



# A STUDY ON THE EFFECTIVENESS OF DIFFERENTIATED PRACTICES TOWARDS ENHANCING THE ACADEMIC ACHIEVEMENT OF VISUAL STUDENTS

Dr.Sreevrinda Nair N

Assistant Professor,N S S Training College,Pandalam.

Pathanamthitta(Dist) Kerala.689501

## Abstract

Each student has unique personality, preferences and learning style. Instructional transactions based on innovative initiatives, differentiated paradigms which intensify appropriate processes, integrated thematic conceptualization and interdisciplinary approach to curriculum are recently gained much research support. It highlights the need for developing a discourse based on differentiated instruction which plays a vital role in constructing a positive learning climate in the class room. Making use of multisensory teaching is one of the key factors ought to consider for helping the learners to retain the given information and it incorporates three main learning styles: Visual, Auditory and Kinesthetic.. This experimental study explains the effect of three select differentiated practices on Visual students.

Key Words: Differentiated Practices, Visual Students, ,Graphic Organizer

## Introduction:

Education is referred to as an experience that has an impact on the academic success of an individual. In popular parlance, education is the modification of behavior in desirable direction (Patak, 2012). Howard Gardner's landmark study of Multiple Intelligences has opened many avenues for improving the process of learning and challenges teachers to explore new instructional practices in schools. He argues that people learn best when they use the intelligence that they favour which is denoted as their 'learning style'. By ensuring an environment where students are nurtured and learn to look within themselves motivate them to build self-confidence and faith in their talents. Students in today's classroom are diverse than ever and this diversity poses the need for inculcating differentiating instruction in the classroom. It is based on the learning styles of the students encourage, enrich their motivation, and challenge them to learn smarter. Making use of multisensory teaching is one of the key factors ought to consider for helping the learners to retain the given information and it incorporates three main learning styles: Visual, Auditory and Kinesthetic. This stylistic pattern of learning is based on the idea of individuation, which implies that all students have strengths and abilities and that each student may learn in a different way.

Each student has unique personality, preferences and learning style. Instructional transactions based on innovative initiatives, differentiated paradigms which intensify appropriate processes, integrated thematic conceptualization and interdisciplinary approach to curriculum are recently gained much research support. It highlights the need for developing a discourse based on differentiated instruction which plays a vital role in constructing a positive learning climate in the class room. Howard Gardner's land mark study of Multiple Intelligences has opened many avenues for improving the process of learning and challenges teachers to explore new instructional practices in schools. He broke away from the common notion of single number that depicts the 'intelligence' of a human being. He argues that people learn best when they use the intelligence that they favour which is denoted as their 'learning style.' The learning style approach to teaching and learning is based on the idea that all students have strengths and abilities and that each student may learn in a different way. This idea was supported by Zapalska (2002) who states that information absorption and retention depends largely on whether it was received through the person's preferred learning modality.

The concept of learning styles advocated that teaching and learning methods should be adapted to suit how individual learners prefer to interact with the information being presented to them. (Kolb, 1984). Dunn and Dunn (2002) points out that learning styles are the way in which each learner begins to concentrate on process, internalize, remember and retain new and difficult academic information. It is the application of information within a meaningful experience in the learner's environment. Learning and engagement preferences on how children receive instructions are affected by the predominant sensory modality, which the individual prefers to approach and engage with, as well as take in new information. Their learning modalities refer to the sensory pathways like, Visual, Auditory and Kinesthetic through which they send, receive and store information (James and Gardner, 1995).

In the present study the investigator detailed learning style as the crucial component in constructing a favourable learning environment for the learners and the chief componential dimensions of sensory preferences refer to the perceptual learning channels with which the learner is most comfortable to receive and retain the information. Hence based on this definition the learners are classified into three categories namely Visual, Auditory and Kinesthetic. A contextualized version of learning styles indicates that students manage and perform the learning task in diversity. An internalized version of the terminology of learning style depicts the deliberate processing and managing of information and act as an instrument of change. Learning styles can be a catalyst for promoting effective learning, enable them to become autonomous, independent in their own learning and equip them to illuminate their engagement and involvement in the classroom. They are the consistent pattern of behavior with a range of individual variability and are based on the research results of cognitive psychology about processing information, active learning and structure of information. A series of research evidences support this view and a substantial number of studies have been reported that learning styles can engage and provoke the learner in a productive manner towards learning to learn and make a tremendous difference in the behavior and learning of students. (Doss & Muthiah, 2002, Dry dale et al, 2001, Tileston, 2004).

