

An empirical study of learning styles of student-teachers in a pre-service teacher education degree programme at University of Delhi.

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ABSTRACT: The concept of learning styles has attracted a rich variety of theorization and research since the last few decades. Yet it has its votaries and detractors. This empirical research investigates the prevalence of learning styles among student-teachers enrolled in a pre-service teacher education programme at an undergraduate women's college of University of Delhi. The study is descriptive, exploratory and data driven. It gathers data virtually using a questionnaire from a volunteer sample of 32 student-teacher participants. The term learning style refers in the study to the approach a student-teacher takes while learning something new. The research found that the majority of student-teachers do have a preferred learning style. The participants demonstrated six main learning styles: reading, writing, aural, diverging, visual and accommodating. The study revealed that student-teachers were aware of the differences in learning style between themselves and their fellow classmates as well. The findings demonstrate the salience of the concept of learning style as a learning and pedagogical approach.

KEYWORDS: accommodators, learning style, pre-service teacher education, student-teachers.

I. INTRODUCTION

There's no one size fits all when it comes to classifying human beings in categories. They are all cognitively, emotionally and socially different. Everyone is different not only in their knowledge, cognition and information processing but also in the way in which they are learning. All students do not learn the same way. Learning is not universal in its nature, logic, and processes nor is it a standardized phenomenon. There are individual differences in how young children learn. The same is true for student-teachers. This is a theme that has attracted a lot of theorization and research in educational psychology, cross-cultural psychology, cultural psychology and educational studies. Consider the case of a project research group at a teacher education institution of University of Delhi. The project research group is the institutional organizational forum for a mandatory 100-mark project in the final year of a four-year pre-service teacher education degree programme. The project group is the unit of organization for undergraduate research projects. Each project group consisted of 10 members two of these were the faculty members and eight were student-teachers. To carry research projects forward institutional learning support was offered through weekly 2 hour meetings amongst the group members. The meetings focused on themes in educational studies, qualitative research methodologies and the specific designs suited to topics of each of the student-researchers. Over the course of the academic year the weekly meetings began to drag. It was not the least because of a lack of interest among the members. A close look at the project group reveals the reason. It was the learning differences among the student members numbered S1 to S8 in this research report.

S1: A learner who is receptive to any type of learning support she gets, anytime, anywhere and then tries to apply it. She was always keen to have longish meetings. She listened in rapt attention to every student's topic-specific discussions. She was never short of time for the meetings. She was willing to read any reading that was suggested by the project mentor-teachers. S2: She wanted learning support in her own way at her own terms, preferred to work alone and often generated ideas in solitude. She felt the meeting was like something that took away a slice of her day; which she could so much better utilize by working on her project independently on her own. This is not to say that she did not value feedback from others. But so far as the main work on the project was concerned she preferred independent time. S3: A type of learner who was shy to ask for any learning support, *tries* to work independently, even if the process was time consuming. Her progress was slow because of reluctance to seek learning support. S4: A learner who processes information in bits and pieces, needs learning support at every step, prefers to work in small sessions rather than finishing the task all at once. For her learning was indeed a linear additive process. S5: A learner who tries to read, process and assimilate all the information given to her irrespective of the fact that the whole is useful or not, take learning support whenever,

whichever way provided. She always looked forward to the meetings. Her written work tended to be somewhat unstructured due to an information-overload. S6: A learner who works on her own and takes learning support whenever needed *only* as per her need. She was never too enthusiastic to join the meetings. Her reading preference was full of independence too. She did not always read the suggested reading on research methodology since she had a reading list of her own at all times. S7: She undertakes a scrutiny of learning support on offer before accepting it. Very organized and structured way of working, with strong opinions. She was a theel (thinking and feeling person). Therefore the depth of her project work was extraordinary but pace of work extremely slow. S8: A learner who needs time to learn, can perform only one task at a time. She engages deeply with the task at hand. If she was writing her teaching journal, she did not want to be distracted by the meeting on that day. Her preference is to read slowly but deeply. If she would read for a day she would need two days to experience what she had read. A preliminary analysis of this very small-sized group indicated that learning support was useful only when it was provided as per the learning preferences of student-members. So after three months the group collectively decided to abandon the weekly meetings in favor of individualized learning support as per student needs. The rationale, nature, and significance of learning styles as a research problem worthy of study were clearly evident.

