

**LEARNING STYLES OF TEACHER TRAINEES
LEARNING THROUGH ONLINE MODE**

BY

C.PRAVEENA

REG: 19PED002

UNDER THE GUIDANCE OF

Mrs. S.ANDAL M.Sc., M.Ed., M.Phil.,

**A THESIS SUBMITTED TO THE
AVINASHILINGAM INSTITUTE FOR HOME SCIENCE AND
HIGHER EDUCATION FOR WOMEN
COIMBATORE – 641043**

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CERTIFIED AS BONAFIDE RESEARCH WORK

Signature of the Head
of the department

Signature of the guide

DECLARATION

I hereby declare that the matter embodied in the thesis entitled “**LEARNING STYLES OF TEACHER TRAINEES LEARNING THROUGH ONLINE MODE**” is the result of investigation carried out by me in the Department of Education, Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore under the supervision and guidance of **Mrs. S.ANDAL M.Sc., M.Ed., M.Phil.**, Assistant Professor, of Education, Department of Education, Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore and it has not been submitted for the award of any Degree/ Diploma/ Fellowship of any other University or Institute.

SIGNATURE OF THE HEAD
OF THE DEPARTMENT

SIGNATURE OF THE GUIDE

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CHAPTER I INTRODUCTION

*Learning is not a product of teaching.
Learning is the product of the activity of learners.*

-John Holt

Education can be viewed from many different perspectives. One view sees it partly as the transmission of the accumulated knowledge of a society. Children are born without culture; they grow up in one, molding their behaviors and beliefs towards their eventual role in their society. In primitive cultures, education often involves little formal education and perhaps no schools as such. In some, only one or perhaps a few sacred books are studied. In more complex societies, the sheer quantity of accumulated knowledge can take many years of formal education to transmit to the next generation, even if broken up into specialized areas of study. Education itself in such advanced cultures becomes a matter of study since efficient and integrated means of transmission of knowledge become more and more critical.

Today, educators, researchers and teachers have become conscious to incorporate such techniques / styles to the teaching-learning process so as to get the best learning outcome in the form of students' achievement. Students need to understand current state of their knowledge and built on it, improve it, and make decisions in the face of uncertainty. The aim of education should be to reorient the minds of young ones and inflame their intellect. It is the time when we also need to redefine teaching and learning. Learning should no more be considered as simple acquisition of facts, knowledge or skill but it should be reoriented as acquisition of facts, knowledge and skill and ability to apply it in real life. In the same way teaching should not be considered as the act of imparting knowledge. Teaching is not a 'giving' matter as is generally understood by layman by 'giving and taking' affair or pedagogically speaking a teaching-learning process, where in the teaching, the teacher not only teaches but learns also, as teaching and learning are complementary process.

No longer are the good teachers conveying information, facts and principles, they are in-tune with how to learn. Learning the best way to learn has become as important as learning the subject matter. It is the time for a move to 'teaching as a science' from "teaching as an art". Tapping the potential of an individual to the maximums has been one of the basic aims of education. Efforts are being made to make the teaching – learning process most effective.

1.1. LEARNING STYLE

1.1.1. Concept of Learning Style

“Learning is the acquisition of habits, knowledge and attitudes. It involves new ways of doing things, and it operates in an individual’s attempt to overcome obstacles or to adjust to new situations. It represents progressive changes in behavior it enables him to satisfy interests to attain goals” (Crow and Crow, 1973).

Learning occupies a very important place in human life. It is a lifelong process. Learning is said to be equivalent to change, modification, development, improvement and adjustment. It is not confined to school learning, cycling, reading, writing or typing; it is comprehensive term which leaves a permanent effect or impression on the individuals. Man is a rational animal. He has got the power of reasoning. This power enables him to learn things quickly. Learning plays a very important role in determining behaviour of an individual. It is the basis of success in life. The miracles of present day civilization are the result of learning. Learning occupies a very important role in the field of education.

The term ‘Learning Styles’ refers to “the view that different people learn in different ways. In recent decades, the concept of Learning Styles has steadily gained influence. The learning styles concept appears to have wide acceptance not only among educators but also among parents and the general public. This acceptance is perhaps not surprising because the learning styles idea is actively promoted by vendors offering many different tests, assessment devices and online technologies to help educators in identifying their students’ learning styles and adapt their instructional approaches accordingly” (Pashler, 2008, p.105).

According to Kolb (1984), “Learning styles indicate individual differences in learning. An individual’s Learning Style is the way he/she concentrates on; processes, internalizes and remembers new and difficult academic information or skills. Individuals’ approach of learning is different due to differences in their learning styles. Pearsons’ approach to learning is relatively a stable indicator of how they perceive, interact with and respond to the learning environment.” Understanding learning styles and the role of learning styles in the thinking or learning process is a key component in effective teaching. Utilizing learning styles theory in the classroom is extremely beneficial at all levels of education for a variety of reasons. Some researchers have found a relationship between occupational preferences and learning style type. In addition, students’ learning styles have been shown to be affected by their educational experiences, particularly at the post-secondary level. Therefore, knowledge of learning styles is useful in designing classroom activities that support the development of this learning style.

Different authors have defined the learning style differently. Sternberg and Zhang (2001) conceptualized learning styles as how an individual prefers learning, for instance, by attending lecture. Jackson (2002) held that “learning styles are a subset of personality having a biological basis and constituting the learnt basis of personality”.

In order to develop presentation and communication techniques that facilitate effective learning, a teacher must have some notions on how pupils learn. Course lectures and school experiences add to and reveal the differences in how individuals learn. Human behaviour, motivation, achievement, personality and self-esteem, all have impact on the activity of learning.

1.1.2. Definition of Learning Style

Life is a sequence of acts of learning of feelings, ideas, attitudes etc. Learning is nothing but a permanent change in behaviour that occurs as a result of experience in the environment. Each learner’s personality is unique in one’s approach to a variety of learning tasks and one’s chosen way of taking a particular task is also unique.

Learning depends upon an individual’s learning style. In other words, the way in which a child is best able to learn visually, orally, by motor activities or a combination of these depends on the child’s learning style. Psychologists and researchers have defined the term learning style in different ways depending upon their theoretical formulations.

Following are some of the definitions given by the different authors:

Sigel and Coop (1974) viewed learning style “as an integral concept that bridges the personality and cognitive dimension of the individuals”.

Gibson (1976) argued that “learning style and cognitive style are synonymous”.

Letteri (1980) stated that learning style refers of the style of information processing, storage and retrieval of information

De Bellow (1990) defined the learning style as the way people absorb, process and retain information.

1.1.3. Characteristics of Learning

- Learning brings progressive change in behavior, as individual reacts to the situation.
- Learning is universal in nature.
- Learning is goal-directed. When the purpose is more clear, vivid and explicit, learning becomes meaningful and effective.

- Learning is active and creative. Learning largely depends upon activities of the learner. No learning can take place where there is no self-activity. Learning is said to be the result of activity and experience; a creative experience of all knowledge.
- Learning is transferable. Transference takes place in learning but amount of transfer may vary. Transfer occurs when there is similarity of content, techniques, ideas, procedure and attitudes.
- Learning is possible on cognitive, affective and conative sides. Acquisition of knowledge is cognitive; modification of emotions is affective and acquisition of skills is conative.
- Learning is a process and not a product.
- Learning involves new ways of doing things but there is no limit of adopting these ways and means. All learning does not take place in the same manner. Therefore, learning as a process is of different types and involves different methods.
- Learning is a continuous process and not restricted to childhood period. It goes with life till death.
- Learning does include changes in behaviour on account of maturation, fatigue, illness, redrugs etc.

1.1.4. Active Learning

Active learning occurs when the pupil has some responsibility for development of the activity. Supporters of this approach recognize that a sense of ownership and personal involvement are key to successful learning. Active learning can be defined as purposeful interaction with ideas, concepts and can involve reading, writing, listening, talking or working with tools, equipment and material such as paint, wood, chemicals etc. In a simple sense, it is learning by doing.

Active learning is contrasted with experiential learning. According to Haynes (2007), “Experiential learning is also learning by doing but with the additional feature of reflection upon both action and the results of action. Active learning strategies benefit both teachers and pupils. Teachers enable to spend more time with groups or individuals which allows better quality assessment to take place. For pupils, activity method encourages autonomous learning and problem-solving skills, important to both academic and vocationally based work. The advantages of active learning to pupils include greater personal satisfaction, more interaction with peers and opportunities to all members of the class to contribute and respond. It encourages mutual respect and appreciation of the viewpoint of others. Active learning is supportive of co-operative learning, not competitive learning.” (Haynes, 2007). “Active learning methods promote habits of learning which, it is hoped, are valuable in the workplace, in the home, and which generally enhance pupils’ capacity to cope with everyday life.

School can be a place where pupils learn to do things well and in certain ways. Skills are developed which are used throughout life. Pupils learn to consult a dictionary in order to counteract poor spellings. These skills become habits capable of reinforcement and development. Reinforcement leads to improved performance” (Hanyes, 2007).

Reiff (1992) has classified learning styles into three major areas as follows: (i) Cognition; (ii) Affective; and (iii) Physiological.

Cognitive style refers to “the way a person perceives, remembers, thinks, solves problems etc. He distinguishes cognitive style from general abilities by asserting that style focuses on ‘how I learn’ and abilities focuses on ‘what I learn’. Style is bipolar or on a continuum ie. sequential to global. Abilities are unipolar or measured with a single score such as percentile, average or poor; style score or style characteristics are not right or wrong” (Reiff, 1992).

Effective components of learning styles include “personality and emotional characteristics related to areas such as persistence, locus of control, responsibility, motivation and peer interaction” (Reiff, 1992).

The physiological component is basically based and related to sex differences, nutrition and reaction to physical environment. In both education and training, an important aspect of the design, development and delivery of learning is the selection of instructional methods, media and assessment strategies. Moreover, as a result of advances in instructional technologies, the range of methods and media available to teachers and learners has increased. Proponents of the concepts of learning styles have been advocating that every learner or trainee has his unique style of learning which enables him to learn best. Therefore, for making improvement in teaching learning process, teacher needs to diagnose the style of learning of his students and to prescribe them instructional treatment matching their learning styles.

1.1.5. Development of the Concept of Learning Style

The development of the concept of learning style may be summarized on the basis of the following theories:

- (1) Information Processing Theory - The concepts from information processing theory have found their way into the concepts of learning style;
- (2) Aptitude-Treatment Interaction-Aptitude-treatment interaction (ATI) research is a systematic attempt to relate individual differences to aptitude including aspects of cognitive and affective styles to instructional method; and

(3) Behaviouristic Theories of Learning - Behaviouristic theories of learning have contributed a lot towards the development of the concept of learning style. The researchers of this tradition describe learning style as learner's behaviour and action.