Differentiated instructional practices facilitates students to keep the track of learning, stimulates intellectual curiosity, and helps to maintain motivation in the learning task. Instead of being distant observers of questions and answers, students become immediate practitioners through the articulation of such practices in the classroom set up. It also helps the students who are having different learning styles. The investigator witnessed this in classrooms

several times. It motivates her to conduct this type of experimental study .In this study the investigator made use of three strategies viz,practice on Self Questioning,Graphic Organizers and Problem Solving.

### **Operational definitions**

#### **Effectiveness**

The extent to which an intervention, when used under ordinary circumstances, brings about a desired effect (Cooper, 2008). It refers to the desired change in the learner's behaviour because of the experimental intervention

#### **differentiated practices**

A framework or practice for effective teaching that involves providing all students diverse classroom experiences and a range of different avenues for understanding concepts.In this study three types of classroom practices viz Self Questioning,Graphic Organizer and Problem Solving were given.

#### **academic achievement**

academic achievement is the extent to which a student, teacher or institution has attained their short or long-term educational goals. In this study it means the achievement produced by the selected students.

#### **Visual students.**

Visual learners learn best when the content is transacted through visuals.They can utilize graphs,charts,maps,diagrams and other forms of visual stimulation to effectively interpret information

#### **Statement of the Problem**

A study of the effectiveness of differentiated practices towards enhancing the academic achievement of Visual students.

#### **Objectives of the study**

1. To identify the learning styles based on the sensory modalities of students selected for the study
2. To find out the effectiveness of select classroom practice, Graphic Organizer towards enhancing the academic achievement of **visual** students.
3. To find out the effectiveness of select classroom practice, Self Questioning towards enhancing the academic achievement of visual students.
4. To find out the effectiveness of select classroom practice, Problem Solving towards enhancing the academic achievement of visual students.
- 5.To compare the effectiveness of select classroom practices namely, Graphic Organizer, Self Questioning and Problem Solving on the academic achievement of visual students.

## Hypotheses of the study

1. There is no significant difference in the academic achievement of visual students with regard to the implementation of Graphic Organizer and Self Questioning strategies
2. There is no significant difference in the academic achievement of **visual** students with regard to the implementation of Graphic Organizer and Problem solving strategies
3. There is no significant difference in the academic achievement of visual students with regard to the implementation of Self-Questioning and Problem solving strategies.

**Sample selected for the study:** 60 Secondary school students (based on their learning style) from three schools belong to three districts of Kerala namely, Pathanamthitta, Alappuzha and Kottayam were selected for the study..Simple random sampling was used in this study.

## Tools employed for the study:

Learning Style Inventory

Lesson transcripts based on Self Questioning ,Graphic Organizer and Problem Solving .

**Methodology adopted for the study:** In the present study, a mixed method of research design, incorporating both quantitative and qualitative data collection and analysis was used.

## Theoretical Framework of the study

Instead of yanking the learners to the classroom, it is better to provide them with a wide variety of learning experiences focusing on nurturing them from the inside by honoring their interest, learning styles, uniqueness so that they can learn the content in a meaningful way and help them to grow into lifelong learners. These inspiring possibilities in the classroom will allow their inner beauty to be established and there by foster their confidence in learning. The Australian council of Educational research (ACER) propose, students involvement with differentiated activities likely to generate high quality learning (ACER, 2008).The National Task force on learning styles and Brain behavior has defined learning style as ‘a consistent pattern of behavior and performance by which an individual approaches education experiences’. It is the composite of characteristic cognitive, affective and physiological behaviors that serve as relative stable indicators of how a learner perceives, interacts with and respond to the learning environment. Students enter in classrooms with a wide range of background knowledge, experiences, cognitive abilities and dispositions. These dispositions create varied orientation and learning experiences to students (Saxena, 2012).To maximize the development of individual potential, it is essential to provide the learner with suitable learning experiences which are challenging ,enlightening and captivating to meet the diverse learning needs of them.