II. RESEARCH OBJECTIVES

The aim of this study was to investigate the learning styles, if any, of student-teachers enrolled in the 4th year of Bachelors of Elementary Education (henceforth B.El.Ed.) degree programme at an undergraduate women's college affiliated with University of Delhi, New Delhi. The research also aimed to explore the nature, logic and teaching implications of these preferred learning styles. The research hypothesis was: Do learning styles exist or not? The statement of a conventional null hypothesis was that: there are no learning styles among B.El.Ed. student-teachers of this sample. The term learning styles was operationally defined as the approach a student-teacher embraces while learning something new.

Research Design: This research was exploratory, data-driven, descriptive, non-experimental and empirical. The primary data was gathered from a volunteer sample (henceforth participants) of 32 fourth year B.El.Ed. student-teachers from the department of elementary education of the college. The pandemic limited access, choice of sample and tools as there was no scope for face to face interaction and data were gathered virtually. The duration for data collection was December 2020-February 2021. Only the 4th year student-teachers were included in the study. The informed consent of participants was taken in advance. As per standard research ethics their identities are blinded in this research paper.

Literature review: The concept of learning styles has attracted a rich variety of theorization and research on it has been conducted in the educational psychology framework in more than 60 universities the world over in the 1980's (Dunn and Klavas, 1989). This section reviews two recent researches that are methodologically relevant for the present study. The first research titled 'How teachers teach students with different learning styles' followed the case study methodology. The researchers were four educators from the University of Nebraska in the USA. The research sample was located in the American K-12 public school systems. The research design focused on eight experienced teachers who had been teaching for several years. It aimed to investigate the ways the teachers addressed the needs of different learners from a diverse student population. The research tools, techniques and strategies included teacher observation and teacher interview. The researchers gathered data on teacher's knowledge about learning styles, reflections of this knowledge upon their classroom practice, and teachers' understanding of student learning. The research conclusions were classified in three themes. First the teachers talked clearly about their students' learning styles as being different. They shared the belief that every child can be actually identified based on their learning style. They identified different types of learners ranging from visual, auditory to kinesthetic. The teachers believed that students do not learn well when taught in learning styles other than their own. Also the process of identifying each student's learning style was not one of labeling a child. It involved a personal connection through which teachers could relate with their students with sensitivity. The second conclusion theme was related to the teachers' pedagogical responses to their students' varied learning styles. The teachers had many teaching strategies and methods in their pedagogical repertoires. They attempted to reach all students by drawing a variety from this rich repertoire. The third conclusion that emerged from the research was the reasons why teachers respond to their students in accordance with their different learning styles. This is because the teachers recognized their own responsibility towards facilitating student learning and the need to do so as per the learning styles of the students they teach (Haar et al, 2002).

Another influential research aimed to explore the developmental trends within learning patterns of student-teachers particularly focussed on changes in learning styles of student teachers over a period of time. It

examined intra-individual changes in learning patterns. The research was titled, ‘The development of learning patterns of Student Teachers: A Cross – Sectional and Longitudinal Study’. As the title indicates the study had two parts one of which was cross-sectional and the other longitudinal. The participants in the former were 646 first-year and 350 third-year student teachers enrolled in an initial pre-service teacher education. The latter was conducted with 236 student teachers. Vermont’s Inventory of Learning Styles was used to assess differences in learning patterns through a questionnaire that was administered to the participants. The results of the research showed that not only student teachers learn quite differently but also that senior students developed the capacity to judge which strategies are more suited to the demands of a particular task. It was also noteworthy that some learning patterns were more amenable to change than others. The development of ways by which student-teachers tend to learn was found to be much dependent on the learning pattern which they have adopted in the first year of their teacher education programme (Donche and Petegem, 2009).

