Literature

Profile of students	Researcher	Publication Year	Location	Results
First year medical students	Kharb et al	April, 2013	Sharda University, India	61% multimodal 41% bi-modal 14% trimodal 6% quadra modal 39% unimodal (K,V,A,R)
First year medical students	Peyman et al	Aug 2014	Medical Sciences University, West Iran	58.4% multimodal 17% bi-modal 13.5% trimodal 27.6% quad modal 41.6% unimodal (A,R,K,V)
First Year medical students	Bhagat et al	Aug 2015	India	Pre and post assessment through VARK showed significant difference ($P < 0.001$).
Surgical Residency Applicants	Kim RH and Gilbert T	Sept 2015	a university hospital-based program (Louisiana State University Health Sciences Center)	57% multimodal 69% showed some degree of preference for kinaesthetic learning style
First Year Physician Assistant students	Marcy V	2001	Emory University, USA	Multi-modal- 72% V-0%, A-0%, R-22%, K-6%

Physiology Under graduates	Wehrwein et al	2007	Michigan State University, USA	majority of male students preferred multimodal instruction, specifically, four modes (VARK), whereas a majority of female students preferred single-mode instruction with a preference toward K.
First year MBBS students	Choudhary et al (2011)	2011	India	Male students preferred OHP to Blackboard(BB) whereas female students preferred BB to OHP.
Post graduate dental students	Shenoy et al (2013)	2013	India	Subjects had a higher preference for multimodal learning.
Medical students	Aydin et al	2015	Baskent University, Turkey	First year students are uni-modal(75.4%); sixth year students are multi-modal(67.4%)

All the above-mentioned studies were conducted using VARK questionnairedeveloped by Neil Fleming. And it also reveals that medical students have undergone such a research.

Research Gap and Objective of the Study

All the above studies as mentioned in LR section have made use of VARK questionnaire. This research has used VAK questionnaire; reliability of which has not been established yet.

Most of the above studies have taken place on medical/dental students as subjects. Research work has gap of exploration of learning styles among engineering and management students.Hence this research was conducted and following research questions were formed:

1. What is the reliability status of VAK questionnaire ?
2. Do engineering and management students in NCR have uni-modality in their learning styles? Or are they multi-modal?
3. Do male and female students differ in their learning styles?
4. Do engineering and management students differ in their learning styles?

Instrument and Data Collection

This research was done in two parts. In pilot study, 300 undergraduate(B Tech Sem V students) and post graduate students(MBA Sem III) from private Universities of Delhi, NCR imparting technical and management education participated in this study. Though some judgement was applied in selecting this data set, however this was more or less based on convenience. Respondents filled VAK questionnaire(30 questions) designed by **Alan Chapman.** Respondents were given an instruction to fill it as quickly as possible(as soon as they read it) so that they could respond it through their subconscious mind. This is how the questionnaire aimed to reach at the 'strongest modality preference' of the respondents.

Respondents returned the filled questionnaire in 7-10 mins depending upon their reading speed. The responses of the questionnaire were then analysedfor reliability. This was done using SPSS version 20 and croanbach Alpha for VAK questionnaire was found to be .56 so some changes were made in the original questionnaire for the research. VAK questionnaire has 30 questions with three options each. These three options point towards single modality of the respondent viz visual, audio and kinaesthetic. In place of three, options were extended to seven with three choices of bimodality and one choice of tri-modality. This was done since LR on VARK learning styles had indications of existence of bi, tri and multi-modalities.

In the second part of research, data was again collected from 300 undergraduate and post-graduate students and this time, 30 questions had seven options.Collected data was once again made to go through reliability testing and Croanbach Alpha was found to be .806. This data set was analysedfor student profiling in different categories: visual(V), auditory(A), kinaesthetic(K), VA, AK, VK and VAK.This answered research question 1 that VAK questionnaire is reliable when used with seven options.

Research Findings(RQ 2-4) and Discussion

Theory on learning styles suggests that LSs of students are evidence of how students prefer to receive/perceive information. VAK inventory resulted in LSP(Learning Style Preferences) of students to receive information. Students may prefer single/uni-modal(V/A/K) or bi-modal(VA/AK/VK) or tri-modal/multimodal(VAK) LSs. The present study conducted on a sample size of 300 engineering and medical students resulted in Table 1. Table 1 shows that 76 students were found to be multi-modal(VAK), 89 students were bi-modal and 64 students were uni-modal. It is also note-worthy that 181 students were male and 119 students were female.

Table 1 shows Learning Style Profile of students in numbers and Fig 1 shows the same in percentage. As it can be seen in Fig 1 that 25% of the students were found to be multi-modal; 21% were unimodal(8% K, 7% V and 6% A);54% were bi-modal(AK 29%, VA 18% and VK 7%). This answered RQ2 that engineering and management students of NCR are not just uni-modal.