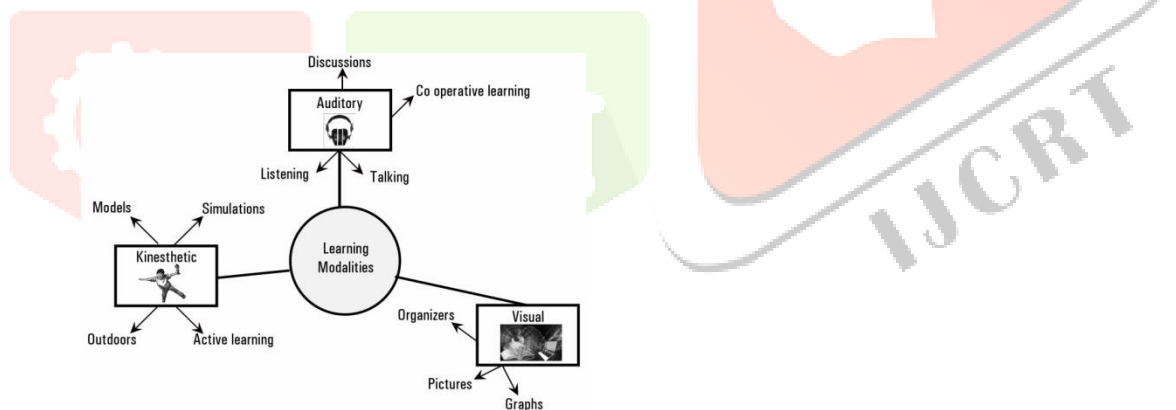
It is important to remember that significant efforts are needed to accept diverse students and create learning style structure in classrooms to manage all types of learners. In order to attain a degree of self-sufficiency in learning and equip different learners to become much more competent in learning there is a great need for indentifying the prominence of learning style possessed by the learners. It will help to design the multifaceted instructional process

in a fruitful manner to accommodate the variety of learning styles and it enables the learner to integrate their preferred style in the process of learning which will automatically heighten confidence and leads to the independent learning. Coffield et al (2004) says that the knowledge of learning styles can be used to increase student's self awareness and meta cognition of their strengths and weaknesses as learners.

A plethora of research was conducted in the area of learning styles which resulted in a myriad multidimensional models representing learning styles.

### VAK Learning Style: A Neuro Linguistic Approach

Gardner's theory of multiple intelligences underpins the principles of accelerated learning developed by Alistair Smith. The accelerated learning methods centre on a range of Visual, Auditory and Kinesthetic (VAK) strategies which are designed to support the three types of learners identified by Neuro-linguistic programming (NLP) which is rooted in both Psychology and Neurology. It is based on the work of John Grinder, a linguistic professor, and Richard Bandler, a mathematician at the University of California at Santa Cruz (UC SC) around 1975. NLP identifies six ways in which individuals perceive information which arrives via the senses. These form the basis of what we now know as 'VAK'. NLP also recognizes the importance of non verbal communication, particularly eye contact, posture, breathing and movement. Smith suggests the need for encouraging the development of a full range of intelligences towards promoting lifelong learning. A supportive and productive classroom practice enables the learners to be receptive to new ideas and to set themselves with high personal targets. Mind maps of these three learning modalities are illustrated in the Figure given below.



**Mind maps of learning modalities**

### Structural design of selected practices

#### 1. Graphic organizers

Graphic organizers were developed on the basis of Ausubel's theory (1963) of meaningful verbal learning which states that when students are introduced to material for which they have little background knowledge, their learning will be improved if they have a structured and clear method for organizing the information. Research suggests that the implementation of G.Os results in increasing the retention and comprehension of students. It also incorporates active learning which also been linked to higher learner motivation, increased confidence, (Cherney, 2008) and improved critical thinking. An emerging body of research makes it clear that learners will learn best and make unprecedented outcome when they get opportunities to practice with graphic organizers. It is a concrete skyscraper Model, to help students become creative and analytical thinkers and develop further skills interactively

through the ever changing 'visual' world.

## 2. Self Questioning

Questioning which act as not only a cornerstone of all effective curriculum transaction, but a rich resource to promote intellectual involvement of learners in the learning task to advance student thinking, learning, achievement and provide valuable feedback . Effective use of questions serves as the first foundational skill for active processing of information and it helps students to deeply engage in orchestrated learning experience which are needed for absorbing and retaining a great deal of information. Art of generating questions is a way of opening students to discussion and to critical thinking and it facilitates development of learner's receptive and expressive language competencies. In 'Developing more curious minds', John Barell (2003) established the nature of good questions. According to him a good question reflects a genuine desire to find out, a deep feeling or waiting to know more than we already know and it helps us think.

