

Classification of Learners: Subjective Validation through Models

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Abstract: This paper describes the learning models and their validation through the results of a study conducted on a group of students. The results do have a good correlation but the validity is to be established with further study over a period of time.

Keywords: Learning Models, Forer Effect, correlation

1. Introduction

The art and science of learning has inspired the researchers and thinkers alike in the history. The learning is still a key point which is receiving attention from most of the disciplines of our society and economy driving forces. This is the only aspect in the development of an organism, which produces everlasting change in it. Extending the words of Alan Wilson Watt who said ‘*every individual is a unique manifestation of the Whole, as every branch is a particular outreaching of the tree*’ to the field of education, a teacher can recognize that every learner is a unique manifestation of all the upbringing, previous schooling, beliefs, motives, goals, experiences, culture, tradition, and so on.

Understanding the learner is a very important step in making the entire process of Teaching-Learning, a much required success.

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Once the learner and his style of learning are well understood, it becomes possible for the teacher to explore other possibilities of conveying the knowledge. This is from the perspective of a teacher. From the learners’ perspective, it could mean fruitful learning. In the Indian context there is no choice or control in selecting the learner, which makes the job of a teacher more challenging and exciting. This challenge is to

bring about the behavioural changes perceptible to learner, to the world around us with in a time limit.

Exploring the career as faculty members at the prestigious BMS Institute of Technology and Management, Bengaluru, we have been getting outstanding support and exposure to do the research in engineering education field. Every new batch of students entering the portals of our Institute brings us fresh perspectives to look at our profession. One thing remains unchanged: *the learning styles of the individuals*. It is this aspect which has been observed by all the practicing educators across various disciplines, to be a matter of concern, which if not addressed in the right direction, would impact the learners and their learning experience.

The dawn of electronic age has permeated in to the class rooms and put issue of the “one-size-fits-all” approach of the content delivery to the centre-stage. This is also the time in history where distance education is seeing an explosive growth. The age old practice of the chalk-and-talk now seems to be looked down on. It has brought with it new terminologies like e-Learning, Learning Management Systems, Educational Hypermedia Systems, Technology Enhanced learning, ICT which focus on the central theme: *differences in learning styles*.

The literature is replete with studies on learning styles of the learner and this area has seen a tremendous growth in terms of publications and commercial arenas in recent decades. Though this can be termed as the modern view towards learners, the ancient scriptures of and the methods of teaching of Indian origin have given enough inputs on these matters very long back. It laid importance to the student and holistically developed an individual who can carry on the cause of humanity, without ever using catchy phrases describing the methods. The following are the accepted models with validated instruments that according to Coffield et al., “proved to be the most psychometrically sound and ecologically valid (2004)”.

- Allinson and Hayes’ Cognitive Styles Index (CSI)
- Apter’s Motivational Style Profile (MSP)

- Dunn and Dunn model and instruments of learning styles
- Entwistle's Approaches and Study Skills Inventory for Students (ASSIST)
- Gregorc's Mind Styles Model and Style Delineator (GSD)
- Herrmann's Brain Dominance Instrument (HBDI)
- Honey and Mumford's Learning Styles Questionnaire (LSQ)
- Jackson's Learning Styles Profiler (LSP)
- Kolb's Learning Style Inventory (LSI)
- Myers-Briggs Type Indicator (MBTI)
- Riding's Cognitive Styles Analysis (CSA)
- Sternberg's Thinking Styles Inventory (TSI)
- Vermunt's Inventory of Learning Styles (ILS)

The urge to know the learners mindset and his faculties must have triggered the thought of creating a method for the same.

Description of Some Models:

In the following section a brief review of the major Learning Styles classifications are presented

A. Felders - Silverman Index of Learning Styles :

This is a questionnaire for determining the learning styles of students, developed by Richard M. Felder and Linda Silverman across four dimension of learning viz. Active-Reflective, Sensing-Intuitive, Visual-Verbal, and Sequential – Global. These dimensions were already a part of other such efforts made by educational researchers to classify the learning styles of the students. This questionnaire is also adapted in an online format and is made available. This has been used by various educators to determine the type of learners they have, and have been successful in improving the performance of the students.

Here is a brief description of the different dimension of learning as mentioned by Felder and Barbara. In the form of a questionnaire, this model tries to classify the learner based on their preferences. It may look like there is some overlap between the categories presented here, but on careful observation each seems to be different. Also, the learners might act as belonging to either class but, their tendencies are more strongly oriented to one side. This is classified in Index of Learning Styles as strong, moderate, and mild. As mentioned elsewhere, good learners learn in any way.