1.1.6. Types of Learners

(1) Visual Learners

These are learners who see the teacher's facial expression and body language to fully recognize the content of a lesson. They tend to prefer sitting at the front of the classroom to avoid visual obstructions. They may think in pictures and learn best from visual displays including diagrams, illustrated textbooks, overhead transparencies, videos, flipcharts and hand-outs. During a lecture or classroom discussion, visual learners often prefer to take detail notes to absorb the information.

(2) Auditory Learners

These learners learn the best through verbal lectures, discussions, talking things through and listening to what others have to say. They interpret the underlying meanings of speech through listening tone of voice, pitch, speed and other nuances. Written information may have little meaning until it is heard. These learners often benefit from reading text aloud and using a tape recorder.

(3) Tactile/Kinesthetic Learners:

These learners learn the best through a hands-on approach, actively exploring the physical world around them. They may find it hard to sit still for long periods and may become distracted by their need for activity and exploration.

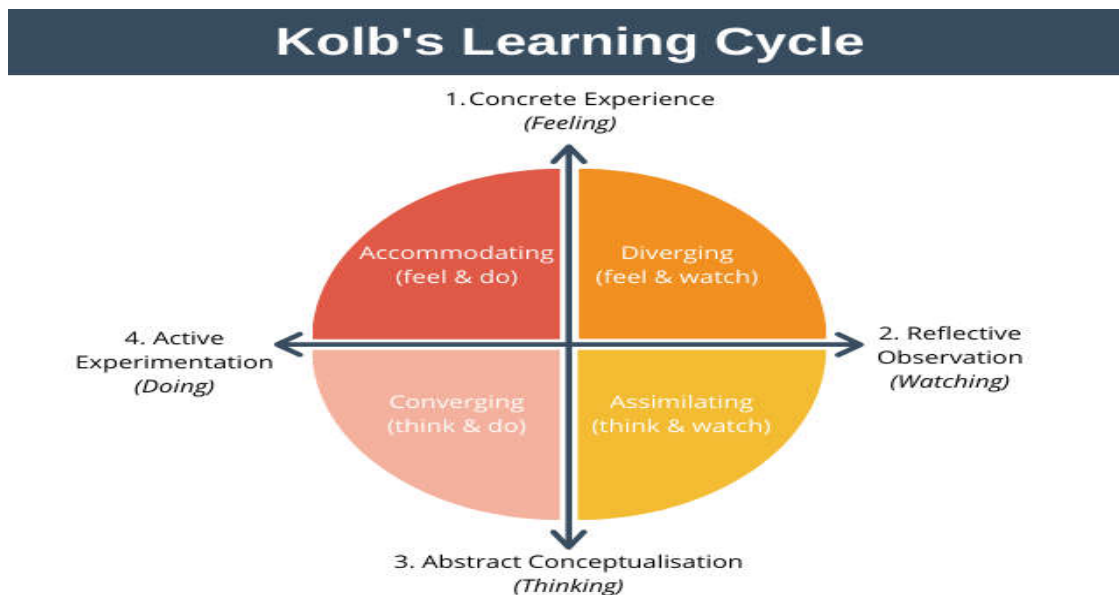
Many students realize that they have a distinctive Learning Style. These Learning Styles impact how well we learn under certain conditions. Some students learn best by hearing information, while others learn best by seeing it. A number of different theories have emerged to describe how students prefer to learn best.

1.1.7. Models of Learning Style

(i) Kolb's Model

One of the most influential models of learning styles was developed by David Kolb in the early 1970s. His theory of experiential Learning and the instrument devised to test theory that is, the Learning Style Inventory (LSI) have generated a very considerable body of research. According to Kolb (1984) "Learning is the process whereby knowledge is created through the transformation of experience. Knowledge results from the combination of grasping experience and transforming it. Experiential learning involves two major dimensions (i) perceiving and (ii) processing. The first describes concrete and abstract thinking and the second an active and information processing activity."

Effective learners need four kinds of abilities to learn: Concrete Experience (CE), Reflective Observation (RO), Abstract Conceptualization (AC) and Active Experimentation (AE). These four capacities structure along two independent axes (dimensions)



They are known as learning modes. The combinations of specific two learning modes generate a unique Learning Style. For example, concrete experience and reflective observation (CE & RO) produce Diverge Learning Style; reflective observation and abstract conceptualization (RO & AC) create Assimilator Learning Style; while abstract conceptualization and active experimentation (AC & AE) produce Accommodation Learning Style. According to Kolb, learning by its nature is full of tensions and these tensions are resolved by preferring or choosing a Learning Style over the other.

Kolb described the process of experiential learning style as a four-stage cycle, which starts from the concrete experience, followed by reflective observation, abstract conceptualization and active experimentation. This theory of experiential learning provides a useful framework for the design and management of all learning experiences.

These four Learning Styles include : (i) Imaginative Learning (ii) Analytical Learning (iii) Precision Learning and (iv) Dynamic Learning

(i) Imaginative Learning Style

Imaginative Learning Style depends on concrete experience and reflective observation. The greatest strength of learners with Imaginative Learning Style lies in their imaginative ability.

They perform the best when they have to generate ideas. They seek background information and sense opportunities; investigate new patterns and recognize discrepancies and problems; and generate alternatives. They have broad cultural interests and tend to specialize in the arts. They are very intense over enthusiastic and dedicated to their work. They are creative, innovative and tend to initiate ideas. They are people-oriented and like to promote interaction among groups to reduce conflicts and disagreements and seek harmony. They believe in trusting and encouraging their team members.

(ii) Analytical Learning Style

Learners with Analytical Learning Style perceive information in abstract and reflective manner. Their greatest strength lies in their ability to create theoretical models. They can assimilate disparate observations into an integrated explanation which is excelling in inductive reasoning. They value continuity and sequential thinking and need to seek option from expert. They are more interested in abstract concepts than in people; less concerned with the practical use of theories; and more concerned with whether the theory is logical, sound and precise. They like to work in their traditional classroom mode to seek personal effectiveness as well as goal attainment. They solve problems through logic, led by principles and facts.

(iii) Precision Learning Style

Precision Learning Style depends on the use of information abstractly but processes it actively. Their greatest strength lies in the practical application of ideas. They seem to be best in those situations where there is a single correct answer or solution to a question or a problem. Their knowledge is organized in such a way that through hypothetic deductive reasoning they can focus on specific problems. They are seen as relatively unemotional, preferring to deal with things rather than people. They are pragmatist who seeks that ideas must have utility; they have little patience for vague and fuzzy ideas. They tend to have narrow interests and often choose to specialize in the physical sciences. They adhere strictly to deadlines and time-table. They prefer people who can understand and implement ideas as possible.

(iv) Dynamic Learning Style

Dynamic Learning Style depends upon the use of concrete experience and active experimentation modes. Learners with dynamic learning style perceive information concretely but process it actively. Their strength lies in doing things, carrying out plans and experiments and getting involved in new experiences. They take more risk than people with other learning styles. They excel in situations where they have to adapt to specific circumstances.

They tend to solve problems in an intuitive, hit and trial manner, relying heavily on other people for information rather than on their own analytical ability. In situations where the theory or plans do not fit the fact, they are likely to discard the plan or theory. They are at ease with people but are sometime seen as impatient and pushy. People with this learning style are action-oriented. They are stimulated by challenging and risk tasking tasks. They solve problems by looking at all possibilities and studying the trends. They are accomplishment-oriented, aiming at implementing solutions and committing resources.

Thus, Learning Styles are not only important for teachers to make teaching-learning process effective but also for administrators to assess the teacher and train them; and to adopt different Learning Styles. They are also important as course designers and textbook writers. Teachers can make use of Learning Style in administration and give examples of appropriate use of various styles.

1.1.7. Role of Learning Styles in Education

The role of learning styles in education of school children is of utmost importance. A number of claims have been made by the advocates of learning styles as indicated below:

Dembo (1977) held that certain learning styles may be of even more importance than intelligence in effecting classroom learning. The identification of these styles should be of particular importance for educators, variables of classification of students may help teacher to optimize the match between teaching and type of students.

“A thorough understanding of students’ learning style can help Counsellors to develop strategies, techniques and programmes that are responsive to unique learning needs” (Griggs, 1981); “The key of effective schooling is to understand the range of student learning style and to design instructions and material that respond directly to individual’s learning needs” (Keefe, 1982); “There is no reason in the world not to diagnose the learning styles of every student and provide guidelines and alternatives for teaching them through their individual strengths” (Dunn et al., 1978);

Reiff (1992) gave the following points in favour of learning styles:

- A better understanding of self-learning style can help teachers in reducing frustration for themselves and their students.
- A matching instruction with learning style of children can result in higher achievement, a more positive attitude and improved self-concept and self-confidence.
- The teacher with learning style knowledge can plan more appropriate lessons to accommodate a variety of learning styles of learners in the classroom. Planning appropriate and varied lessons will improve both instruction and management.

- Teachers need to share teaching style information with administrators, counsellors, special education teachers and other staff. A co-operative team effort is always more effective.
- The overview of learning style research and terminology can provide a theoretical basis for versatile teaching. The effective teachers can demonstrate flexibility by using a variety of instructional techniques in the classroom.

To sum up, learning style concept provides a new perspective for teachers, students, administrators, curriculum designers, guidance workers and parents. It is a new way of looking at learning and instruction; it offers a deeper and most profound complexion of the learner than known previously. It is basic framework upon which theory and practice can be built. All types of learners at all stages (from pre-primary to university) can be benefited from understanding their learning styles.

1.2. Introduction to Online Education

The recent years have seen an exponential increase in the communication industry with the advent of Internet and its subsequent development. The modern World Wide Web is a result of the developments made by the Defence Advanced Research Projects Agency (DARPA), the agency responsible for creating new technologies for the department of the Defence of the United States of America. The Arpanet, the simple network developed to send and receive packets of data across the computer systems of the U.S. military, formed the foundation of the biggest and most complex network connecting computer systems across the world.

The onset of the internet changed the basic rules of the world that was known by placing the most elite and coveted tool into every person's hand i.e. accessibility. Information that was earlier available for the disposal of an elite few was now accessible to anyone who had a computer system and a stable connection. This increased accessibility, today, has led to the formation of a global community that can share ideas and information and gain knowledge from their mutual association without the hindrance of borders. With each passing day more and more people are becoming a part of this community enriching it further with their own knowledge.