## 3. Problem solving

Good pedagogy makes the content knowledge 'visible' to the learners. Providing clear explanations in disseminating knowledge and solving problems equip the learners to become better performers in the learning task. The challenge of education is to design learning environments and processes which help to sharpen their abilities for solving problems, which is the most authentic forms of human activity (Jonassen 2004). Regular mental exercises enable the learners to solve the problems they encounter in their learning scenario and it acts as resurgence from oxymoron modes of learning.

## Review of Related literature

Verma and Sharma (1987) studied Academic Achievement in relation to learning Styles of Adolescents. They observed that the group of dependent learning style is significantly better than the group of independent learning style students so far achievement is concerned. Malohotra (1993) studied the learning outcomes among Adult learners in the Union Territory of Chandigarh as related to goal orientation, persistence and Learning styles. They found that the goal of reading and writing had a positive effect on the learning outcomes of the learners. Lemire & David (1998) through their research describes the psychometric issues associated with three different learning styles models (Visual, Auditory, and Kinesthetic) and the instruments designed to assess these models. They also present some backgrounds to the learning styles idea along with suggestions for utilizing this information with developmental students. Kopsovich (2001) in his study investigated the Correlation between learning styles of students and their Mathematics scores in the Texas Assessment of Academic Skills Test. Malathi & Malini (2006) conducted a study which revealed that there is high correlation between learning style and achievement, which implies that higher the achievement scores, the better was the learning style among higher secondary students.

Gohel (2009) explored the effect of learners' learning style based instructional strategy on science achievement of secondary school students. He found out the impact of varied instructional strategies in accordance with their learning styles namely, Visual, Auditory and Kinesthetic . Martin (2010) conducted a descriptive phenomenological study explored qualitatively the lived experiences of freshman nursing students who were taught with teaching strategies that were different from the strategies to which they were accustomed. Further the study explored whether or not the teacher's teaching strategies complemented the learning styles of the learners. Joshua Cuevas (2015) conducted a study on comprehensive analysis of recent research on learning styles (Theory and

Research in Education, 2015 .Joshua Cuevas University of North Georgia, USA) They opined that there was a lack of empirical evidence supporting the concept of learning styles-based instruction and provided guidelines for the type of research design necessary to verify the learning styles hypothesis. This article examined the literature since 2009 to ascertain whether the void has been filled by rigorous studies designed to test the matching hypothesis and identify interaction effects. Correlational and experimental research recently published on learning styles is reviewed, along with an examination of how the subject is portrayed in teacher education texts.

The investigator couldn't find any study which reveals the impact of differentiated practices among any specialized groups of students with regard to their learning styles. Identifying the research gaps from this review of related studies, lies rationale for undertaking this type of research. The other notable thing is that no studies have been conducted in Malayalam language learning area. Here lies the rationale of this study.

### **Procedure adopted for the study**

**Preparation and Standardization of learning style inventory:** The investigator prepared a learning style inventory with special reference to the sensory modalities (VAK) of secondary school students for assessing their preferences in learning. The draft inventory was subjected to the experts' opinion and they were requested to validate and rate the draft inventory statements. The draft inventory with 90 items was administered to 150 students of standard VIII and the statements for which 't' value is greater than or equal to 1.75 was regarded as an item. 30 statements having 't' value lower than 1.75 are rejected from the draft form. Thus the finally selected 60 statements were arranged from 1-60 numbers in such a way that the first 20 (1-20) statements were meant for 'Visual' learning style group, the next 20 (21-40) for the 'Auditory' learning style group and the last 20 (41-60) for Kinesthetic' learning style group.

**Validity & Reliability:** In the present context, the investigator discussed the items in the learning style inventory with various experts in the field of language education, made appropriate modifications in the items, and hence ensured content validity. For establishing reliability Test-retest reliability Co-efficients were calculated. For this purpose, a sample consisting of 40 boys and 45 girls were selected and the Learning style inventory was administered over them at the interval of 60 days. Co-efficients of co-relation for Visual learning style scores, Auditory learning style scores, Kinesthetic learning style scores were 0.918, 0.904 and 0.929 respectively. All of the three values were high and significant. It means the learning style inventory was reliable.