Table 1 - Learning Style Profile of Private Universities of NCR, India

Sample Size-300	Single submodality			Bimodality			Multimodality
	V-21	A-20	K-23	VA- 53	AK- 87	VK-20	VAK-76
No.of males-181	15	17	16	25	53	11	44
No.of females-119	6	3	7	28	34	9	32

Fig 1 - Learning Style Profile of NCR, India Engineering and Management Students

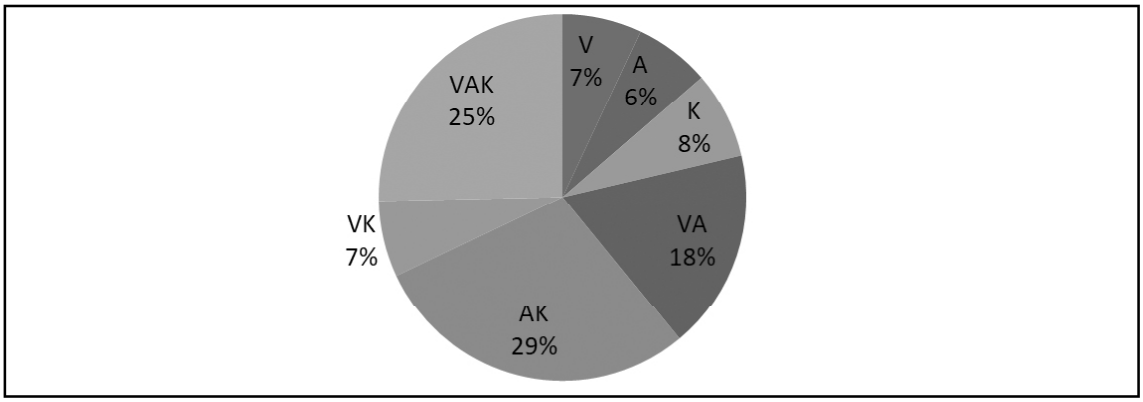


Fig 1.1 and Fig 1.2 show Learning Style Profile of female and male students in percentage respectively. The same can be seen in numbers in Table 1 above. Fig 1.1 shows that 27% of the female students are multi-modal; 13% are uni-modal(6% K, 5% V and 2% A); 60% are bi-modal(AK 29%,VA 23% and VK 8%). Fig 1.2 shows that 24% of male students are multimodal; 27% were uni-modal(10% A, 9% K and 8% V); 49% were bi-modal(AK 29%, VA 14% and VK 6%). Male and female students are significantly different in uni-modality and bi-modality.This answers RQ 3.