Internet, these days, apart from a forum of sharing information has also become a hub of business and services. Various platforms for providing services ranging from banking, buying groceries, booking tickets to even getting an educational degree online have cropped up. These services provide a robust business transaction base with the world in general. This enhances connectivity and the general awareness amongst the global community. The internet has found a great utility in the education sector as well.

It has brought college to each and every person's personal computer and reduced the obstacles one faces in accessing higher education. Higher education had always been within the access of the bourgeoisies, however with the aid of the internet people living in remote areas with no colleges/schools within an accessible region can also enjoy good guidance from the best faculty.

One of the idealistic goals of every administrative body is to bring every child of the country and eventually the world to school, however the internet is now making serious progress by bringing the school to every child and taking away the power that social and sometimes economic constraints have over education.

Apart from the social impacts that online education has, it has levelled the playing field for the average student. The traditional brick and mortar classroom is no longer the only place for him or her to understand concepts and resolve doubts. Internet has become a "booster" for every student. Video lectures and discussion forums have now become a part of the mainstream educational practices and this has led to expanding the prospects of "group study". Students from across the world can now communicate with each other and resolve their queries by mutual discussion. This diversifies the knowledge base of all involved.

Of course, the importance of one on one interaction in the traditional classroom set up can never be undermined, but the internet has undeniably created a niche for itself in the education sector. The supplement that online education provides is becoming more and more primary with time and is slowly becoming indispensable.

But most importantly, online education has become an important tool to provide education to people across the world. With online education the distinction between the instruction and information that an ivy league student and a student studying in the developing or undeveloped countries becomes lesser. All people now have an equal chance at receiving good education with good references.

The best part about the online mode of education is that it helps set a common standard of education for all, and the number of people that are educated are incremented exponentially using nearly the same resources. Also the reach of online education is much vaster than that of the traditional forms of education systems.

1.2.1 Advantage of Online Classes

There are various advantages of online classes.

- **Time flexibility**

The online classes have huge time flexibility that impacts both teachers and students.

They can choose a convenient time based on their criteria. They can start their classes based on their comfort time zone.

- No travel**

We don't need to rush with traffic anymore. The facility of online classes will not let us travel physically to attend the classes. This is safe also.

- Available 24/7**

The online classes will give you 24/7 knowledge. Even if the teachers are not available we can play the records to join their classes. Also, we will be provided with various study materials that can be accessed any time and anywhere i.e. 24/7.

- Planned work**

The online classes are so planned that we can feel the function of the library virtually. Everything is arranged so that we can access on your own. Play classes, join the online tests, download study material, and learn tricks and tips from E-books and many more. Get an opportunity to join the best online schools that gives the planned study material.

1.2.3. Disadvantages of Online Classes

There are several disadvantages to online classes:

- Unstable job**

Yes, the online classes are an unstable job. You are not sure when you get a boom and deficit with the online classes. Students might cancel or leave online classes anytime. Therefore, it is not a fixed job based on salary.

- Limited learning method**

The online classes have limited learning methods. You need to be very limited with the online classes while interacting with the students. Hence, such a limited learning style makes teachers uncomfortable to perform during classes. You need to depend on the online and visual classes.

- Technical faults**

One of the biggest barriers is technical faults due to bad weather, irregular faults, or system error. These problems are very dangerous in online classes and quite difficult to fix it off. You need to depend on the technician to come and fix it. If the teachers get faults, they won't be able to start the classes and if students get fault they won't be able to join the classes. It is one of the biggest barriers of all time.

1.3. SCOPE OF THE STUDY

The role of the teacher is so great that the teachers are the one and only one who could bring in a lot of change in the behavioural styles as well as learning patterns or styles of the students that they must create a kind of awareness and bridge up a soothing link between innovative style and inherent potentials of the student individuals. At this juncture the teacher has to insist that the changing educational patterns also demand a change in the learning styles and attitudes of the students. The teacher could assist the students in crossing through the hurdles of various types of skill based learning in which a patterning is possible. Teacher intervention in this change process could assist them and cluster them according to their inborn nature. Interventions of such kind demand a lot of unique techniques which are appropriate to indulge in stages of concern. Our assessment is examination oriented. So it is necessary to know, what type of impact is caused by the different learning styles followed by the student teachers on their achievement levels. Therefore an attempt is taken to find the learning styles in education as practised by the prospective student teachers and how it influences their achievement.

1.4. STATEMENT OF THE PROBLEM

The present study is entitled as “Learning Styles of Teacher Trainees Learning through Online Mode”

1.5 ASSUMPTIONS OF THE STUDY

- It is assumed that the learning styles followed by the students would have some impact on their academic achievements.
- Their study organization style would render better traits to study their inherent attitudes and enable to improvise their learning further.
- A better identification of their mode of choice in learning style namely visual, auditory or kinesthetic could be achieved, that would facilitate their learning.

1.6. THE OBJECTIVES OF THE STUDY

- To identify the learning styles of Teacher Trainees.
- To Determine if there is any significant difference in the learning style of teacher trainees based on their age, locality, subject specialization and parental income.
- To explore if there is any significant difference in the learning style of teacher trainees of B.Ed and M.Ed programme.

1.7. HYPOTHESIS

1. There is no significant difference between learning styles of Teacher Trainees based on their age.
2. There is no significant difference between learning styles of Teacher Trainees based on their programme.
3. There is no significant difference between learning styles of Teacher Trainees based on their subject.
4. There is no significant difference between learning styles of Teacher Trainees based on their locality.
5. There is no significant difference between learning styles of Teacher Trainees based on their Parental income.

1.8. LIMITATION

Due to the time constraint, the study is confined only to the Teacher Trainees of Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore

1.9. ORGANIZATION

This study, “Learning Styles of Teacher Trainees Learning Through Online Mode” is arranged in 5 chapters

- The **first chapter** consists of Introduction, Meaning of the Terms used, Need and Scope of the study, Objectives, Hypothesis, and Organization of the study.
- The **second chapter** presents the Review of Literature which is related to the study.
- The **third chapter** administers with the Methodology of the study which includes the sampling techniques, the tool used and the mode of administration of the tool and statistical system.
- The **fourth chapter** deals with the Analysis and Interpretation based on the statistical techniques used.
- The **fifth chapter** deals with the Summary of the findings, Recommendation and Suggestion for further research.

CHAPTER -II

REVIEW OF LITERATURE

2.1 INTRODUCTION

A literature review is an account of what has been published on a topic by accredited scholars and researchers. Many students are instructed as part of their research program, to perform a literature review, without always understanding what a literature review is. A literature review is critical and in depth evaluation of previous research.

A good literature review expands upon the reasons behind selecting a particular research question. A literature review is a critical and an evaluate summary of the themes, issues and arguments of a specific clearly defined research topic obtained from the published (and not published) literature.

Brogan & Gall (1983) mentioned that the review can help in researching a number of important specific goals namely delimiting the research problem, seeking new approaches, avoiding sterile approaches, insights into methods and sampling. The investigator needs to acquire up to date information, about what has been done in the particular area from which he/she tends to take a research problem.

A literature review must do these things:

1. Be organised around and related directly to the thesis or research question that are developed.
2. Synthesize results into a summary of what is known and is not known.
3. Identify areas of controversy in the literature.
4. Formulate questions that need further research.

2.2 NEED FOR REVIEW

Review of a research report is done to know what research works have already been done this and related topics or fields, the methodology adopted by them, the hypotheses formulated and tested by them, the findings and the conclusions, the listed scope for further research and so on. Similarly review of research papers is intended to be known from the papers that thrust issues, the hypothesis, the tool of data collection the methodology, the findings and the implications of them for the research for its current work.

It has two phases,

1. The first phase includes identifying all the relevant published material in the problem area and reading that part of it with which people are not thoroughly familiar.

People develop the foundation of ideas and results on which our own study will be built.

2. The second phase of the review of literature involves writing this foundation of ideas into a section of the research report. This section is for the joint benefit of the researchers and readers. For the researcher, it establishes the background in the field. For the readers, it provides a summary of the thinking and research necessary for them to understand the study.

2.3 PURPOSE OF REVIEW

- ◆ To find out what is already known, what others have attempted to find out and what problems remain to be solved.
- ◆ It is foundation of which all future work will be built.
- ◆ To avoid duplication of research works [in case an almost similar work as the present one has already been done by someone.
- ◆ It enables him to know the means of getting to the frontier in the field of research.
- ◆ To adopt an alternative method of study in case an almost similar work as the present one has already been, for some reason carried out.
- ◆ It furnishes him with proper procedures, likely methods and tried techniques.
- ◆ To test the efficacy of suggested courses of action in earlier work.
- ◆ It provides ideas, theories, explanations, hypothesis, or methods of research variable in formulating and studying the problem.
- ◆ To fill up the gap between one study and the other.
- ◆ To build a theory, review of literature is needed.
- ◆ To split one major study into smaller sub studies.
- ◆ To combine two or more study sub studies to major study.
- ◆ It guides him to carry out the investigation successfully and familiarise the investigator with the proper procedures.
- ◆ It fulfils the objectives of presenting the background of research in this area so for done.
- ◆ It gives the investigator a good understanding of the efforts made and progress achieved in this field.
- ◆ Thus, the researcher must know the available resources and how to use the information about what has been done in the particular area from which he tends to take a research problem.

According to Mouly (1964) “The review also provides comparative data on the basis of which evaluate and interpret the significance of one’s findings”. In addition, it contributes to the scholarship of the investigator.

2.4.RESEARCHES IN INDIA

Agarwal (1987) studied on **‘Learning Style among Creative Students’**. Main objective of the study was, To compare the learning styles of high creative and low creative students at +2 stage belonging to different types of institutions. Out of 554 subjects only 400 provided complete and usable data. Learning Style Inventory was developed by the investigator and used to identify the preferences for learning styles. Findings of the study revealed that: The high creative students were found having flexible learning style as compared to low creative students who preferred non-flexible learning style. High creative students were found to have preferred visual learning style as against the low creative students who were found having aural learning style. High creative students were identified as having field independent learning style, while low creative students preferred field dependent learning style. High creative students were found to possess environment oriented learning style whereas low creative students were identified as preferring environment free learning style. High creative students and low creative students in all were found to have preferred individualistic vs non- individualistic learning style, short attention span vs long attention span learning style and motivation centred vs motivation non-centred learning style equally.