After identifying the learning styles of the students, the investigator selected the students categorized as visual students and conducted a pre test for them and collected their marks. After that investigator gave special classes for them by inculcating the three differentiated instructional strategies (Self questioning, Graphic Organizer and Problem Solving) in an effective manner. With the assistance of a training teacher, the investigator given appropriate opportunities for the remaining students (kinesthetic and auditory) to engage with other activities related to the particular topic.

The topic selected for the study was 'Urvarathayude Sangeetham', (a unit from Malayalam textbook) which consists of three lessons. All of these lessons deal with the need for conglomeration of agriculture. The three lessons were taught by using the selected three instructional practices. The selected Graphic Organizer strategy consists of varied graphical representations of the content like charts, graphs, diagrams, maps and the like. Video clippings of the

content material, posters, and animations were also used for the demonstration of the content. The investigator effectively used circle words, use of high lighters, OHP transparencies, and newspapers workbooks towards making the content more clear. For practicing the strategy, Self Questioning, the investigator made use of activities like group work, read to self aloud, oral reports, and study groups, group discussions, using audio tape, brain storming sessions, panel discussions and question answer methods. Students were practiced preparing different types of questions and demonstrate the purpose of them in the classroom settings. Field trips, hands on test, role-playing, studying in short breaks, using flash cards to memorize the topic, problem-solving activities developing editorials etc were given as part of the select practice, Problem Solving. Learning by doing experiences was given more importance with regard to this particular practice. After implementation of the three practices, investigator conducted a post test for the students and compares the extent of effectiveness of selected differentiated practices on visual students.

**Comparison of the extent of effectiveness of the select Meta cognitive classroom practices namely, Graphic Organizer, Self Questioning and Problem Solving among the Visual students.**

In order to analyze the extent of effectiveness of select meta cognitive classroom practices namely, Graphic Organizer, Self Questioning and Problem Solving among the Visual students, the post test scores of the three experimental groups who were treated with the experimental intervention were compared pair wise and it is detailed as follows.

**(a). Descriptive statistics of pretest and post test achievement scores.**

This section throws light on the comparison of the extent of effectiveness of the select meta cognitive classroom practices namely, Graphic Organizer, Self Questioning and Problem Solving among the Visual students. The descriptive statistics of pre and post test achievement scores of Visual students who were exposed to the select three meta cognitive classroom practices were found out and described in Table 1

**Table 1. Descriptive statistics of pretest and post test achievement scores of Visual students exposed to the select three Meta cognitive classroom practices.**

Variable	group	N	AM	SD	SE	LCL	UCL
pre	G.O	28	5.36	2.36	0.45	4.44	6.27
	S.Q	32	5.34	2.35	0.42	4.50	6.19
	P.S	25	5.32	2.21	0.44	4.41	6.23
	total	85	5.34	2.29	0.25	4.85	5.83
post	G.O	28	27.07	4.17	0.79	25.45	28.69
	S.Q	32	19.13	1.13	0.20	18.72	19.53
	P.S	25	19.16	1.46	0.29	18.56	19.76
	Total	85	21.75	4.55	0.49	20.77	22.74

From Table 1, it is clear that the pre test achievement scores in G.O group have AM 5.36 with SD 2.36. The SE value is 0.45 which is very small indicating that the sample AM is approximately equal to the population mean. S.Q group have AM 5.34 with SD 2.35. The SE value is 0.42 which is very small indicating



that the sample AM is approximately equal to the population mean. P.S group have AM 5.32 with SD 2.21. The SE value is 0.44 which is very small indicating that the sample AM is approximately equal to the population mean. For the G.O group the 95% confidence interval varies from 4.44 to 6.27 and for the S. Q group it is from 4.50 to 6.19 and for the P.S group it is from 4.41 to 6.23.

The post test achievement scores in G.O group have AM 27.07 with SD 4.17. The SE value is 0.79 which is very small indicating that the sample AM is approximately equal to the population mean. The S.Q group have AM 19.13 with SD 1.13. The SE value is 0.20 which is very small indicating that the sample AM is approximately equal to the population mean. The P.S group have AM 19.16 with SD 1.46. The SE value is 0.29 which is very small indicating that the sample AM is approximately equal to the population mean. For the G.O group the 95% confidence interval varies from 25.45 to 28.69 and for the S. Q group it is from 18.72 to 19.53 and for the P.S group it is from 18.56 to 19.76.