Concept of Learning Style: The concept of learning style is ancient indeed. It predates modern psychology or educational psychology. It was recognized as early as 334 BC by Greek philosopher Aristotle, who believed that each child possessed specific talents and skills (Reiff, 1992). The concept has evolved ever since based on theoretical and empirical recognition of the fact that children learn differently. As different ideas were developed on how children learn, why children learn in different ways and its educational implications; several theories came up on the different types of learning styles. These theories cut across theoretical frameworks ranging from behaviourism, cognitivism and humanistic education. The concept of individualized learning styles has acquired great import in the 1970s, and has greatly influenced educational practices. It has its detractors too which has supported its criticism and even non-existence by research based evidence too (Nancekivell, 2020). The most recent and well-known theories in support of the concept have been developed by educators Howard Gardner, Neil Fleming, and David Kolb. Howard Gardner ardently believed that students learn in identifiably distinct ways. This implied that teaching should be based on these distinct ways of their learning. This in fact was the genesis of his celebrated idea of multiple intelligences. He proposed seven different types of intelligence. Even though he called them multiple intelligences each of these are looked at as learning styles in the conceptual framework of this study. Gardner’s seven distinctive learning styles are the following. Visual-spatial learning preference is shown by people who think in terms of physical space. Kinaesthetic learners are bodily beings who enjoy movements of the body. Musical persons possess sensitivity to sound, not just that which comes from with music but in the environment around them. Interpersonal intelligence is nurtured by individuals who understand the world through interaction with others. Intrapersonal persons are inward seeking, contemplative and seek self-knowledge. Not only so they learn through this inward drive. The linguistically intelligent learn through words, sentences and enjoy working with written text. The logical-mathematical learners like to explore patterns, networks and relationships (Gardner, 1983). Although Gardner describes these learning styles as distinctive, a learner doesn’t always follow one style, but can be a composite of multiple styles of intelligences (Gardner, H., and Hatch, T., 1989) as also evolve varied learning styles from time to time.

Learning style theorist Neil Fleming had a slight view on learning styles as he coined the acronym, VARK, representing Visual, Aural, Reading/Writing, and Kinaesthetic aspects of learning. He was referring to learner’s instructional preference by which they prefer to take in and give out information. According to the VARK framework visual learning style refers to individuals who prefer to look at graphs, charts, hierarchies, symbols, and pictorial things that teachers use to represent words (instead of words). The aural learners prefer to engage in speaking or hear the teaching. These, for example, are the students who enjoy learning through lectures, group discussions, receiving feedback, phone calls, presentations, and through speaking with others. The reading/writing learning style refers to those whose instructional preference is working with words that are either read or written. Lastly, the kinaesthetic individuals simply learn by doing for example, through concrete experiences, illustrations, and practice (Fleming, 2011). He also adds that teachers especially benefit from knowing their own individual instructional practice preferences. When a teacher understands their own learning style it enables an understanding of an efficacious style of teaching too (Fleming and Baume, 2006). Yet diverse pedagogical practices are necessary within the classroom to support students with a range of learning styles rather than just teaching using one’s own learning style (Fleming and Mills, 1992).

The assumption underlying learning style theorist David Kolb’s work is that each person is naturally drawn to a single learning style. He believes learning preference is based on two separate choices that individuals exercise. The choices can be represented on the Cartesian axis, in which the vertical axis is a perception continuum. This is a repository of how a person thinks, cognises or responds to a task. The horizontal axis, from west to east, is the processing continuum, and the basis of the way in which one undertakes a task, something like watching a phenomenon from a distance. On a perception continuum, a person chooses between concrete experience, here