Purkiss (1995), studied on **‘Learning styles and the Changing Face of Community Colleges’**. Investigator concluded that, it is clear that there is some validity to the claim that style is a predictor of success in different academic disciplines. It is clear that, at least in the examination of the experience encountered by this freshman class, the institution has been more supportive of abstract conceptual learning style dominated students. Real effort must be made to develop methodologies of engagement that will stylistically democratize the community college and allow all students to step into the learning dynamic as equal partners in the process.

Sims & Sims (1995) studied on **‘Learning and Learning styles: A review and Look to the Future’**. They concluded that, it is urgent that those responsible for teaching and training in higher education and other organizations recognize, accept, and understand delivery in regard to leaning styles. Acceptance of style as a fundamental strength of each person contributes to the development of self-esteem and, ultimately, to achievement. It is important that instructor and trainers first know and care and then teach about learning style, thus helping students and trainees understand their own strengths and weaknesses. Orientation sessions before the beginning of school and orientation classes during the first semester appear to be a practical starting point in colleges and universities.

Aragon, Johnson & Shaik (2002) conducted a study on **'The Influence of Learning Style Preferences on Student Success in Online versus Face-to-Face Environments'**. Three learning style instruments were used, viz. Reichmann and Grasha's (1974) Student Learning Style Scale ((SLSS), Weinstein, Palmer, and Schulte (1987) Learning and Study Strategy Inventory (LASSI), and Kolb (1985) Learning Style Inventory (LSI). Results showed no significant differences in the social and environmental preferences between the students of two delivery formats. It revealed that both formats students are similar in their learning and study strategies, with the exception of study aids. Although significant differences were found between the learning style preferences of the online students and those of the face-to-face students, these differences were not significant when success factors were controlled. The results of this study suggested that the students can learn equally well either delivery format, regardless of learning style, provided the course is developed around adult learning theory and sound instructional design guidelines.

Logan and Thomas (2002) studied on **'Learning styles in Distance Education Students Learning to Program'**. The result of the study shows in the Honey and Mumford's Learning Style Questionnaire, significant gender related differences in the Pragmatist and Theorist measures. Significant positive correlations were found existing between the Pragmatist, Theorist and Reflector Style for females while males were found to have significant negative correlations between the Activist & the Reflector & Theorist styles. Analysis of the responses to the Grasha Reichmann Student Learning Style Scales showed no apparent differences between genders. All scales were found to be significantly different from their expected distribution ($P < 0.01$) subjects were also noted to have a greater preference for the collaborative & independent style than expected. Significant correlations were also found between Independent and Dependent as well as between participant & the Avoidant, collaborative and Dependent Scales.

Srivastava (2002) studied on **'Effect of self concept on the learning style preference: A study of High School Pupils'**. explored the effects of self concept on the learning style preferences of High School male pupils. The findings revealed that as the self concept level of the urban boys increased they showed increasing preferences to flexible, non-individualistic, visual, field-independent long attention space, motivation centered and environment free leaning styles. He also found that accommodating learning styles is the most popular learning style among students.

Verma and Mishra (2002) in their study '**cognitive and Meta cognitive aspects of learning styles of prospective secondary teachers in relation to teaching aptitude and Self Esteem**' proposed to ascertain the main and interaction effects of teaching aptitude and self esteem on cognitive and meta cognitive strategies of learning of prospective secondary teachers. A sample of 387 subjects was selected randomly from the four Teacher Education Institutions of Himachal Pradesh. The tools used were Inventory of learning styles by JDH Vermant, Teaching Aptitude Test by Jai Prakash and R.P. Srivastava (1973) and self esteem scale by M. Rosenberg (1965). Statistical Technique ANOVA was used to analyse the data. The result revealed that teaching aptitude and self esteem to influence some cognitive & meta-cognitive strategies of learning of prospective secondary teachers in an independent manner. However, no interaction effect of the two variables was found on any cognitive and meta-cognitive strategy of learning.

Bureck, Malmstrom & Peppers (2003), studied on '**Learning environments and learning styles: nontraditional student enrollment and success in an internet-based versus a lecture-based computer science course**'. The primary objective of the study was to determine if there is a relationship between students' preferred learning environment and their learning style. The secondary objective was to determine if there were any differences in the academic success of students in the face-to-face versus on-line sections. Participants were adult (ages 22+ years), non-traditional computer science students given the option to take a face-to-face lecture-based or an on-line Internet-based computer science course. Results revealed that computer science students in the face-to-face learning environment were more likely to have the Assimilator learning-style, whereas computer science students in the on-line Internet-based learning environment were more likely to have the Converger learning-style. Student academic success did not reliably differ as a function of learning environment selection.

Shinde and Kamat (2006) studied on '**Learning styles in computer based learning**'. The study was undertaken with following objectives: To find out the extent to which scholastic achievement of the learners is affected by the levels of interactivity. To find out the extent to which scholastic achievement of the learners is affected by the learning styles in two different environments. The following tools were used in the study: a. Learning Style inventory developed by Kolb. b. Non-verbal Test of Intelligence developed by Nafde (1991). c. Pre-test and post- test on Communication .d. Rating Scale for Experts to Evaluate CAI.e. Opinionaire about High Interactive CAI for the subjects. f. Opinionaire about Low Interactive CAI for the subjects.

Jaiswal (2010), studied on **‘a study of learning style preferred by high and low creative students’**. This study was conducted through survey method in which tools were given to the sample students studying in class X. The result shows that the most preferred style of learning in high and low creative students in participant style, while least preferred style of learning in avoidant.

Kumar (2010) studied on **'Learning Style Based Multimedia Designs'**. The conclusion of the study is like this- the designing a proper multimedia is one of the key aspects. This designing aspect should take into consideration of various researches based findings. Needless to say that one of the significant strategy to harness the potential of otherwise underutilized but powerful tool of education is to integrate learning styles of the learner while designing the multimedia package for educational purposes. Hopefully properly integrating different learning styles of the learner will pave way for maximizing achievement gains of the learners.

Rathod (2010) studied on **'Evolving ICT enabled strategies for teaching science catering to the learning styles of the students'**. Index of learning styles tool was used to identify the learning styles of Std. VIII students. He found that 17% of std. 8 students were found to have a sensing preference. These students tend to perceive information in a concrete factual way, and are less comfortable with theories and abstraction. 61% 44 of students process new information in an active manner. More than half of the class finds it hard to learn through the lecture method, as they need to actively process new material. The majority of the students (80%) demonstrated a global preference in understanding new material. 13% of them have strong or very strong preference for global understanding.

Gulbahar & Alper (2011) studied on **‘Learning Preferences and Learning Styles of Online Adult Learners’**. They concluded that online learning environments possess passive learning features when a student reads, listens, and analyzes graphics, and consist of active learning features when students discuss and express themselves through writing in various platforms. Instructor should provide hands-on activities, interactive experiences like simulations and games, activities that need discussion, creativity, exploration and research, and wide range of printed materials like books, hand-outs, worksheets, puzzles, and newspapers for concrete and abstract learners. They should provide content considering both inductive and deductive approaches, real-life problems, and guided work plan for logical and sensual learners. From the perspective of instructional methods; instructors should use a mix of all the appropriate methods such as direct instruction, lecture, demonstration, discussion, cooperative learning, case studies, discovery learning, problem-based learning, role-playing, scaffolding, and storytelling in harmony.

Singh (2011) in a study of **'Impact of e-TV on learning style of students studying in class 11'** of Allahabad city found that on components of learning style namely writing modes, memory, examination performance the students who had been exposed to e-TV programmes do not differ significantly on above components of learning styles, on the other hand they had significantly differed on components namely time determination, physical conditions, reading aptitude, learning motivation & health.

Upadhyay (2011) studied on **'A study of learning styles among undergraduate students'**. Descriptive method of research was employed in the study. Sample for the study consists of 96 undergraduate students of Ewing Christian College, Allahabad. Out of these, 50 were Arts stream and 46 were of science stream. Learning style Inventory prepared by K.S. Misra had been used to collect the data. t-ratios had been computed for the analysis of the data. The results revealed that students of Arts and Science stream do not differ from one another on learning styles. It implies that both students of Arts and Science stream had similar enactive, figural, verbal, enactive, reproductive, enactive constructive, figural reproductive, figural constructive, verbal figural and verbal constructive learning styles.

Zacharis (2011) conducted a study on **'The effect of learning style on preference for web-based courses and learning outcomes'**. The Kolb Learning styles Inventory, a statistically reliable and valid 12-item questionnaire in which respondents attempted to describe their learning style, was administered online to both student groups, one week after the start of the course. The first research questions was that, Is there is relationship between students' learning style and the selection of course delivery format? To determine the answer to the first research question, a Pearson chi-square test was used to examine the relationship between student learning style and preference for online or face-to-face instruction. The second research question sought to determine if there was a difference in student achievement due to the instructional delivery method. The third research question investigated whether students' learning style influenced their academic performance differentially contingent upon whether they took the course in either a face-to-face or fully online delivery format. The fourth research question aimed to find out if there was an interaction between instructional method and learning style, based upon the students' course grades.

Saha (2013) in his article **'Leaning styles and its classroom Applications'** developed different models of learning styles. Some of them are: David Kolb's model, Honey and Mumford's model, Anthony Gregore,s Model, Sudbury model, Fleming's VAK/VARK model, Chris. J. Jackson's model and R.M.

Felder & R. Bronte's models of learning styles. He found that when mismatch between the teaching and learning styles occurs many students can't get what's being thought. As a result they become Bored, inattentive or disruptive in class, do poorly on tests, get discouraged about the course, curriculum and about themselves.

Dhiman (2014) studied on '**Learning Style Preferences among Prospective Rural and Urban Teacher Educators**'. The study aimed at finding out the difference in learning style preferences among prospective teacher educators belonging to rural and urban residential backgrounds. The objective of the study was to find out the significant difference in Visual, Auditory, Tactile, Kinesthetic, Group and Individual Learning Style Preferences among Rural and Urban Prospective Teacher Educators. The sample comprised of 120 M.Ed. Descriptive survey method of research was used for conducting the study. The analysis of collected data revealed that residential background had significant influence on learning style preferences among prospective teacher educators. Result revealed that urban prospective teacher educators had more preference towards Auditory Learning Style than their rural counterparts. Rural and urban prospective teacher educators did not appeared to differ significantly with regard to their Visual, Tactile, Kinesthetic, Group and Individual learning style preferences.