### (b). ANOVA of pretest and post test achievement scores

ANOVA was carried out to find out whether there is any significant difference between the pre test and post test achievement scores of Visual students belong to the select three experimental groups. The detailed description is given in Table 2.

**Table 2. ANOVA of pre test and post test achievement scores of Visual students belong to the select three experimental groups.**

Variable	SV	SS	df	MSS	F	P
pre	BV	0.02	2.00	0.01	0.00ns	1.00
	WV	439.09	82.00	5.35		
	T	439.11	84.00			
post	BV	1181.09	2.00	590.55	86.36**	<0.01
	WV	560.72	82.00	6.84		
	T	1741.81	84.00			

ns: not significant ( $P>0.05$ ), \*\*: Significant at 1% level ( $P<0.01$ )

ANOVA shows that the three experimental groups do not differ significantly in their pre test achievement scores ( $F=0.00$   $p=1.00>0.05$ ). The three experimental groups who were exposed to the select three intervention treatment differ significantly in their post test achievement scores ( $F=86.36$ ,  $P<0.01$ ). This indicates that the three experimental groups who were exposed to the three meta cognitive classroom practices namely, Graphic Organizer, Self Questioning and Problem Solving showed varied levels of impact in improving the academic achievement in Malayalam language learning.

**(c). Genuineness of the difference in performance of the Visual students belong to the select three experimental groups.**

The analysis of the post test achievement scores of Visual students in the select three experimental groups revealed that the Visual students in the experimental group performed at varied levels with regard to the select three classroom practices. Thus the investigator concluded tentatively that the select meta cognitive classroom practices play a significant role in their academic achievement of Malayalam language. But it cannot conclusively say that the performance of experimental groups varied significantly by simply comparing the post test scores of the three groups. Since it was highly inconvenient to sort out the students from different classes to form equated groups, the investigator selected intact class groups for experimentation . Hence it was difficult to ascertain whether the varied levels of performances of Visual students in the experimental groups in their post test scores resulted from the experimental factor or from other intervening variables. So it become necessary that the scores had to be analyzed using the technique of analysis of co-variance (ANCOVA) for much more reliable results.

**(d). ANCOVA of post test achievement scores of Visual students in the three experimental groups by eliminating the effect of pre test achievement scores.**

ANCOVA was employed to compare the extent of effectiveness of the select three meta cognitive classroom practices namely,Graphic Organizer, Self Questioning and Problem Solving in improving academic achievement of Visual students.The detailed description is given in Table 3

**Table 3. ANCOVA of post test achievement scores of Visual students in three experimental groups by eliminating the effect of pre test achievement scores.**

Variable	SV	SS	df	MSS	F	P
Adj.post	BV	1182.17	2.00	591.08	87.04**	<0.01
	wv	550.07	81.00	6.79		
	T	1732.24	83.00			

\*\*:. Significant at 1% level (P<0.01), R Squared=0.859 (Adjusted R Squared = 0.848)

ANCOVA shows that the three experimental groups differ significantly in the post test scores after eliminating the effect due to their initial pre test scores (F=87.04, P<0.01) .More over using the ANCOVA model 78.7% variation in the post test scores can be explained(R Squared=0.859, Adjusted R Squared=0.848).This indicates that the Visual students in the three experimental groups differ significantly in their post test achievement scores in Malayalam language learning.

**(e). Adjusted mean of post test achievement scores.**

The Adjusted AM of post test achievement scores of Visual students after eliminating the effect due to pre test scores is given in Table 4.