and now of things as they are, or undertakes an abstract conceptualization, of relating to the world as concepts or ideas. Learners who prefer the processing continuum move beyond their perception continuum and process in one of two ways: active experimentation, which consists of empirical observations and trying it out to prove that they are valid. The other way is reflective observation, which is an abstraction of one's observation more in the mind than through sensory experience. Kolb's learning styles involve preferences between these two choices along an interactive axis from the processing to the perception continuum. Kolb's four styles of learning correspond to these choices. They are the divergers who are concrete experiencers and reflective observers. The convergers those who are abstract conceptualizers and active experimenters. Accommodators prefer concrete experiencers followed by active experimentation. The assimilators who are abstract conceptualizers and reflective observers (Kolb, 1981). A diverging learner has capacity and preference for looking at things from various vantage points. They learn better by observing and listening to other opinions. An assimilating learner focuses on logical ideas and theories that come from science-based research as opposed to theories that are seen as more pragmatic. A converging learner performs action rather than just listening. Converging learners are also good at solving problems and like to find practical solutions to things. An accommodating learner performs best through taking other people's perspectives, theories and ideas together. He often comes to conclusions on the basis of many such propositions (McLeod, 2013).

III. DATA COLLECTION

This is an empirical study that is primary-data driven. The research tool used to collect data from the participants was a researcher-made questionnaire. It consisted of four specific questions traversing the scope of the research objectives. It consisted of the following questions:

- Do you think that your learning style differs from the way in which your other classmates learn? If so, elaborate the ways in which you learn and how it is different from that of your classmates.
- Do you think that you *always* show the preference for a particular type of learning style? Elaborate this briefly.
- Do you think if teaching is matched to your learning style then it will facilitate your learning more effectively? If yes, give example.
- In the third year of our programme an assignment in educational studies coursework required review of course-literature including readings from the course. Did you gain awareness of your learning style in undertaking that assignment?

The data was collected electronically. The responses of the 32 participants are abbreviated as P1 to P32. These were transcribed, documented, and maintained as annexure though not reproduced in this paper for the sake of brevity. Select data vignettes of participant responses are presented in the next section. The participants were free to choose on their own manner of responding. They could text, send audio recordings or speak over a telephone. Of the 32 participants; 3 responses were received over telephone, 14 sent audio messages, 1 sent via written responses and 14 sent text messages.

IV. DATA PRESENTATION AND ANALYSIS

Some select data is presented as figures 1 to 5.

Figure 1 Omnipresence of learning styles among student-teachers

In response to the first question, the majority of participants (29) reported in the affirmative that they had an inherent, unique learning style which was different from that of other student-teachers in the sample.

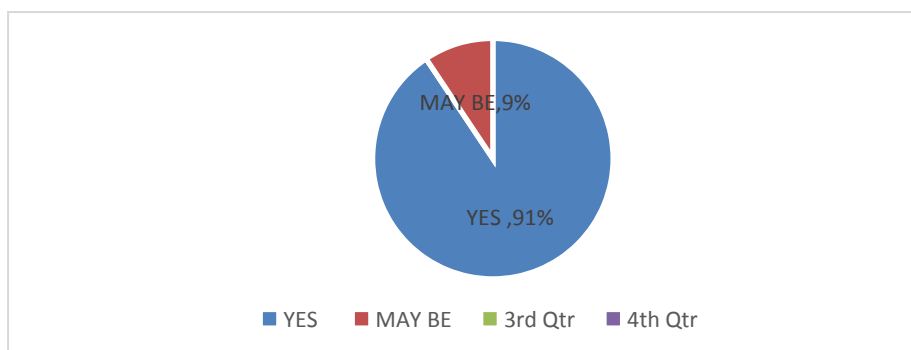


Figure 2 Nature of variation in learning style in different contexts

There was variation in the preference for a particular type of learning style. 14 participants reported that they had a particular learning style all the time. 18 participants did not report a preference to a particular type of

learning style but instead mentioned adopting different styles depending on the type of content they were engaging with at different times, situations and content areas. The question do you have a static learning style was answered in the affirmative by more than half participants.