Active and Reflective Learners: Both of the categories of learners process the information available to them in the external world in the form of instructions by a person / manual, diagrams,

waveforms etc. and conclude about it in their mind, which has been termed as internal world. The term 'active' is for learners who want to try out things by 'active experimentation'. These learners will learn effectively when he is able to experiment in the laboratory or try it out on a simulator. The active learners will discuss the concepts with others and try to arrive at the core of the problem based on the instructions received, whereas reflective learners will be more introvert and try to think through the concepts. He will observe and think about all the possibilities before conducting experiments. Some studies have indicated that engineers are more active learners than reflective. As is evident, if the delivery of content is through only lectures, then the active learners tend to get bored, and may dislike the contents. On the same lines, the reflective learners will fail to keep up with the rest if content delivery is only hands on. Also, the active learners will gather around peer group and experiment, where as the other class will be with relatively small group or mostly alone.

Sensing and Intuitive learners: The 'sensors' are more oriented towards learning facts, whereas 'intuitive' learners who are better at understanding the underlying principles and abstractions, prefer discovering new possibilities. The intuitive learners do not like courses which are having routine and predictable calculations and outcomes, like those in Power System Analysis, where as other courses of the type of Programming and Network Synthesis will be welcomed.

Visual and Verbal Learners: As is evident from the names, 'verbal' learners tend to understand more from the written texts or spoken explanation, as against the 'visual' learners, who tend to understand by images, block-diagrams, or maps. The courses which are more of 'theory' are not a favourite course for visual learners, like Engineering Materials, or Entrepreneurship and Management Principles.

Sequential and Global Learners: Sequential learners tend to understand the concept in logical order. The outcome of each step is connected by them to finally arrive at the big picture. The 'global' learners, on the other hand understand the 'big picture' or the gist of the matter, and then try to figure out how individual steps worked. The details are not clearly known to global learners as they do not think sequentially.

B. Fleming – Mills' VARK Model:

Neil Fleming's VARK model is one of the most popular representations developed in 1987 as an inventory designed to help students and others to learn more about their individual learning preferences. This

model development began on the lines of Stirlings model which had only three categories, and the observed difficulty in accommodating all the learners in these. In this model, which is often referred to as VARK learning styles, learners are identified by the preference given: a preference for visual learner (pictures, movies, diagrams), auditory learner (music, discussion, lectures), reading and writing learners (making lists, reading textbooks, taking notes), or kinaesthetic learner (movement, experiments, hands-on activities). A point to be noted is that learning styles does not just indicate the characteristics of learning, but the choices and preferences made by the learner in learning.

C. Myers- Briggs Type Indicator:

The Myers-Briggs Type Indicator (MBTI) is an introspective self-report questionnaire designed to indicate psychological preferences in how people perceive the world and make decisions. This is a combination of personality and cognitive modes which was created in 1944. The type indicator works in classifying peoples types instead of the traits. As per the agreed understanding in the said model, traits can be improved akin to skill over time, but the types will remain as it is. A suitable environment can bring out the best in the learner. The types this model sorts are known as dichotomies. These are extraversion / introversion, sensing / intuition, thinking / feeling and judging / perceiving. A given type's preference in each dichotomy is in each of the sixteen types is referred to by a four-letter abbreviation, such as ESTJ or INFP. It states that the person taking the indicator is always the best judge of what their preferences are and that the indicator alone should never be used to make this decision.

In Myers Briggs theory, for each pair you prefer one style over the other. You combine the letters associated with your preferences to get your Myers Briggs personality type. For example, having preferences for E, S, T and J gives a personality type of ESTJ. Although you have preferences, you still use all eight styles - in the same way that most people are right-handed but they still use both hands.

Extraversion (E) and Introversion (I) - The first pair of styles is concerned with the direction of a persons energy. If it is preferred to direct the energy to deal with people, things, situations, or "the outer world", then his preference is for Extraversion. If he prefers to direct energy to deal with ideas, information, explanations or beliefs, or "the inner world", then preference is for Introversion.

Sensing (S) and Intuition (N) - The second pair concerns the type of information/things that one process. If one prefers to deal with facts, what one knows, to have clarity, or to describe what he sees, then the preference is for Sensing. If preference is to deal with ideas, look into the unknown, to generating new possibilities, anticipating unobvious, then preference is for Intuition.