**Table 4.Descriptive statistics of post test achievement scores of Visual students in the three experimental groups by eliminating the effect of pre test achievement scores.**

Group	Adj.AM	SE	LCL	UCL
G.O	27.07	0.49	26.09	28.05
S.Q	19.13	0.46	18.21	20.04
P.S	19.16	0.52	18.12	20.19

The Adj. AM of post test scores of the G.O group is 27.07 with SE 0.49 and 95% confidence interval ranges from 26.09 TO 28.05. For the S.Q group Adj.AM of post test scores is 19.13 with SE 0.46 and 95% confidence interval ranges from 18.21 to 20.04. For the P.S group Adj.AM of post test scores is 19.16 with SE 0.52 and 95% confidence interval ranges from 18.12 to 20.19. This results indicates that the Adjusted AM of post test achievement scores of visual students who were exposed to the three experimental treatment showed differences in their academic achievement in Malayalam language which again implies that the three select classroom practices have varied impact on the visual students in language learning. The comparative bar diagram of Adj. post test achievement scores of Visual students who were exposed to the select three meta cognitive classroom practices namely, Graphic Organizer, Self Questioning and Problem Solving is shown in Figure 1.



**Figure 1. Comparative bar diagram of Adj. post test achievement scores of Visual students in Graphic Organizer, Self Questioning and Problem Solving.**

The graphical representation also reveals the varied impact of the select meta cognitive classroom practices among the Visual students.

**(f). Pair wise comparison using LSD.**

In addition to the above analysis, LSD test was also conducted for comparing the extent of effectiveness of the select classroom practices namely, Graphic Organizer, Self Questioning and Problem Solving for enhancing the academic achievement in Malayalam language learning of Visual students at secondary level. It enabled the investigator to test whether there is any significant differences between the Adjusted A.M of the post test achievement scores of the select three experimental groups. The details of the test are given in Table 5

**Pair wise comparison (LSD) among Visual students in experimental groups namely Graphic Organizer, Self Questioning and Problem Solving.**

Group 1	Group 2	MD	LCL	UCL
G.O	S.Q	7.94**	6.61	9.29
G.O	P.S	7.91**	6.49	9.34
S.Q	P.S	-0.03 ns	-1.42	1.35

ns: not significant ( $P>0.05$ ), \*\*: significant at 1% level ( $P<0.01$ )

Since ANCOVA shows significant difference, LSD test has been administered for testing significant pair wise difference between the effect of select meta cognitive classroom practices namely, Graphic Organizer, Self Questioning and Problem Solving in enhancing the performance of Visual students in their achievement in Malayalam. If the 95% confidence interval for difference in means contains zero, those pairs are not statistically significant. Thus from the table, it is evident that the effect of meta cognitive classroom practices, Self Questioning and Problem Solving do not differ significantly ( $P>0.05$ ). It can be concluded from the LSD test that, the select classroom practice, Graphic Organizer exercised marked influence on the achievement in Malayalam of Visual students compared to other two practices namely, Self Questioning and Problem Solving. This may be due to the strengthened impact of the select classroom practice, Graphic Organizer on the Visual students towards comprehending the information and capturing their attention to retain the same in a motivating manner. The use of illustrations and graphical organizations helped them to remember the content more and organize the idea and concepts in a sequential way. Association of ideas also helped them to increase the comprehension of the learned content. Collection of information through the medium of visual practices and reflection and interpretation of the graphical representations equipped them to create intrinsic motivation and produce visually rich communications. Probably the most compelling reason for their remarkable achievement in learning is that visual images are stored in long term memory which make the students have a picture in their 'mind's eye' and it enabled them to recall and retain the concepts and content in a meaningful way.

### **Comparative effectiveness of the select meta cognitive classroom practices namely, Graphic Organizer, Self Questioning and Problem Solving on Visual students.**

While analyzing the comparative effect of the select meta cognitive classroom practices, namely, Graphic Organizer, Self Questioning and Problem Solving on the academic achievement of Visual students it is revealed that, the three experimental groups differ significantly in the post test achievement scores after eliminating the effect due to their initial pre test achievement scores ( $F=87.04$ ,  $P<0.01$ ) In addition to the above analysis, LSD test was also administered for comparing the extent of effectiveness of the select classroom practices namely, Graphic Organizer, Self Questioning and Problem Solving for enhancing the academic achievement in Malayalam language learning of Visual students at secondary level. The results show that the effect of meta cognitive classroom practices, Self Questioning and Problem Solving do not

differ significantly where as the effect of 'Graphic Organizer' differ significantly from the other two classroom practices (vide Table 5.59, MD 7.94,7.91 & -0.03,  $P<0.01$ , $P<0.01$  &  $P>0.05$  respectively).It is also revealed that the select classroom practice, Graphic Organizer has a strong impact on Visual students than the other two meta cognitive classroom practices namely, Self Questioning and Problem Solving.It can be concluded that Visual students can easily absorb and retain the information in a greater amount through the active implementation of graphic organizers in a particular learning context.