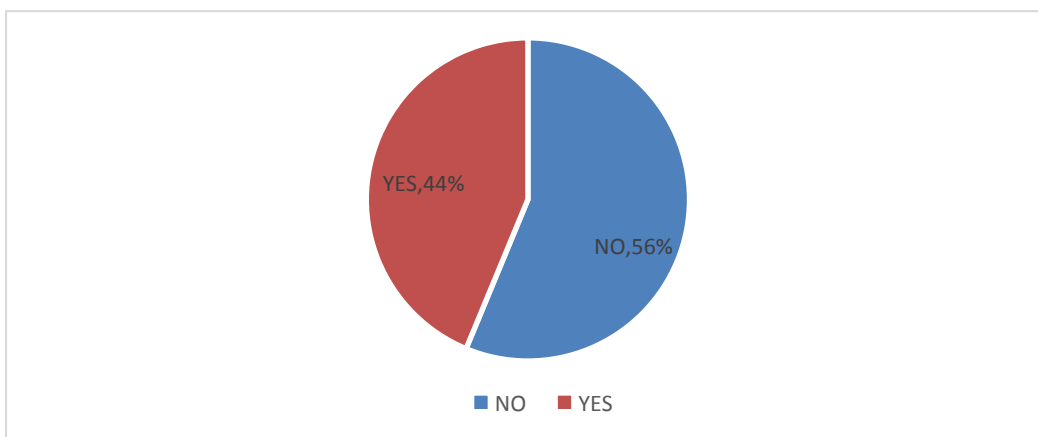


Figure 3 Effects of matching teaching to student-teachers learning style
All the 14 participants who reported a type of learning style preference responded that matching teaching to their preferred learning style will help them to learn their best.

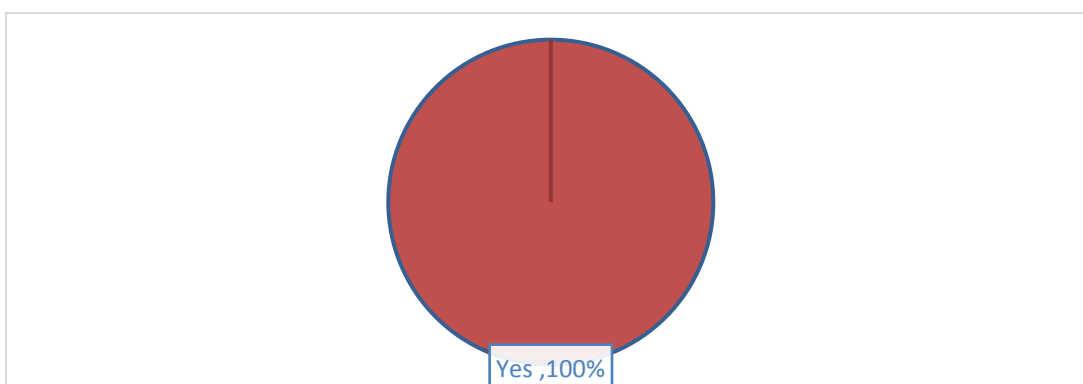


Figure 4 Matching teaching to learning style at all times
Even the 18 participants who did not report a preference for a particular type of learning style mentioned that if they will be taught according to their way of learning *at a given moment* it will help them to learn best.

