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DEVELOPMENT OF PREFERRED LEARNING STYLE INVENTORY (PLSI) FOR STUDENT TEACHERS

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Abstract

There are several learning styles among the learners in an educational setting. As a result, a teacher who is adept at determining the learning preferences of their pupils can integrate the curriculum in ways that will maximise the learning outcomes for them. Again, teacher education is more extensive and the programme for teacher education incorporates an interdisciplinary curriculum with student teachers from diverse backgrounds. Therefore, it becomes crucial to identify learning preferences that are more common among such diverse student-teacher groups to improve their academic performance. Therefore, there is a need to develop an inventory to measure the Preferred Learning Styles of Student Teachers, the result of which will bring forth scientific results that will be more reliable and valid as compared to the results drawn from an unstandardized tool. Thus, an inventory viz. Preferred Learning Style Inventory (PLSI) for Student Teachers has been developed. The Inventory consists of 52 items having three modes of learning styles viz. Visual (V) with 19 items, Auditory (A) with 15 items, and Kinesthetics (K) with 18 items. Item analysis was carried out using the Critical Ratio technique, and reliability was established through internal consistency (α=0.877 and Spearman-Brown Coefficient value of 0.889) and the inter-item correlation method (significant at 0.05 level). Further, the inventory's validity was established through content validity using experts' opinions.

Keywords: Student Teachers, Preferred Learning Style, Learning Style Inventory, Visual, Auditory, Kinesthetics.

1. Introduction

The idea that learners of all ages respond distinctly but consistently to learning conditions has been acknowledged by research in both education and psychology (Fleming & Mills, 1992). It is believed that each person is different with respect to how they perceive, acquire information and learn new things. In an educational institution, learners possess different styles of learning viz. visual learners, who may understand better through visual aids like charts, graphs, and pictorials; auditory learners may understand better when taught through lectures, reading, and podcasts; while kinesthetic learners may comprehend better through an activity-based learning experience (Vaishnav, 2013). Thus, if students are aware of their learning styles, they can use learning strategies that work best for them and ultimately enhance their academic achievement and success (Awang, Samad, et al., 2017; Reid, 1987). Additionally, the literature also shows that when the teaching style of teachers is congruent with the student's learning styles, it increases the academic achievement of the students (Chetty et al., 2019; Damavandi et al., 2011). Thus, diagnosing the learning style preferences of learners at the beginning of the course will aware the learners about their learning style preferences and

will also inform the educators about the type of instructional modalities to be used and designing of the course in alignment with the students' learning style preferences to maximize students' academic benefits (Cekiso, 2011; Hamed & Almabruk, 2021; Yassin & Almasri, 2015). However, when it comes to classroom implications and the role of teachers, the feasibility of designing curricula to accommodate different learning styles in a diverse classroom becomes nearly impractical (Fleming & Mills, 1992). Thus, the best way to accommodate all types of learning style preferences of learners would be possible by accommodating a multimodal approach to teaching (Cekiso, 2011; Reid, 1987). Furthermore, in tertiary education, learners don't necessarily solely depend on educators for their academic performance. Here, learning also takes place through self-exploration of the vast information available across the internet in varied forms. Hence, empowering the learners about their learning preferences can help them adjust and encounter any type of program that is in their best interest (Fleming & Mills, 1992).

Teacher education is a comprehensive programme consisting of teaching skills, pedagogical theory, and professional skills. Therefore, learners who are enrolled in teacher education programmes are considered to be students who are preparing themselves for future teaching jobs. Hence, like any other students from higher education, they too have differences in their preferred learning styles towards acquiring information that best suits them. Additionally, many learners who complete teacher education programs pursue their higher education instead of directly joining a teaching job. Thus, furthering their learning journey. Again, the teacher education programme is a multidisciplinary curriculum that includes student teachers from various backgrounds. As a result, in order to improve the level of academic performance of such diverse groups, it is critical to first identify the types of learning preferences that are more prevalent among such diverse student teacher groups, so that appropriate changes in curricular activities that foster best practices in teacher education programmes can be made. According to one study, one of the major issues that university teachers face is matching teaching strategies to students' learning styles to boost academic accomplishment (Tulbure, 2012). Hence, for learners to reap the greatest benefits, the teaching and learning processes must work in tandem.