### Discussion of the Findings

The tangible results of the study shows that designing differentiated instructional practices in accordance with the students' preferred learning styles will be helpful for making them independent and autonomous to a greater extent. Although it is difficult to meet the needs of entire students of a class at a stretch, it is important to meet many of them as possible. The unlocking of the potentialities of these practices integrated with students' learning styles viewed as a vehicle for promoting greater success and achieving autonomy in language learning. The findings of the present study have implications for instructional practitioners towards implementing differentiated instructional strategies towards providing valuable space for deep success in the learning of Malayalam language.

The study reveals that visual students favor all of the select classroom practices, they shows a special inclination towards the strategy, Graphic Organizer. This particular strategy begins by an explicit explanation about the significance and remarkable benefits incorporated in the particular modes of learning experiences. It helps to cognitively reexamine and reorganize their understanding about the learned content. The guided practices inculcated in the classroom instruction offered a gradual release of responsibility from the part of the teacher, which is the corner stone of constructivist paradigm. The study points out that the successful completion of the journey of learning process requires the needs to bolster up the varied learning styles of the students and booster the corresponding instructional strategies, which lead to the transformation of knowledge and empowerment of learners. The investigator made use of three classroom practices namely, Graphic Organizer, Self Questioning and Problem Solving towards enhancing academic achievement of students at secondary level.Graphic Organizer will capacitate the students to build an explanatory framework which led to the articulation and processing of information. It will help to spark enthusiasm, promote retention of the content material and thereby help the learner to become higher achievers in learning. Use of questioning practices and self-generated questions advances student thinking and learning. 'Problem Solving' trained the students to formulate some problematic issues through the process of discussing certain events related to the social context.

Preferred learning styles will be helpful for making them independent and autonomous to a greater extent. The conscious effort to practice these strategies stimulated learners' attention and expanded their horizons of language proficiency in an appreciable manner. Although it is difficult to meet the needs of entire students of a class at a stretch, it is important to meet many of them as possible. The study shows that the academic performance of students in the learning of Malayalam Language is highly related to the instructional practices based on differentiated instructional activities.In order to internalize the process of language learning, a reorientation is needed to explicate the underlying features of classroom practices. The new trends in innovative practices and instructional designs need to focus on the higher order forms of thinking which depict the process of learning rather

than the product of learning. Differentiating instruction occurs when teachers produce several avenues to challenge the needs of students having varied learning styles and learning requirements. This instructional approach gives the students a sense of ownership over the learning process and focuses on individual needs. Differentiated practices will certainly play a key role in the improvement of academic achievement of students.

### References

- Doss, A.S. & Muthiah, P.N. (2002). Learning style and Academic performance of college students. *Experiments in Education*, 6, 111-118.
- Baxendell, B. (2003) Consistent, Coherent, Creative: The three C's of graphic organizers. *Teaching Exceptional Children*, 35(3), 46-53.
- Walsh, J.A. & Scatter, B.D (2003) Questioning and understanding to improve learning and thinking. Teacher Manual (second edition) Charleston, WV: AEL.
- Cherney, D. (2008). The effects of active learning on students' memories for course content. *Active learning in Higher Education*, 9, 152-71
- Fogarty, R. (2009) Brain compatible classrooms. Third edition Corwin press. SAGE Company
- Gohel, K. D. (2009). The effect of learners' learning style based instructional strategy on science achievement of secondary school students. (Un published Doctoral Dissertation, Saurashtra University, Rajkot) URL: [www.maitrividyalpith.org/Ph.D.Thesis.pdf](http://www.maitrividyalpith.org/Ph.D.Thesis.pdf)
- Martin, H.C. (2010). The use of teaching strategies that complement learning styles in freshman nursing students. (Doctoral Dissertation, Capella University, United States).
- Pathik, R.P. (2012). Educational Psychology. Published by Dorling Kindersley (India) Pvt.Ltd, Licensees of Pearson Education in South Asia.
- Lowokwaru, Kota Malang, (2015) Kinesthetic Learning Style Preferences: A Survey Gender Peptia Asrining Tyas, Mega Safitri English Education Program, Faculty of Veteran, Ketawanggede.