



Diversity in learning styles: Implications for Higher Education

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Abstract

This Study was conducted to identify student preferences in assimilation and processing of information; then use these findings to design an intervention and study its impact on student academic achievement. The Study was designed in two phases. In Phase I, a 16-point multiple choice VARK questionnaire version 7.1 was implemented on first year undergraduate Science students. The statistical analysis revealed that uni-modal learners were only 9% while the others were bimodal 33%, tri-modal 30% and quadric-modal 28% thus concluding that students do have wide diversity in learning styles. Using this as reference, the second phase would be initiated with a pre-test post-test mixed group design. The findings of this Study establish the diversity of learning styles and the consequent need for instructors to design instruction accordingly. It highlights the need to update teacher understanding and application of the newer developments via organized pedagogical training at Higher Education levels.

Keywords: learning styles, diversity, pedagogical training, instructional design, Higher Education

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Introduction

A major theoretical development in recent education research is the move towards a more “constructivist perspective” and how people actually learn. Across the world, the recent trends in practice of teaching and learning are from a behaviorist view to a more constructivist and developmental view where students are more actively engaged in the learning process. Recognition that students must be more active participants in the learning process, wherever possible, stems from the aim of promoting deeper processing of knowledge. Higher education in science should develop a broad perspective on the chosen discipline, an in-depth understanding, the ability to see relationships, to have to have an inquiring mind, exercise independent judgment and have an analytic and creative approach (King, 2004).

What has been most productive in the learner-centered tradition has been the additional insight gained about individual differences and strategies that emerge while learners are engaged in the process of learning. Jonassen and Wang (1993) concluded that merely providing information and showing students structural relationships is not sufficient for higher cognitive performance. They concluded that “what matters most is the construction of personally relevant knowledge structures” (p.7). Learning improves when learning styles are taken into account (Riding & Rayner, 1995; Riding & Douglas 1993). Research has also revealed that teaching students how to learn and how to monitor and manage their own learning styles is crucial to academic success (Mathews, 1991; Biggs and More, 1993). When permitted to learn difficult academic information or skills through their identified preferences, students tend to achieve statistically higher test and attitude scores than when instruction is dissonant with their preferences. Moreover, knowing their learning preferences can be both empowering and transformative and thus students should be given insights into their possible learning strengths and weaknesses.

While fully acknowledging these developments, the educational scenario in India reveals that traditional methods of teaching *are still* prevalent at both school and University

levels. With the objective to achieve planned and coordinated development of the teacher Education system throughout the country, the regulation and proper maintenance of Norms and Standards in the teacher education system and for matters connected therewith, the National Council for Teacher Education in India, as a Statutory body, was instituted on 17th August 1995. The mandate given to the NCTE was very broad and covers the whole gamut of teacher education programs including research and training of persons for equipping them to teach at pre-primary, primary, secondary and senior secondary stages in schools, and non-formal education, part-time education, adult education and distance (correspondence) education courses. A strong need was voiced for substantial improvement in the quality and quantity of teachers at college and university levels too. There is an acknowledgement that while infrastructure and other material facilities are essential for promoting quality education, how and what is taught at different levels is also equally important. It is obvious that any learning program depends heavily on the understanding of the teacher and methods of teaching. With continuing rapid advances in different fields of Science, it becomes essential that the teachers not only keep themselves abreast with these developments but also be able to excite young minds so that they become more imaginative and creative. In addition to the need for self-learning by teachers, there is a need for organized training to update their knowledge, understanding and application of the newer developments (IAS, 2008, pp17).

A review of related literature revealed that addressing learner needs as a basis for providing responsive instruction has never been more important than now as educators meet the needs of diverse student populations. To identify their students' learning styles (Beaty, 1986, Dunn et al. 1989) teachers must employ a reliable and valid learning style preference instrument (Curry, 1987). In India too, there is need for well-trained faculty who will improve instruction to produce quality graduates. The existing teacher training programs in Indian Universities are insufficient both in number and the aspects that they cover to meet this demand (Bansal & Supe, 2007). Thus, globally, the focus has shifted from concentrating on the constructs of intelligence and information processing to an increased interest in learners' active response to the learning task and learning environment (Riding & Rayner, 1995).

These concerns prompted the researcher to take up this Study to determine the preferred learning styles of undergraduate science students who are at the threshold of a very crucial period of their lives; one which allows them to expand their knowledge and skills,

grasp abstract concepts and theories and increase their understanding of the world around them.

As part of a larger Study as to how learning preferences prevail and impact academic achievement and the need to address this reality via well designed instructional strategies, the present Study was conducted with the objective of determining the preferred learning styles of first year under-graduate science students in a private University in Vadodara, Gujarat, India. The Study was designed to be conducted in 2 phases.

Phase I was the implementation of the VARK scale (learning style inventories include models described by various educationists such as Dunn and Dunn, Felder-Silverman, Honey and Murnford, Kolb and VARK which was introduced by Fleming in 2006. VARK is an acronym which stands for visual, aural, read/write and kinesthetic preference modalities) and finding out the percentage of students in each category of learning style.

Using the findings of this phase, Phase II would then be initiated.