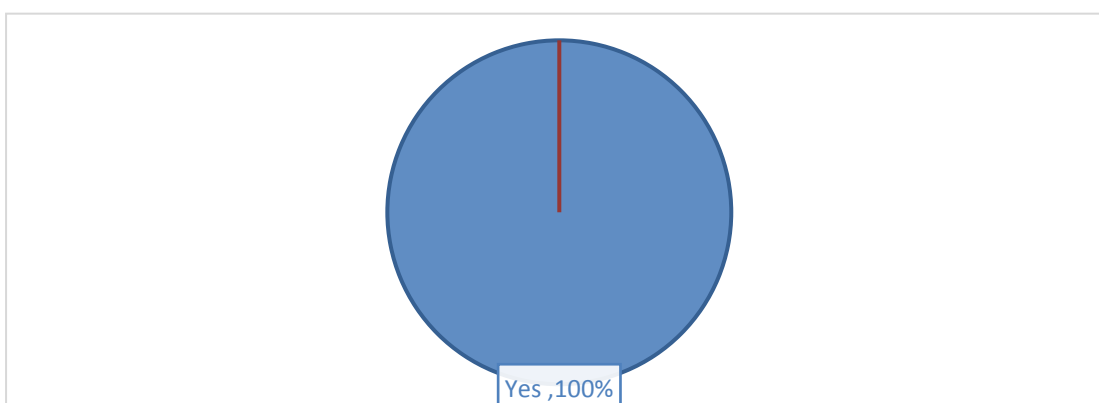
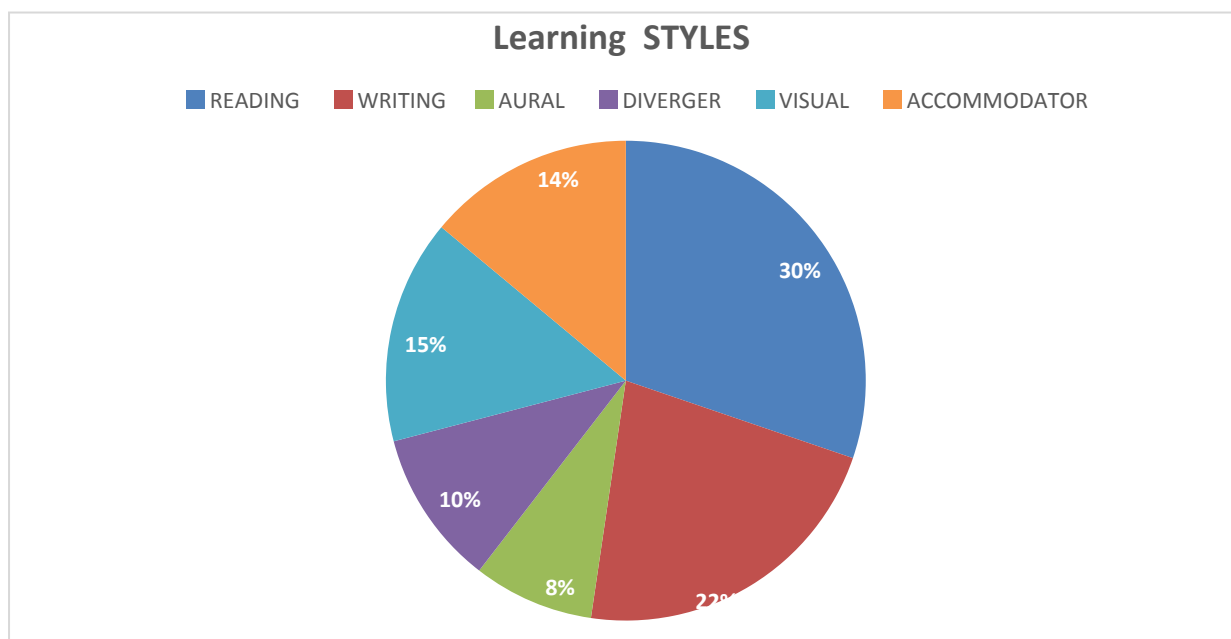


Figure 5 Types of learning styles
The research found the prevalence of six main types of learning styles among the student-teachers. The accommodators reported learning best through experiential learning that incorporated their own real life, lived experiences into a formal learning situation in the classroom. They preferred action or doing things in order to

have concrete experiences, experimentation, and connecting textual knowledge to real life examples. In a sense they developed empirical knowledge as an accommodator type learning style. The linguistic learning style was manifest in the sample in two different ways. The linguistically intelligent were separated into the reading and writing categories. The reading learning style was reported by student-teachers who learn best by reading multiple times from various sources of knowledge including coursework reading. The linguistic learners also included those who preferred to learn by writing. They liked to prepare notes on content knowledge by highlighting themes and writing in their own language. The visual learning style individuals preferred to learn by watching videos, making charts, diagrams, web charts, flowcharts, lists and other such pictorial symbols. The aural learners style emphasized. classroom lectures and even listening to someone else who spoke on a topic of the coursework. The divergers focused on discussion. It is by talking to someone else, during group talks, during two-way communication, having real discussions around ideas from course texts that their learning blossomed.