Fig 1.1 - Learning Style Profile of Female Students

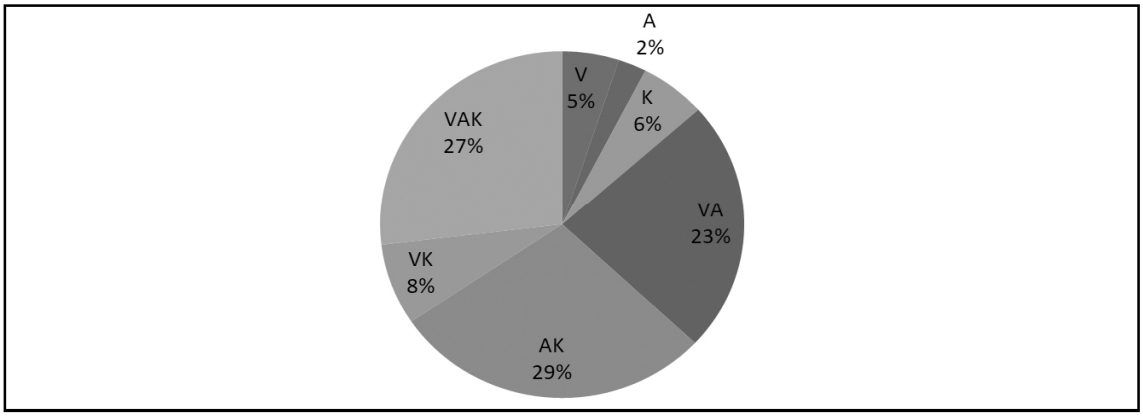


Fig 1.2 - Learning Style Profile of Male Students

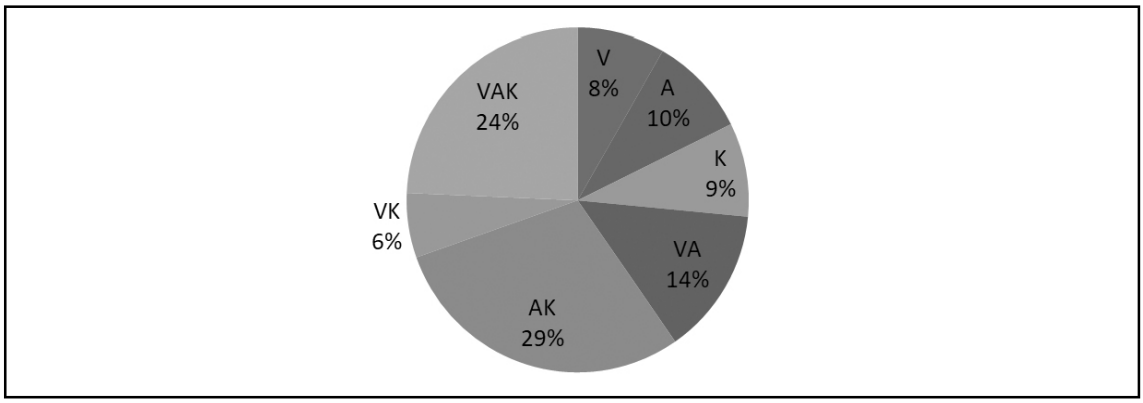


Table 2 shows Learning Style profiling of students as per the program(engineering or management) in numbers. Fig 2.1 and Fig 2.2 show learning profile of engineering and management students in percentages respectively. Fig 2.1 shows that 25% of engineering students are multimodal(VAK); 24% are uni-modal(10% V, 9% K and 5% A); 51% bi-modal(VA 26%, AK 16% and VK 9%). Fig 2.2 shows that 26% management students are multi-modal(VAK); 19% are uni-modal(8% A, 7% K and 4% V) and 55% bi-modal(AK 42%, VA 9% and 4% VK) respectively. This shows that engineering and management students exhibit minor difference in unimodality and bi-modality.This answers RQ 4.

Table 2 - Student Profiling according to Program

Sample Size-300	Single submodality			Bimodality			Multimodality
	V-21	A-20	K-23	VA- 53	AK- 87	VK-20	VAK-76
Engineering -150	15	8	13	39	24	14	37
Management-150	6	12	10	14	63	6	39

Fig 2.1 - Learning Style Profile of Engineering Students in NCR

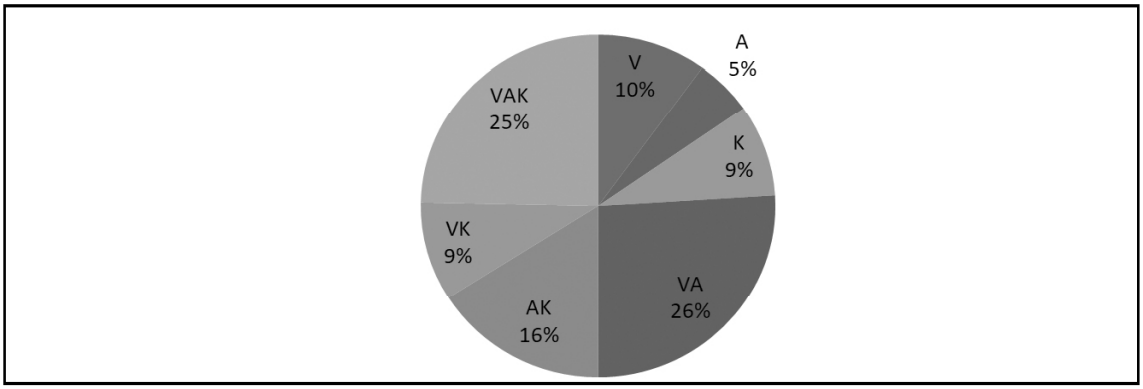
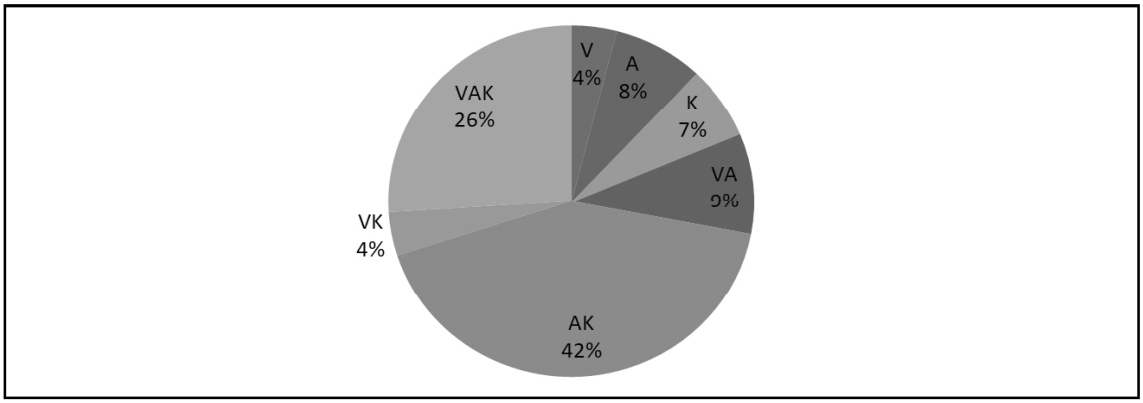