Dey & Chaudhary (2015) studied on '**The Perception of B.Ed. Students on Printed Self-Learning Material and Learning Style in ODL**'. As a sample of study 100 B.Ed. students (50 male and 50 female) were selected purposively from the Delhi Region who had enrolled in the B.Ed. programme of IGNOU. Descriptive survey method was employed in the study. For measuring perception on self learning materials and learning style of the B.Ed. students, structured questionnaires based on five point Likert type rating scale was used. No significant difference was observed between the male and female students both in their scores in learning style as well as, on the perception scale. The teaching experience of the students did not influence either their learning style or perception. The number of male and female students who had scored above or below the desired average scores either in the scale of learning style in ODL or in their perception on SLM did not differ significantly.

Cecil (1975) designed a **study to investigate the extent to which designated learning styles are reflected in academic performance on paper and pencil tests**. He concluded that a large percentage of persons who choose the same professional career and meet the criteria to be accepted into that career in a particular educational programme are, people who have a relatively flexible learning style. These findings indicate that the flexible learning style may be a need of the people in the educational field.

Kaley (1977) tried to explore “**the relationship of field dependent/field independent and learning style**”. The study also investigated the ability to predict learning style from anyone or any combination of independent variables of reading achievement, I.Q and Group Embedded Figure Test score. The findings suggested that reading achievement significantly predicted learning style when considered alone or in combination with I.Q. However I.Q significantly predicted the learning style only when considered together with reading. The factor of field dependent field independent measured by GEFT was not a significant predictor of learning style.

Price (1978) explored **the relationship between Learning Style and self-concept** of the subjects drawn from grades three, six and seven from twelve different schools. Individuals were clustered into two groups, those having a high self-concept and those having a low-concept with the overall mean of both groups at 142.30. These two groups were compared on each of the twenty four areas of the LSI to determine if a significant relationship between self concept and how individuals prefers to learn could be found. On this analysis, individuals having a high self-concept preferred quiet liked to study in a warm temperature, where adults and teacher motivated were consistent preferred to learn in several ways, namely by self or with peers, did not have auditory preferences and did not need mobility. In general individuals having a low self-concept preferred to study in a cool, noisy environment where adult or teacher motivated were not consistent preferred not to learn in several ways, and had auditory preferences and showed a need for mobility.

In a study by Ribich and Schemeck (1979) three self- report instruments assessing “**Learning Style**” were administered to 106 undergraduates-the Inventory of Learning Processes, Study Behaviour Questionnaire and Learning Style Inventory. Performance measures on word list and prose learning task were also obtained using both immediate and delayed retention tests. Canonical correlation analysis of the pairs of learning style instruments indicated that there was a small to moderate amount of overlapped variance. Inspection of the canonical variates revealed that what overlap existed was generally due to a common factor related to the “depth of processing” conception of memory. The inventory of learning processes and the Learning Style Inventory each obtained one significant canonical correlation with the set of prose retention measure, indicating the role of the learning style in studying individual differences in learning and memory processes, and the assessment of “depth of processing” at the level of individual differences.

Najar (2017) conducted “**A study of learning style preferences among secondary school students in relation to their gender and place of living**”. The study was conducted to analyse preferable learning styles among secondary school students of district Srinagar. The present study is a modest effort to find out the effect of gender and place of Living on learning style preferences of secondary school students. A sample of 300 secondary school students of District Srinagar of Jammu and Kashmir was selected for the study. Learning Style Inventory (2012) by Sreekala and Amalraj was used to collect relevant information for the study. Findings of the study indicate that the most preferred learning style among secondary school students is Visual (45.7%) followed by Auditory (21.0%) and Kinaesthetic (15%) It means that most of the secondary school students favoured visual format of learning. It was also found that the most preferred learning style among male and female students was visual learning style. Rural, urban and semi-urban students were found to have no significant difference in their learning styles.

Hackman (1988) designed “**a study to determine whether differences exist between gifted and non-gifted students in their learning style preferences**”. Findings of the study revealed that significant learning style differences existed between gifted and non-gifted students. Gifted students, as opposed to their non-gifted peers, expressed strong positive preferences for a cluster of self-directed instructional activities and strong negative preferences for several teacher-directed activities whereas on the other hand non-gifted students showed positive preferences for a cluster of teacher-directed activities and milder preferences for instructional activities. From this it may be inferred that intelligence has a relation with learning style.

Verma and Tiku (1990) studied “**the effects of socio-economic status and general intelligence on learning styles of high school students**”. It was observed that the main effect of general intelligence on learning styles did not come out to be significant except in case of avoidant learning style. The low intelligent students showed greater mean score on avoidant learning style as compared to high intelligent students. Another finding revealed that there was no significant interaction between socio-economic status and general intelligence with regard to independent, dependent, participant, collaborative, competitive and avoidant learning styles of high school students.

Verma (1991) studied “**the relationship between learning style and achievement motivation**”. 51 class XI students (28 high in motivation, 23 low in motivation) completed the Achievement Motive Inventory and the Learning Style Inventory (Agarwal, 1982) subjects learning style preference was independent of achievement motivation. In other words, high and low achievement motivated subjects did not differ significantly in terms of flexibility, individualism, visual \s arousal learning style, field

independent, attention span, motivation centeredness or orientation to environment.

Indu and Haidy (2008) conducted **“study on perceptual learning styles of high school students”**. The major objective of the study was to find out whether there is any significant difference in the perceptual learning styles of boys and girls students in government, government aided, corporation and private schools. The major finding was the government school students showed marked difference in learning styles as compared to students of other types of schools. Most of the government schools students followed visual and auditory learning styles.

Richardson and Fergus (1993) examined **“the learning style of grade 9 students”** (47 boys and 67 girls) in 2 different ability groups, A and B, in the high schools of Montserrat. Results indicate a better performance of B in ability group, A in deep processing, fact retention, and methodical study when compared with their counterparts in ability group B. The sex difference that emerged pointed to female superiority over males on behaviours reflective of methodical study.

Kumari Balesh (1995) carried out **“a study of the learning styles of socioeconomically advantaged and disadvantaged adolescent students in relation to intelligence and personality types”**. Significant relationship appeared to exist between introvert/extrovert type personality and individualistic vs. non-individualistic learning style preference and environment oriented vs. environment free learning style preference of socio-economically advantaged group while in socioeconomically disadvantaged group, this relationship did not exist. Also, there was significant relationship between stable/neurotic type personality and short attention vs. long attention span learning style preference of socio-economically advantaged and disadvantaged groups.

Verma (1996) conducted **“a study on the relationship of personality and achievement motivation with learning styles of post graduate students”**. In this study achievement motivation was measured by Helmreich and Spence and achievement motivation scale and learning styles Kolb’s learning style inventory. The findings revealed that achievement motivation was not found to be a significant factor in concrete experience, abstract conceptualization, active experimentation, diverger, converger, assimilator, accommodator learning styles. However, reflective observation was found to be significantly influenced by achievement motivation. Highly achievement motivated demonstrated more preference for this mode than students having average and low level of achievement motivation.

Neuhauser investigated study on **“Learning Style and Effectiveness of Online and Face-to-Face Instruction”**(2002). In this study the investigator compared two sections of the same course-one

section was online and asynchronous; the other was face-to-face-by examining gender, age, learning preferences and styles, media familiarity, effectiveness of tasks, course effectiveness, test grades, and final grades. The two sections were taught by the same instructor and used the same instructional materials. The results revealed no significant differences in test scores, assignments, participation grades, and final grades, although the online group's averages were slightly higher. Ninety-six percent of the online students found the course to be either as effective or more effective to their learning than their typical face-to-face course. There were no significant differences between learning preferences and styles and grades in either group. The study showed that equivalent learning activities can be equally effective for online and face-to-face learners.

Anna Ya Ni “**Comparing the Effectiveness of Classroom and Online Learning: Teaching Research Methods**” As public administration programs extend their online education offerings to reach more time- and place-bound students, and as accredited institutions become interested in documenting teaching and learning effectiveness, the degree to which online students are successful as compared to their classroom counterparts is of interest to teaching faculty and others charged with assessment. By comparing student performance measures and assessments of learning experience from both online and traditional sections of a required graduate public administration research methods course taught by the same instructor, this paper provides evidence that student performance as measured by grade is independent of the mode of instruction. Persistence in an online environment may be more challenging in research methods classes than in other public administration classes. Furthermore, participation may be less intimidating, and the quality and quantity of interaction may be increased in online classes.

Amanda R. Hurlbut conducted the study on “Online vs. traditional learning in teacher education: a comparison of student progress” Online education programs are well established in higher education, including graduate level and non-traditional teacher education programs. However, there is a lack of substantial research into online programs for undergraduate students in comparable preparation programs. The purpose of this study was to determine how student progress in a face-to-face or traditional growth and development course compares to student performance in an online section taught by the same instructor, and to determine what factors contributed to performance in the course as determined by student grades and responses, perceived instructional strategies, and participation in online interactive content. This study used a mixed-method design using both quantitative and qualitative data. Findings from the study suggest that students enrolled in the traditional class generally

received slightly higher grades and assignment scores than those who participated in the online section.

Other differences in the courses existed and contributed to overall performance, but instructor feedback was reported as an important hallmark of both courses.

Wade H , Lawanto & Santoso conducted the research on the topic **“A Learning Style Comparison between Synchronous Online and Face-to-Face Engineering Graphics Instruction”** The immediate objective of this research was to look at the effectiveness of teaching Engineering Graphics with a synchronous online delivery method and to compare it to a more traditional face-to-face delivery method. Using Kolb’s learning style inventory, student learning styles in both educational settings were investigated and analyzed to discover the student population’s prevailing learning style. Data relating to class success was collected with surveys, personal feedback, and by observing overall student performance based on grades and responses to the survey material presented. Data analysis allowed for an introspective look into correlations between academic success and the learning styles of the students. Findings suggest that Converger students receive significantly higher final course grades when they are in a synchronous online environment; Assimilator and Converger synchronous online students show significant improved differences in their final open-ended project scores over their face-to-face taught peers, the prevalent learning style within the course. Suggestions to accommodate learning styles are present.

Yuliang Liu investigate **“A Comparative Study of Learning Styles between Online and Traditional Students”**. This comparative study was designed to investigate how online and traditional face-to-face (FtF) students used different learning styles in a graduate educational course. A nonequivalent control group design was employed. The study involved 19 students in an experimental group (online section) and 25 students in a control group (FtF section) in a graduate course in the Fall semester of 2004. Although no significant statistical differences were detected in learning styles at pretest, significant statistical differences were found in many learning style subscales at posttest between experimental and control groups. Specifically, at the end of the course, online students seemed to have a higher preference for peer interaction, competition, interaction with the instructor, details of the course materials, independence, authority, reading, direct experiences, and clear goal setting than their counterparts in the FtF section. No significant statistical differences were detected in learning performance between both groups. Implications resulted from the study.