Data Vignettes

The accommodating learners P5 and P16 expressed,

I recently attended a workshop about learning to use software, because of the hands-on learning approach I was able to understand at a fast pace and if I compare that to my school experience of learning computers, we were supposed to memorize the text and I scored low because I had no experience of using software. If we could use the software, I would've done better in the exams. The rote memorization fades away with time. We can't keep it in our heads for a longer duration and we will eventually unlearn it. But if we use experiential learning and hands-on experience then we can't forget or unlearn it. Some of the student-teachers tended to have a learning style that was a combination of several modes of learning, and effectively a pattern. To build the introductory base knowledge of a topic the learner used visual mode by watching videos, then to gain more understanding of it the learner may prefer to read about it and then to recall in future she will try to write down the main points in the form of notes and to assess whether he understood the concept. She may later act as a diverger and try to discuss the topic with other persons. P11 for example expressed not a single mode but a variety of learning styles. I listen to what my lecturers are saying, then search more about the topic on the internet and read more, then I used to ask my doubts from the teachers. It gives me a kind of holistic approach towards that topic. The research found that in spite of differences in learning styles there were some similarities, the logic of which depended on the type of content to be learned. Several linguistic style student-teachers expressed proclivity to read the text more than twice to comprehend meaning, then try to relate and connect it to their real-life experiences and then they write its review. But among them P9, P10, P12, P22 responded that while learning mathematics they simply prefer the paper-pencil mode and write and practice content multiple times. P11 who identified themselves as visual learner or an auditory learner still showed a deviation.

I think I am a visual and auditory learner. I can also process verbally while doing assignments. Collected the reading and surfed on the internet, read it and added my hypothesis to it. The participants were perceptive to differences amongst each other in not only their learning style but in their learning pace too. P31 spoke of a fellow classmate. Her learning or memorizing ability was faster than mine. She learns concepts better in less

time. But my learning pace was slow. If I learn at my pace, then I understand concepts better and remember them for a long time. The role of previous knowledge and nature of domain-specific content shapes the style as is expressed by P12 and P19 respectively. I can do math by writing, practicing, and solving. But for science, I'll have to read and understand the concept. For any theoretical subject, I may learn and understand just by reading about that.

For self-learning I prefer reading but while getting the base of the topic audio-visual method suits me best.

The existence of strong learning styles is indicated by narratives from P 9 and P5, who state Prefer to read not write even in school time. I don't like math because I have to write in it. I have got in the habit of only reading to learn something. Since school I have learned to work with the available learning styles and now, I am used to it.

P23 indicates the dynamic nature of learning styles.

Earlier I used to read, and rote memorized everything. Then I started writing and making notes. Now I prefer to learn while listening to music.

I don't like monotony because I require frequent changes and am not able to learn in one way. Change in way of learning, setting as I can't sit at one place for longer duration. Routine matters in learning but frequent breaks are required if I am learning the whole day.

V. CONCLUSION

The findings of the research disprove the null hypothesis. Learning styles existed among the student-teacher participants. At the same time the student-teachers don't have a single learning style be it visual, auditory, kinesthetic, or any other; but a pattern of learning which consists of a combination of different styles. It can even be said that a vast number of student-teachers don't have a preference for a particular type of learning style as they have learning patterns. The study concluded that student- teachers report both a fixed learning style as well as variation in it depending on the nature of the learning task at hand. The student-teachers were unequivocal in their belief that students learn best when teaching methods match their learning styles. Though this study had a limited sample size and limited scope of data collection as it was an undergraduate research project, scaling it up will reveal wide-ranging pedagogical implications. The research concludes that in any case teaching must remain sensitive to different learning styles.

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