Thus, the current research will focus on the development of an inventory to measure the Preferred Learning Styles of Student Teachers with special reference to the tribal-predominated State of Arunachal Pradesh and to other states with similar contexts in India.

1.1.Learning Styles

One of the most widely accepted common categorizations of the various types of learning styles is Fleming's VARK model first developed (1.0 Version) in 1987 by Neil Flaming, later in 1998 Flaming in collaboration with Bonwell released its 2.0 Version. The inventory has been revised several times since then with some major revisions during 2006, 2009 and 2013 (Fleming & Bonwell, 2019).

The revised version includes some additions or subtractions of the learning types, as such additions like Text, Tactile, and Heptic have been made according to the objectives of the study, while the removal of Read/Write from the original VARK can be also seen. In the present study, the VAK learning modalities have been considered which is the acronym for the Visual (V); Auditory (A); and Kinesthetic (K) sensory modalities that help to inform learners about their preferred style of learning based on their perceptual sensory preferences to acquire

information. This model was an extension of the previous Neuro-Linguistic Programming models termed the 'Representational Systems' which opines that human brains utilize senses in building an internal representation of the outside world around them (S K & Helena, 2017). Flaming and Bonwell (2019) in their 8.0 VARK Version describe the different types of learners as follows:

a) **Visual (V):** This group of learners prefers information in the form of charts, graphs, symbolic representations, and hierarchies as a sensory input and output mechanism for learning new information, concepts, and skills. For such learners, the need for blueprint, layout, headings, highlights, and designs are important in developing meanings.
b) **Auditory (A):** This group of learners prefers information through oral instructions or through listening to sounds. They learn best through lecture methods, group discussions, asking questions, and chatting.
c) **Kinesthetic (K):** This group of learners develops meaning and learns through activities. It is experience and practice-oriented that can be achieved in both real and simulated environments. Teaching practices such as fieldwork, experiments, drill and practice methods, and demonstration methods can be incorporated for such learners for their maximum benefit.

Thus, learning styles help in classifying different ways people learn and how they approach information to learn new concepts and skills. In the present study, the researcher has developed a Preferred Learning Style Inventory based on the VAK model to identify the most preferred learning style among the student teachers. The knowledge about the most preferred learning styles has the potential to help teachers to incorporate teaching strategies that maximize the learning outcome of their pupils.

2. Operational Definition of the Key Terms Used

- **Preferred Learning Styles:** In the present study, 'Preferred Learning Styles' refers to the scores obtained in the Preferred Learning Style Inventory (PLSI) by the Student Teachers. It includes (a) Visual, (b) Auditory, and (c) Kinesthetic.
  a) **Visual (V):** In the present study, visual learners are those who prefer information in the form of charts, graphs, symbols, and hierarchies as a sensory-motor input and output mechanism for learning new information, concepts, and skills.
  b) **Auditory (A):** In the present study, auditory learners are those who prefer information through oral instructions or through listening to sounds.
  c) **Kinesthetic (K):** In the present study, kinesthetic learners are those who learn through practice-oriented activities and experiences.

3. Objectives of the Study

To develop the Preferred Learning Style Inventory (PLSI) for Student Teachers.

4. Methodology

The Steps Involved in the Development of Preferred Learning Style Inventory (PLSI) for Student Teachers are as follows:

4.1. Planning
4.2. Preparation
4.3. Standardization of the PLSI
4.4. Blueprint

4.1. Planning

For the development of the Preferred Learning Style Inventory (PLSI) for Student Teachers, the researcher has undertaken several Literature reviews on the area to understand the concept and to identify the dimensions.

4.2. Preparation

It includes the following stages:

4.2.1. Identification of Dimensions of the Inventory:

It consists of three learning styles based on Fleming's VAK model as follows:

I. Visual (V)
II. Auditory (A), and
III. Kinesthetics (K)

The Preferred Learning Style Inventory is based on Likert's 3-Point Scale consisting of options viz. 'A lot like me', 'Somewhat like me', and 'Not like me'.