Castro, tumibay (2019) **A literature review: efficacy of online learning courses for higher education institution using meta-analysis.** The Internet has made online learning possible, and many educators and researchers are interested in online learning courses to enhance and improve the student learning outcomes while battling the shortage in resources, facilities and equipment particularly in higher education institution. Based on the analysis, three main themes developed: 1.) comparison of online learning and traditional face-to-face setting, 2.) identification of important factors of online learning delivery, and 3.) factors of institutional adoption of online learning. Identification of different processes and activities in designing and developing an Online Learning Courses for Higher Education Institution will be the second phase of this study for which the researchers will consider using the theoretical aspect of the ADDIE framework.

2.5. RESEARCHES IN ABROAD

Gunawardena, Jayatilleke and Lekamge (1996) studied on '**Learning styles of the open university students of Sri Lanka**'. The objective of this study was to Identify the learning style of adult students in the B.Sc. programme and the PGDE programme using the LSI. Determine if there is a relationship between demographic characteristics (age, gender and employment) and learning styles, and Examine whether these two groups of students (B.Sc. & PGDE) are different in learning styles. Two instruments were administered for this study. One was the revised LSI (Kolb, 1985) and the second was a questionnaire developed together demographic information and information related to the objective of this study. Results showed that the learning style that emerged as the dominant style in the entire population consisting of both B.Sc. & PGDE students was that of Assimilator. This was followed by both the converger and Diverger learning styles.

Gokalp (2013) studied on '**The Effect of Students' Learning Styles to Their Academic Success**'. Researcher evaluated the learning styles of education faculty students and determined the effect of their success and relationship between their learning styles and academic success. Population of the study was comprised of the students of Education Faculty in 19 May University, Samsun, Turkey and the sample included 140 students. Out of which 68 was Art and 72 pre-school teacher department students. Depending on the results obtained from pre-test, it was aimed to improve students' knowledge and skills in studying. The validity and re- liability of the test were determined by considering the Cronbach alpha coefficients for each and all of the items. The study found statistically significant differences between the results of the first and final applications of the sub- tests on learning styles and academic

success; those subtests covered the items of learning, planned study, effective reading, listening, writing, note taking, using the library, getting pre- pared for and taking exams, class participation and motivation.

Hina, Ajmal & Rahman (2010) studied on '**Relationship between Multiple Intelligence Categories and learning styles of students**'. The main objective of the study was to investigate the relationship between multiple intelligence categories and learning styles of secondary school students. The study was conducted in 6 girls secondary schools of Islamabad 354 students of grade X participated in the study. Two instruments namely modified version of multiple intelligence assessment, scale (Adam, 2004) and Modified Version VAK learning styles scale (Pride Company, 2002) was used to called data. Survey method was used to explore the inter relationship. The finding of the study showed that different learners have different type of intelligence like multiple intelligence. As for as relationshipbetween multiple intelligence and learning styles was concerned, the findings of the study showed that visual learning style did not found any relationship with multiple intelligence.

Ren (2013) studied on '**which Learning Style Is Most Effective in Learning Chinese as a Second Language**'. Findings of the study revealed that that visual learners are the great majority (57%) among the secondary school CSL girls under investigation; The girls with auditory learning style have performed better orally; whereas the girls with kinesthetic learning style have performed better in writing. The girls with visual learning style have never been ranked on top of the list neither in oral nor in written examinations.

Ismail (1982) examined "**The relationship between achievement motivation and learning style**" as measured by Mehrabian and Bank's measures of achieving tendency and Kolb's learning style inventory respectively. The study was conducted on Malasian students attending Illinois university. The results disclosed that correlation's between achievement motivation and each of the learning style sub scales ranged from 35 to 44. It was concluded that motive to avoid failure was related to concrete learning. The motive to achieve success was related to abstract learning. Achievement motivation was found to be independent of the dominant learning style preferences Academic major group and level of schooling were significant factors in correlating achievement motivation with learning style.

Lindsey (1987) administered the Kolb Learning Style Inventory (KLSI) to 320 North Carolina Community College, technical college and technical institute students to determine whether significant difference existed between the learning style of high school graduates and dropouts.

Four types were identified: concrete experience, reflective observation, abstract conceptualization and active experimentation. But no significant differences were revealed along the students who scored highly on concrete experience, reflective observation, abstract conceptualization and active experimentation. However, all subject samples preferred to perceive information concretely and process it reflectively. This study clearly reflects that no specific learning style determines whether or not the students will continue their education up to higher level.

Mohamad, Nasir (2006) administered “**the Learning Style among Multi-Ethnic Students in Four Selected Tertiary Institutions in the Klang Valley**” This study examined the learning styles of multi-ethnic students’ in four selected universities in Klang Valley in terms of gender, program of studies and academic achievement levels. Using a modified Honey and Mumford learning Style Questionnaire, 291 valid responses from two public and private universities were subjected to further quantitative analyses of the study. The result of the descriptive analyses revealed that the multi-ethnic students exhibited all the four learning styles that were Activist, Reflector, Theorist and Pragmatist style. Reflector style was found to be the most preferred learning style by the multi-ethnic students while the Activist style was the least preferred. The male and female students demonstrated different patterns of learning styles even though the Reflector style was the most preferred style of both genders. The arts and science students seemed to exhibit similar patterns of learning styles except for the Malay students.

[Edwin Keith Lindsay](#),(1999) **An analysis of matches of teaching styles, learning styles and the uses of educational technology**. Analysis of variance was used to answer the first two research questions asking what differences, if any, in student satisfaction and student achievement exist when there is a match or mismatch between learning and teaching style in academic settings with varied uses of educational technology. Also investigated in this study was if a match or mismatch in teaching and learning style affected a change in learning style over time in academic settings with varied uses of educational technology. The study findings indicated that a match between learning style and teaching style reveals increases in student achievement and satisfaction under both technology conditions. Study findings indicated no support for teaming styles changing over a period of time when teaching and learning styles are mismatched.

Ahmad Marzuki Hajizainuddin(1999) **“A study of learning styles and hypermedia's organizational structures in a Web-based instructional program designed for trainee teachers at the International Islamic University Malaysia”**

The purpose of this study was to determine teaching and learning styles in the Exploring Leisure Alternatives course at North Carolina State University and analyze the effects of the use of emerging educational technology with student achievement and satisfaction. The dependent variables in this study were student achievement and student satisfaction. The independent variables were teaching style, learning style and the type of educational technology used. The instruments in this study were Kolb's Learning Style 1985 to determine teaching/learning style, the College of Forest Resources Teaching Evaluation to measure student satisfaction and a student questionnaire to collect demographic information. Pre-tests and post-tests midterm and final exams were administered to measure achievement.

Naser-nick (2006) **“The Influence of Learning Styles on Learners in E-Learning Environments”**:

The purpose of this study was to compare the effects of e-learning versus those of traditional instructor-based learning, on student learning, based on student learning styles. Another goal was to determine if e-learning is more effective for those with a particular learning style. The Kolb Learning Style Inventory (LSI) measured the learning styles of students. This post-test, intact-group design examined the dependent variable of student knowledge based on the learning style of each subject and the learning method to which each was exposed. The results revealed that for the instructor-based learning class (traditional), the learning style was irrelevant, but for the web-based learning class (e-learning), the learning style was significantly important. The results indicated that students with the Assimilator learning style (these learn best through lecture, papers and analogies) and the Converger learning style (these learn best through laboratories, field work and observations) achieved a better result with the e-learning (web-based) method.

Luqiman & khalid (2018) **“The relationship between Personality Traits, Learning Styles and Academic Performance of E-Learners”**.

The rapid growth of e-learning has greatly influenced the educational system across the globe. Personality traits and learning styles are both likely to play considerable roles in influencing academic achievement of e-learners. Based on this foundation, a study was designed that attempts to establish the missing links between personality traits, learning styles, and academic performance of students enrolled in various e-learning courses. University students (N=144) completed the Big Five Inventory (BFI), Index of Learning Style (ILS) and reported their grade point average (GPA). One of the Big Five traits i.e. extraversion was positively related with all four learning styles whereas neuroticism was negatively related with all four learning styles. It has also been revealed

that GPA was positively correlated with three personality traits and was negatively correlated with neuroticism. Similarly GPA was positively correlated with three learning styles. Finally, there were no significant differences in learning styles and personality traits of e-learners in terms of gender. Implications of these results are expected to help academics, managers, and policy makers for implementation of future e-learning strategies in Pakistan.

2.6. Conclusion

The above review of related literature enabled the investigator to know the already done researches in the field of social media. Through this, the investigator found out that the studies were done on school children, college students, and university students but not with the prospective professional students like teachers, Physical educators and Nurses, who are going to shape the minds of the thousands and thousands of children shortly and look after their physical as well as mental health respectively. This vacuum can be filled by this new study to be undertaken by the investigator. Hence this investigation was attempted by the investigator.

CHAPTER III

METHODOLOGY

3.1 Introduction

"Research methodology is a careful critical inquiry or examination in seeking facts or principles, diligent investigation to ascertain something."

Webster's International Dictionary (2012).

Educational research refers to a systematic attempt to gain a better understanding of the educational process, generally with a view to improving its efficiency (Pathak, 2011). Traverse (1968) defines "Educational research is that activity which is directed towards the development of the science of behavior in an educational situation". The successful outcome of research depends upon its methodology adopted. The selection of methods for research work depends upon the tools and techniques that the researcher uses. There are several methods available for the research workers for the data collection. The methodology adopted for this research is described in the following pages.

3.2 Method Adopted for the Study

In behavioral science, general survey method is adopted more frequently, compared to the experimental approach. Fraenkel and Wallen (2003) describe the survey as follows: "Survey is an attempt to obtain data from members of a population to define the current status of that population concerning one or more variables". The survey method is an important method that has significantly developed since the middle of this century and is valuable for many purposes. The survey covers the grounds to be explored, providing detailed information regarding some current state of affairs describing the salient features concerning what has been examined in the course of the study. The survey method is essential for the collection of facts and information relevant to the problem investigated. In educational research, the aim and purpose of the educational survey is to bring to light many events which will point out the need for refinement and improvement in the educational system. It involves measurement, classification, interpretation, comparison, evaluation, and generalization, all directed towards a proper understanding and solution of the problem. The survey method contributes to the advancement of knowledge because it affords penetrating inside into the nature of what one is dealing with. It suggests the course for future development.