Fig 2.2 - Learning Style Profile of Management Students in NCR



Matching Learning Style with Teaching Style

Regarding this, 20 faculty members(3-10 years of work experience) were approached in Staff Rooms of six Universities/Institutions. An initial interview with them revealed that 80% of them though knew that individuals learn differently, could not name different types of learning styles. 20% of them could name visual and audio(they called it audio; not aural) however had no clue about the term kinaesthetic. When asked if they think an assessment of learning styles would help improve teaching-learning process; they answered in affirmative. They were quite excited and enthusiastic about it. When further asked whether matching instructional methodologies with learning style of learners will make learning effective; they again answered in affirmative.They were also asked whether students have any role in designing curriculum,they said that students fill feedback form at the end of a course that includes a couple of questions on course curriculum too. However, they are not sure how effectively these suggestions on change in curriculum are implemented practically. Lastly, they were asked whether they knew their own learning style/preference; they answered in negative. Overall, the discussion revealed that engineering and management faculty in private Universities of NCR is still ignorant about possible impact of learning style(s) on learning.

Conclusion

This research paper based on empirical research conducted on student sample concludes that engineering and management students of NCR don't prefer one common learning style. Rather they prefer different submodalities for learning. Based on focus group interviews with faculty members, it is concluded that faculty members are ignorant about their own learning style and learning style of their students.

Also, it was observed that engineering and management students lack self-awareness regarding their learning styles. Self-awareness of one's own learning style would certainly impact one's learning.

AndragogicalRecommendations

Based on Primary Research

LS inventories should be administered on engineering and management students of NCR. LSs of

students should be shared with them so that they can utilize their core competence as well as work on their weak submodalities. This will certainly assist their learning.While they fill the questionnaire, they should be instructed to fill it carefully. Mutual discussions about learning styles will bring inclusive and integrated learning among student and teacher community. However, based on the results of questionnaire, students should not be labeled to possess a specific learning styles.Students should be informed that LSs may undergo change depending upon their capacity to stretch themselves in weaker learning submodality, age, maturity level and even exposure to various instructional methodologies catering to various learning styles. The implementation of learning styles would certainly bring promises and challenges so implementation requires high degree of carefulness and prudence. All these will help transform conventional teaching into accelerated learning. And students will have a self-talk-'everything is OK with me; I need to either learn this thing differently or need to make little more effort'. Also, role of faculty would be challenging in deciding which instructional methodology should be used for a particular topic. They should keep checking with students if they are able to understand or not; intermittently. It should not come as a shocking surprise to the faculty that majority of the class failed to understand what was taught in the class. Also, faculty should be prepared to explain something in different ways; not repeatedly in the same way. It must be understood that students are different and not dumb.

Based on Literature Review

Adult students are no more children so this paper does not make recommendations on pedagogy. According to Dr. Malcolm Knowles(1984), andragogy refers to adult learning; andra means 'man' and 'gogy'means 'leading'. His andragogical principles are: involvement of adults in the planning and evaluation; experience is significant; immediate relevance and impact of learning; problem-centred learning rather than content-oriented.

Private institutions and Universities of NCR should follow some/all of the above recommendations depending upon their customized requirements in order to enhance learning experience.

Suggestions For Future Research

Compare and contrast LSs of first year, second year, third year and final year of engineering students; if possible; with the same set of students knowing their identity but keeping it anonymous. This should be done to see whether LSs of students undergo any change when they mature academically.Similarly, compare and contrast LSs of first year(early) and second year(late) for two-year MBA program students to establish whether LSs of these students undergo any change.

The above pre and post design could also have an intervention of informing the students of their LSs. Also, do students go multi-modal as their level of year in program furthers?

LSs throw light on outermost layer of onion model of a person's learning. VARK/VAK questionnaire can be conjointly studied with inventories related to personality and cognitive-processing and a relationship could be established.

A compare and contrast study design could be framed for faculty and students. For example 50 students and 50 engg/management faculty could fill VAK questionnaire and the general notion that faculty would have more inclination towards Visual(that includes Read/Write) could be tested.

Using the above, a lot of anecdotal information on LSs can be empirically and qualitatively researched.

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