4.2.2. Writing of Items

Initially, the Preferred Learning Style Inventory (PLSI) for Student Teachers consisted of 63 statements that were framed in consultations with the supervisor. Since, for the writing of the items for PLSI, the main objective was to identify the type of learning styles preferred by the student teachers, hence, for the framing of items, positive or negative aspects were not considered as including a negative item will automatically counter the very nature of identifying the learning preferences of the respondents, moreover, the same practiced has been carried out by previous researchers working on Learning Styles Inventories.

4.2.3. Expert Opinion

The Inventory consisting of 63 items were then given to Eight experts for their pertinent opinions and recommendations. Thus, based on this, a few items were modified and three items were omitted, thus, the remaining 60 statements were retained.

4.3. Standardization of the Preferred Learning Style Inventory (PLSI) for Student Teachers

It involved the following steps:

4.3.1. Pilot Study

To examine the relevance and coherency of the language used in the items, the Inventory comprising 60 items was administered for the pilot study to 16 student Teachers (Eight each having Undergraduate and Post-graduate degrees) randomly selected amongst those pursuing 2-years B.Ed. course from the Dept. of Education, Rajiv Gandhi University Campus. Thus, based on their suggestions, a few statements were modified. At this stage, the number of items within each dimension was 20. The scores of the items were marked as 3 for 'A lot like me'; 2 for 'Somewhat like me'; and 1 for 'Not like me'.

4.3.2. Try-out

For conducting the try-out, the inventory containing 60 statements was then administered to 170 student teachers pursuing B.Ed. at Arunachal University of Studies, Namsai and Apex Professional University, Pasighat. However, 163 questionnaires were returned to the researcher, of which 13 copies were found to be incomplete and were discarded. Thus, questionnaires collected from 150 respondents were finally used for the item analysis of the Inventory.

4.3.3. Item Analysis

Item analysis of the inventory comprising 60 statements was carried out using Kelley's (1939) method, where the sum was calculated for each respondent in all the statements. After which, the list was arranged according to descending order, thus, 27% of the total respondents who scored the highest on the test (upper group) and 27% of the total respondents who scored the lowest on the test (lower group) were selected for computing the mean, standard deviation & critical ratios. For the present study, the Level of Confidence taken is 95%. Hence, the value of Critical Ratio (CR) of each item was compared with 2.00 at d_f=78. Thus, if the calculated CR value of an item is ≥2.00 then those items were selected for the Final draft of the Inventory. Thus, after drawing out of items based on their critical ratios at .05 level of significance at d_f=78, out of a total of 60 statements, eight items were eliminated and the remaining 52 items were retained for the Preferred Learning Style Inventory (PLSI) for Student Teachers. The items were now distributed as Visual with 19 items; Auditory with 15 items; and Kinesthetics with 18 items.

4.3.4. Establishing Reliability

Reliability refers to the measurement of consistency. In the present study, the researcher has estimated the reliability using the following methods:

i. Inter-item Correlation with Dimension Total
ii. Inter-dimension and Dimension Total Correlation
iii. Internal Consistency

i. Inter-item Correlation with Dimension Total: To test the correlation of the items within the dimension of the inventory, the correlation coefficient of 52 items (items retained based on their critical ratios at .05 level with the responses of 150 student teachers) separately for each dimension with their dimension total was calculated. Thus, all 52 items were found significant at .05 level. Therefore, the overall number of items retained for the **Preferred Learning Style Inventory (PLSI)** for Student Teachers remains 52.

ii. Inter-dimension and Dimension Total Correlation: The inter-dimension and dimension total correlation was calculated as follows:

Table-1

Inter-dimension and Dimension Total Correlation

	Visual	Auditory	Kinesthetics
Visual	1		
Auditory	.677**		
Kinesthetics	.705**	.522**	
PLSI	.923**	.819**	.865**

Note: PLSI: Preferred Learning Style Inventory

***Correlation is significant at .01 level (2-tailed)*

From the above table, the Pearson correlation coefficient of inter-dimension ranges from .522 to .705 indicating the existence of good reliability. Further, the correlation of the three dimensions with the total ranges between .819 to .923, indicating high reliability between the dimensions with the Inventory.

iii. Internal Consistency

The internal consistency of the Inventory was established using Cronbach Alpha and Split-half methods. Cronbach Alpha was calculated to determine the internal consistency of the items in the whole test. While Spearman-Brown Coefficient was used to compute the Split-half method by dividing the items in the Inventory into two halves based on the Odd-Even form. Thus, Cronbach's Alpha value of .877 and Spearman-Brown Coefficient value (equal length) of .889 were obtained which indicates that the Preferred Learning Style Inventory (PLSI) for Student Teachers has good internal consistency.