3.2.1 SURVEY METHOD

The survey is a method for collecting information or data as reported by individuals. It is a research method that collects data from respondents through a series of questions by interview or questionnaire. It involves a clearly defined problem and definite objectives.

As the present study deals with learning styles of Teacher Trainees Learning through online learning, the investigator adopted the Survey method which has been found suitable to collect the essential and relevant data.

3.3 Sample and Sampling Technique.

•Sample

Best and Kahn (2003) stated, "A sample is a small proportion of a population selected for observation and analysis. By observing the characteristics of the sample, one can make certain inferences about the characteristics of the population from which it is drawn. Contrary to some popular opinion, samples are not selected haphazardly; they are chosen in a systematic way so that chance or the operation of probability can be utilized."

In the present study, the population is the student teachers of professional institution in Coimbatore.

3.2 METHODS ADOPTED IN THE PRESENT STUDY

In the present study survey method was used. Survey refers to gather information by individual samples so as to learn about the whole thing. The survey is a non-experimental, descriptive research method. Surveys can be useful when a researcher wants to collect data on phenomena that cannot be directly observed. Data are usually collected through the use of rating scale, although sometimes researchers directly interview subjects. There are two basic types of surveys: cross-sectional surveys and longitudinal surveys. The investigator adopted the survey method to study "learning style of teacher trainees learning through online mode".

3.4 VARIABLES USED IN THE STUDY

A variable is a characteristic of a person, object or phenomenon that can take on different values. Variables are the conditions or characteristics that the experimenter manipulates, controls or observes.

Variables used for the study are as follows:

- i. Age of teacher trainees.
- ii. Qualification of teacher trainees.
- iii. Programme of teacher trainees.

iv. Locality of teacher trainees.

v. Parent's income of teacher trainees.

3.5 TOOLS USED IN THE STUDY

The selection of suitable tool is of vital importance for successful research. Tools employ distinctive ways of describing and quantifying data for testing of hypothesis for the required data as to get objective information. The choice of a tool depends on a variety of factors such as nature of the topics undertaken, the nature of the subject involved, the time at the disposal of the investigator and so on.

The following tools prepared by the investigator were used in the study.

1. Personal data sheet. prepared by the investigator
2. David Kolb's Learning style questionnaire.

An online tool- Google forms supported the technological aspect for the study. For statistical analysis of the data, Microsoft Excel and SPSS software are used.

3.5.1 PERSONAL DATA SHEET

The personal data sheet includes basic information about the sample and their family. The basic information section primarily gathers information such as Name, Age, Qualification, name of the program, subject specialization, year locality and income of parents for the study.

3.5.2 LEARNING STYLE QUESTIONNAIRE

David Kolb's learning style questionnaire is used for the study. 12 standardized questions based on four stages like concrete, reflective, abstract and active.

3.7 LOCALE OF THE STUDY

The investigator selected sample from the present students of Department of Education of Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore.

3.8 SCORING AND TABULATION:

All the responses are scored systematically using scoring keys.

S.NO	ITEMS	SCORE
1.	Least like you	1
2.	Less like you	2
3.	More like you	3
4.	Most like you	4

3.8.1 STATISTICAL TECHNIQUE USED FOR THE STUDY

The collected data were consolidated, tabulated and analyzed statistically by using the following tests:

- i. Test of significance (t-test)
- ii. Mean, standard deviation and percentage

3.8.2 TEST OF SIGNIFICANCE (t-TEST)

't' test is based on the distribution and is considered an appropriate test for judging the significance of the difference between the means of two samples in case of small when population variance is not known". (Best & Kahn, 2006)

This test is used to find the significant level of difference between two groups of sample. The t-values are calculated with the help of the mean scores and standard deviation. If the obtained 't-value' is 2.58 and above, then the significant level of difference is 0.01 and if the value lies between 1.96 and 2.58, the significant level is 0.05 and if the value is below 1.96, the difference is not significant.

The Mean, Standard Deviation and Percentage Analysis are done to make simple comparisons wherever necessary.

3.9 CONCLUSION

In this chapter, the methodology of the present investigation was explained. A clear cut view about the method selected, administration of the tool and evaluation of the tool were discussed. Thus, the data obtained was consolidated, analyzed, interpreted and is presented in Chapter IV.

CHAPTER-IV

ANALYSIS AND INTERPRETATION OF DATA

INTRODUCTION

After collecting and analyzing the data, the researcher has to accomplish the task of drawing inferences followed by report writing. This has to be done very carefully. Otherwise, misleading conclusion may be drawn and the whole purpose of doing research may get visited. It is only through interpretation and analysis that the researcher can expose the processes that underlines his findings. “interpretation means an adequate exposition of the true meaning of the material presented in terms of the purpose of the study reported and of the chapter and selection of topic involved” (Whitney, 2005).

In the present study, data were collected from 280 Teacher Trainees of Avinashilingam Institute, Coimbatore to analyze the learning style of Teacher Trainees learning through online mode. The information gathered from the sample through the rating scale and questionnaire are quantified and interpreted here.

The process by which sense and meaning are made of the data gathered in qualitative research, and by which the emergent knowledge is applied to clients' problems. This data often takes the form of records of group discussions and interviews, but is not limited to this. Through processes of revisiting and immersion in the data, and through complex activities of structuring, re-framing or otherwise exploring it, the researcher looks for patterns and insights relevant to the key research issues and uses these to address the client's brief.

4.1 ANALYSIS AND INTERPRETATION OF DATA

4.1.1 FREQUENCY ANALYSIS

TABLE 4.1

AGE GROUP OF THE RESPONDENTS

Age Group	Frequency	Percentage
20 - 25yrs	238	85.0
Above 25 yrs	42	15.0
Total	280	100.0

Source: Primary Data

INTERPRETATION:

The above table 4.1 depicts that 85% of the respondents belongs to '20 to 25 years' of age group whereas 15% of the respondents belongs to 'Above 25 years' of age group.

CHART 4.1
AGE GROUP OF THE RESPONDENTS

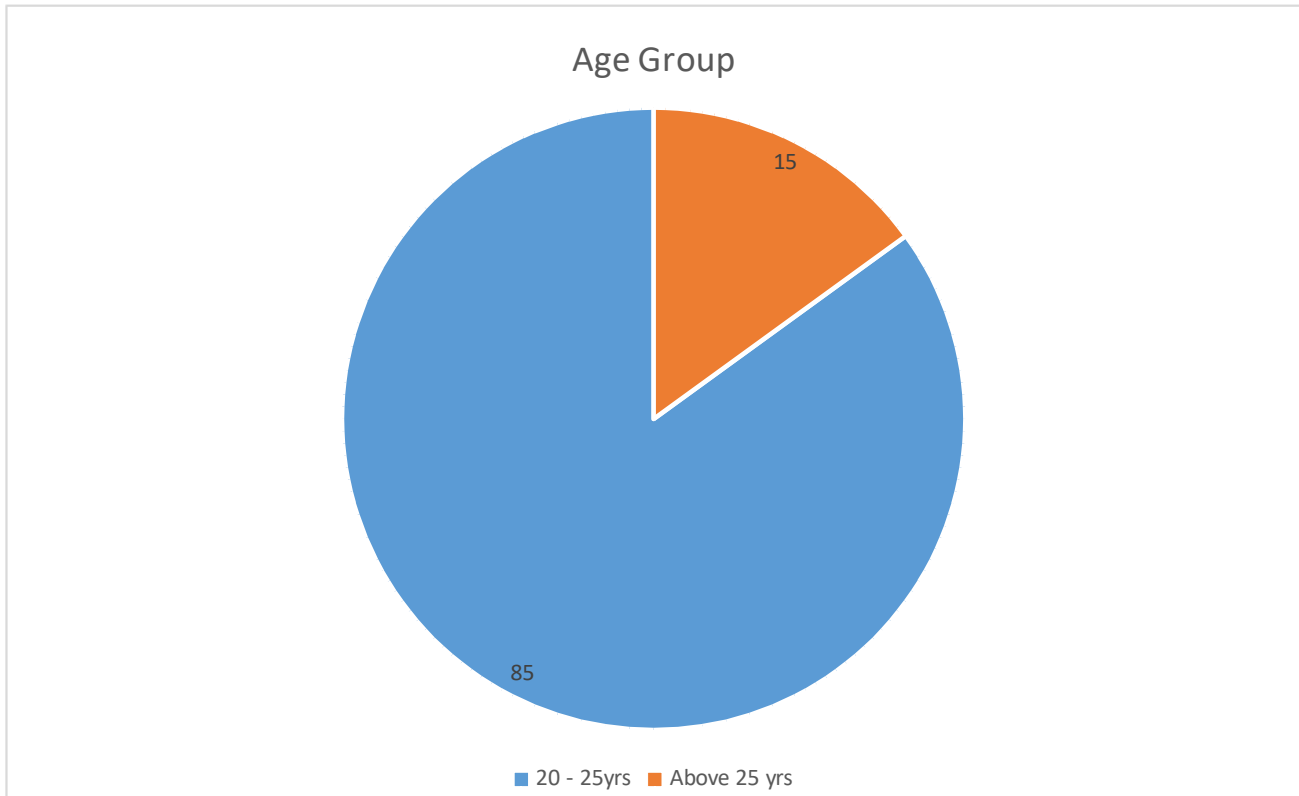


TABLE 4.2
EDUCATIONAL QUALIFICATION OF THE RESPONDENTS

Educational Qualification	Frequency	Percentage
UG	201	71.8
PG	79	28.2
Total	280	100.0

Source: Primary Data

INTERPRETATION:

The above table 4.2 depicts that 71.8% of the respondents belongs to 'UG' whereas 28.2% of the respondents belongs to 'PG'.