Methods (Phase I)

Ethics – Due consent was obtained from the respondents and complete anonymity maintained during data collection. Tool employed – The 16 multiple choice VARK questionnaire version 7.1 [Copyright (2006) held by Neil D. Fleming, Christchurch, New Zealand and Charles C. Bonwell, Green Mountain Falls, Colorado 80819, USA] was implemented. It was downloaded from the VARK home page <http://www.vark-learn.com/english/page.asp?p=questionnaire>.

Study procedure – The first year undergraduate Science students (100) were briefed about the objective of the Study and responses were elicited regarding their learning preferences i.e. visual, aural, read/write, kinesthetic.

Analysis

Quantitative analysis

The responses received were then tabulated into a Microsoft Excel sheet and the scores were statistically analyzed to determine the percentage of students in each category via percentage analysis.

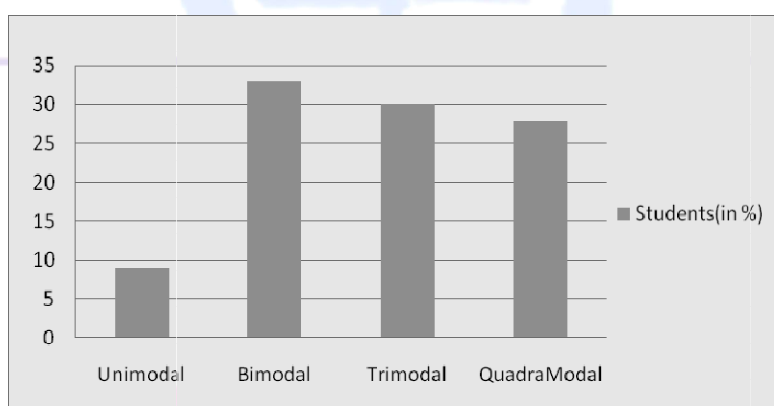
Findings

Figure 1 below shows the learning preferences among undergraduate science students. The statistical analysis revealed that unimodal learners were only 9% while the other learning preferences were bimodal 33%; trimodal 30%; quadrimodal 28%. Mode refers to the specific learning preferences which could be one mode (visual, auditory, read-write, kinesthetic) or a combination of these. Scores were given accordingly.

The findings of Phase I clearly revealed individual differences in learning styles. It now remains to be seen in Phase II whether or not a compatible learning style with the teaching style of a course instructor would enable the students to retain the information and apply it more efficiently and effectively.

Figure 1.

Learning preferences among undergraduate science students.



Methods (Phase II)

On the basis of Phase I findings, Phase II has been initiated.

While Phase I was designed with the objective of identifying learning preferences, to guide this phase, the objectives framed were –

1. To develop an Intervention program based on diverse learning styles to teach Science to UG students.
2. To study the effectiveness of Intervention program in terms of achievement of students with diverse learning styles. To compare achievement scores of the students with diverse learning styles by considering Intelligence as covariate.

Hypothesis - There will be no significant difference between the adjusted mean scores of the different student groups (based on learning styles) as a result of the intervention based on learning styles when Intelligence is considered as covariate.

Tools employed - Intelligence Test by J.C. Ravens, Achievement Test designed by researcher.

Study procedure - To achieve the above mentioned objectives, an intervention program based on learning styles is being designed which will be implemented on the UG student group with diverse learning styles. The design adopted will be a pre-test post-test mixed group design. The intervention program and the pre and post tests will be validated by subjectexperts.

Sample

The population in this Study will be all the undergraduate science students of Vadodara city. The Undergraduate science students of a private University were chosen as sample of the Study to study via instruction based on learning styles". The Institution was chosen based on certain parameters namely well-equipped infrastructure, experienced teachers, etc. The students were selected via 'convenience sampling'.

The Study will be delimited to students at the first year undergraduate level and to the subject Chemistry. The batch size will be 100 students and 2 teachers randomly selected. The intervention program would be a twelve-week instructional unit on concepts in the subject of Chemistry.

Analysis

To determine the equivalence of the four groups (students with different learning styles) Intelligence Test by J.C. Ravens will be implemented initially. The effectiveness of the intervention program will be determined by comparing the pre-test and post test scores of the Achievement test self-prepared by the researcher. Data analysis will be done by statistical technique of correlated"test.

Conclusion and implications - (Phase I, II).

The findings of Phase I clearly revealed individual differences in learning styles thus implying that learning materials need to be evaluated in terms of learner styles and preferences so that instructional designers are sensitized to the needs and cognitive styles of the learners and become more responsive to these needs during the designing of instructional materials. Adapting academic materials to learning styles will facilitate learning and thereby

help increase learning especially for low and moderate achieving students (Zin, Zaman & Noah, 2002). Most importantly findings of such research studies would provide insights to improve learning in both traditional and e-learning settings.

Conclusion

This Study is both significant and timely. The Indian education system has a strong focus on academic subjects and examinations which makes the atmosphere very competitive. There is need to encourage independent and critical thinking and problem solving skills but, more importantly, originality and deviance, for research and innovation which is the true objective of Higher Education. This can be done through greater learner involvement.

Also, as a research community, we must continuously question our educational practices as we collectively expand our vision of transforming and enriching 'learning' and the Study is an attempt to challenge stereotypical notions about learning.

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Paper Received	: 24 th October, 2020
Paper Reviewed	: 80 th November, 2020
Paper Published	: 1 st January, 2021