4.3.5. Establishing Validity

In the present study, validity has been established using Face Validity and Content Validity methods.

- **Face Validity:** It refers to the extent to which a test appears to measure what it intends to measure. Face Validity for the current Preferred Learning Style Inventory (PLSI) for Student Teachers was measured by the Supervisor and the Eight experts to whom the Inventory had been given for their critical evaluation. Thus, Face Validity has been established by the researcher.
- **Content Validity:** Content Validity refers to the degree to which an instrument is representative of the target construct which it is designed to measure. Thus, the inventory was given to Eight experts to study the coverage of the diverse content areas of Preferred Learning Styles. Based on their pertinent opinions, recommendations and feedback modifications were made accordingly. Thus, the Content Validity of the Preferred Learning Style Inventory (PLSI) for Student Teachers was established by the researcher.

4.4. Final Blueprint

The final blueprint consisting of 52 items was distributed dimension-wise viz., Visual with 19 items; Auditory with 15 items; and Kinesthetics with 18 items.

5. Result and Discussion

The present Preferred Learning Style Inventory (PLSI) for Student Teachers is an inventory comprising of three major modes of learning styles viz. i) Visual (V); ii) Auditory (A); and iii) Kinesthetics (K). For item analysis, critical ratio technique 't' was used and the level of significance considered was .05 level. Further, reliability was established using internal consistency methods viz. i) Inter-item Correlation with Dimension Total; ii) Inter-dimension and Dimension Total Correlation; and iii) Internal Consistency. The internal consistency was established through Cronbach's Alpha whose value obtained was .877 and Spearman-Brown Coefficient value obtained was .889 indicating that the Preferred Learning Style Inventory (PLSI) for Student Teachers has good internal consistency. The inter-item and inter-dimensional correlation were established at .05 level of significance. The validity of the Inventory was established through content validity. Thus, the final form of the PLSI obtained has a total of 52 statements spread across its three modes of learning styles viz. Visual (V) with 19 items, Auditory (A) with 15 items, and Kinesthetics (K) with 18 items.

The Preferred Learning Style Inventory has been the subject of extensive research. The items in existing literature have primarily been constructed by giving respondents the option to select one of three options (i.e., each representing Visual, Auditory, and Kinesthetics learning styles) within an item or statement. This process has limited the respondents' ability to select

multiple modes of learning. In actuality, though, learners may simultaneously utilise or prefer more than one type of learning style in order to comprehend an idea. A student may therefore have various models or modes of choice; nevertheless, it is limited in the literature on preferred learning styles inventories to evaluate these types of multimodalities. Therefore, in order to account for the various modes of learning preferences that Student Teachers may have, the current version of the "Preferred Learning Style Inventory (PLSI) for Student Teachers" has been specifically developed. This is achieved by giving respondents the option to select from among the three modes of learning styles, and as a result, each individual learner will receive a separate score for each of the three modes of learning styles, which can then be compared. Each person's chosen learning style will be determined by tallying the mean scores of the various modes of learning; the mode with the greatest mean score will be deemed the most preferred, followed by the mode with the lowest mean score being the least preferred.

6. Limitations

In the present study, the Preferred Learning Style Inventory (PLSI) for Student Teachers has been constructed based on Likert's Type self-reporting style. Hence, like any other self-reporting tool, it is subjected to respondents' bias, thus, influencing the obtained result. Therefore, to get a more appropriate and objective result, it is recommended to employ triangulation coupled with observation and experimentation.

7. Conclusion

The present study has contributed to the existing literature by developing a Preferred Learning Style Inventory (PLSI) for Student Teachers which is suitable for learners having multimodalities or multiple modes of learning preferences that have been undermined. The final version of the present Preferred Learning Style Inventory for Student Teachers comprising 52 items can serve as an enabler to the teachers/educators, curriculum developers and other researchers who seek to measure and evaluate the preferred learning styles of student teachers, especially those with multiple modes of learning preferences.

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