Thinking (T) and Feeling (F) - The third pair reflects the style of one's decision-making. If one decides on the basis of objective logic, using an analytic and detached approach, then his preference is for Thinking. Else if decision is using values then preference is for Feeling.

Judgment (J) and Perception (P) - The final pair describes the type of lifestyle one adopts. If he prefers life to be planned, stable and organised then preference is for Judging. Otherwise if preference is to go with the flow, to maintain flexibility and respond to things as they arise, then his preference is for Perception.

2. Data Collection and Analyses:

In order to understand and explore the correlation of learning styles proposed by some prominent instruments, we invited 50 students of Electrical and Electronics Engineering department, belonging to different semester, to participate in this search. Each student was given the questionnaire, which was completed by them, and the responses have been recorded. This was done only after briefing them about the study. Separate questionnaires for each of the three types of models were handed out. There are no right and wrong answers in these questionnaire and the students were supposed to select an option which is closer to their way of thinking.

The following are the results obtained in terms of the classification. These classifications are in accordance with the learning style instrument used, and are tabulated below. The total students and the percentage of the students in the subcategory is given in the form of a table.

The following classification is according to the Felders - Silverman Index of Learning Styles.

Sl. No	Category	Total Students	Percentage
1.	Active Learners	30	60.0
	Reflective Learners	20	40.0
2.	Sensing Learners	21	42.0
	Intuitive Learners	29	58.00
3.	Visual Learners	43	86.00
	Verbal Learners	07	14.00

4.	Sequential learners	35	70.00
	Global learners	15	30.00

The results of VARK model are given below: 69% of the students were found to be multimodal and remaining uni-modal.

Sl. No	Category	Total Students	Percentage
1.	Visual Learners	06	12.00
2.	Aural Learners	08	16.00
3.	Read/Write Learners	20	40.00
4.	Kinesthetic learners	16	32.00

Myers-Briggs Model:

Sl. No	MB Type Indicator	Total Students	Percentage
1.	Extraversion (E)	22	44.00
	Introversion (I)	28	56.00
2.	Sensing (S)	31	62.00
	Intuition (N)	19	38.00
3.	Thinking (T)	24	48.00
	Feeling (F)	26	52.00
4.	Judgement (J)	27	54.00
	Perception (P)	23	46.00

Observe that the group of student who were of the study has around 60% of them as 'Active Learners'. These category of students want to try out things in labs and experiment out before arriving about the conclusion. This trait will bring them closer to the actual point of application of concepts. They would gather a group of co-learners and discuss with them unlike the reflective learners who prefer to read material about the concepts and think about it. This may happen more in isolation and not in groups. But eventually Active and reflective learners will learn the topic. As far as the Engineering education is concerned it is mostly the application of concepts in various situations demanding an active type of learner.

In comparison to the active learners of the Felders - Silverman Index of Learning Styles, the VARK model has an overlapping category to Active Learners viz. Kinesthetic Learners and Visual learners. Similarly the Myers- Briggs Model has Sensing and Thinking Type Indicator which overlaps with the Active learners. Such overlapping can be found in other category of learners in each of the three models presented here.

There is no one universal model earmarked for this type of classification, and the choice of one should be based on the experimentation and the result.

Forer Effect: The personal belief makes one to correlate two unrelated events. This might have affected the results of the study. Forer has written on some of the methodological errors which can effect estimations of the validity of personality interpretations and measuring instruments. The uniqueness of the individual lies in the relative importance of the various personality forces in determining his behaviour and in the relative magnitudes of these traits in comparison with other persons. So the importance given to the outcomes of these studies has to be decided in consultation with experts in the field.

The results of study in no way can predict the performance of a learner in a test or examination. This also can not completely reflect the learners' competence in various fields. This type of learners models and associated suggestions can become one of the tools which could enhance the effectiveness of time used in learning the topics.

Conclusion: A variety of learner types were found in a small group of only 50 students, each giving preference to a particular way of presentation or learning modality. It has been considered the most efficient and effective modality will help the learner in receiving, processing, retaining and recalling the information. This necessitates that the teacher presents the contents to the learners in a form most suitable to them for effective learning. The classroom environment many a times becomes very rigid with respect to the topics, syllabus coverage, time availability etc, and the authors next venture is to use the model and try out different possible ways of presentation of the contents and finding the effect thereof.

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