CHART 4.2
EDUCATIONAL QUALIFICATION OF THE RESPONDENTS

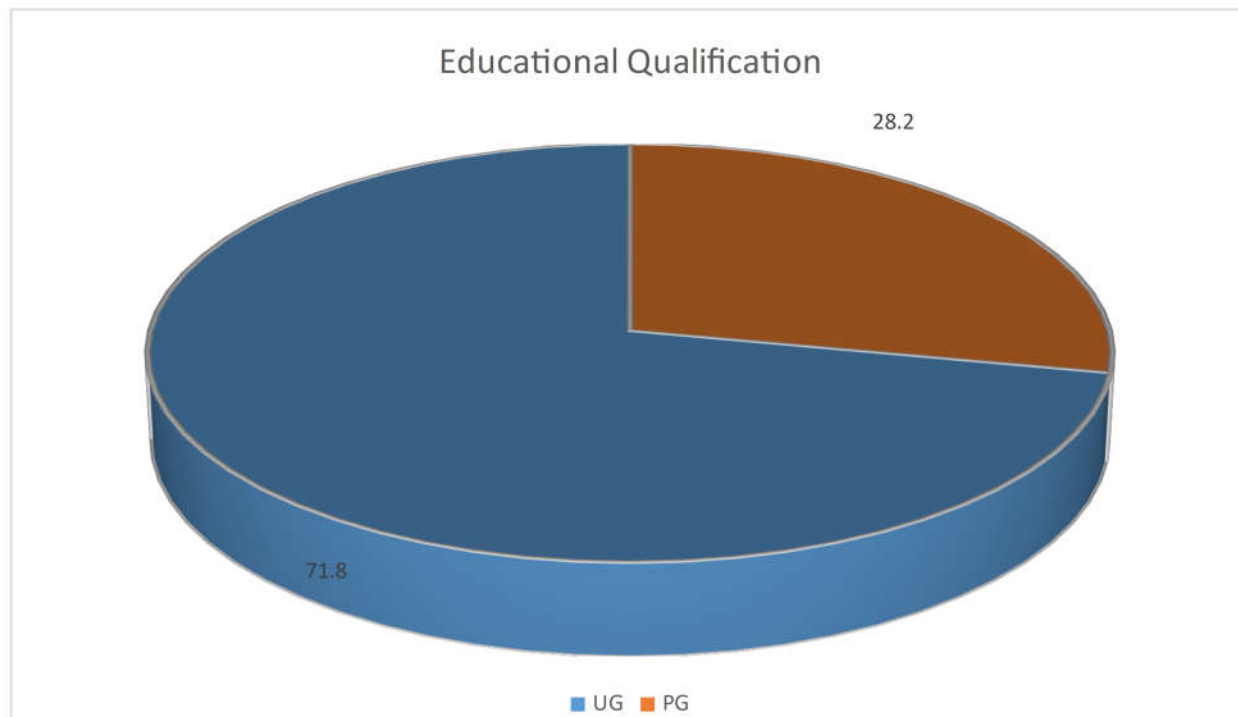


TABLE 4.3
PROGRAMME

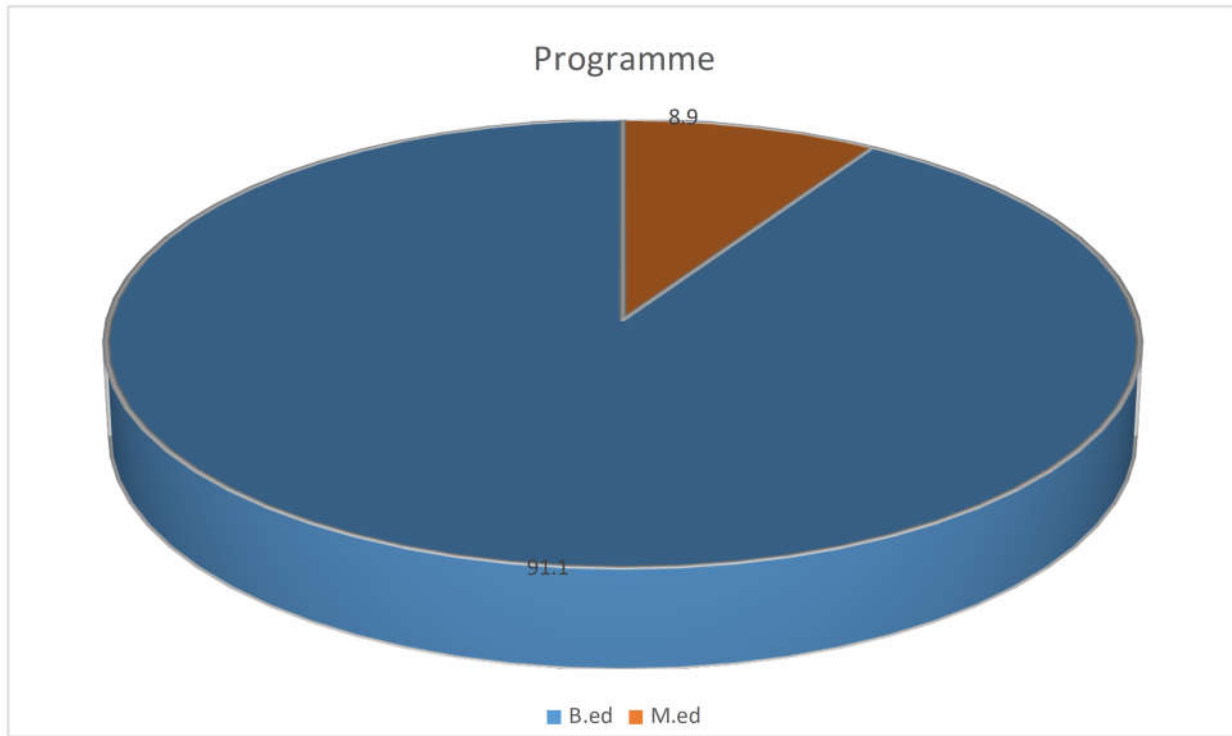
Programme	Frequency	Percent
B.Ed	255	91.1
M.Ed	25	8.9
Total	280	100.0

Source: Primary Data

INTERPRETATION:

The above table 4.3 depicts that 91.1% of the respondents belongs to ‘B.Ed’ whereas 8.9% of the respondents belongs to ‘M.Ed’.

**CHART 4.3
PROGRAMME**



**TABLE 4.4
SUBJECTS OF STUDY**

Subjects of study	Frequency	Percentage
Group 1 - Maths, Physical science , Bio science, Home Science	112	40.0
Group 2 - History , Economics, English	45	16.1
Group 3 - Special Education	123	43.9
Total	280	100.0

Source: Primary Data

INTERPRETATION:

The above table 4.4 depicts that 40% of the respondents belongs to ‘Group 1 -, Maths, Physical science , Bio science, Home Science’ whereas 16.1% of the respondents belongs to ‘Group 2 - History , Economics, English’ and the remaining 43.9% of the respondents belongs to ‘Group 3 - Special Education’.

CHART 4.4
SUBJECTS OF STUDY

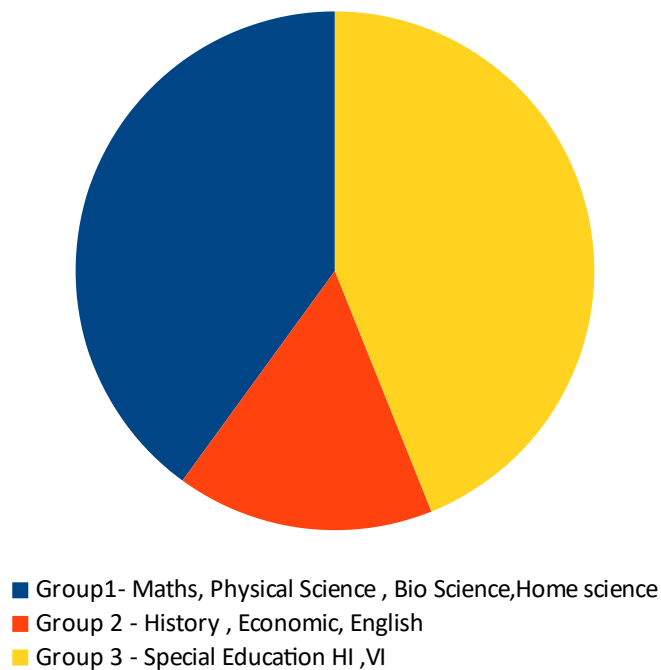


TABLE 4.5

LOCALITY

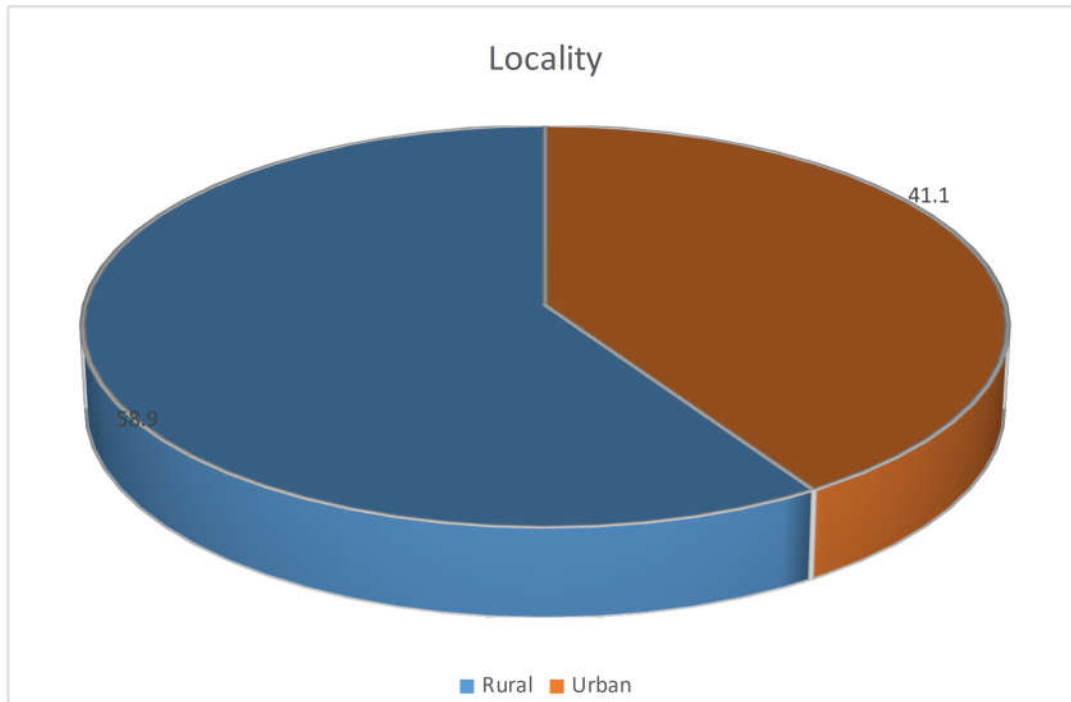
Locality	Frequency	Percent
Rural	165	58.9
Urban	115	41.1
Total	280	100.0

Source: Primary Data

INTERPRETATION:

The above table 4.5 depicts that 58.9% of the respondents are from ‘Rural locality’ and the remaining 41.1% of the respondents are from ‘Urban locality’.

**CHART 4.5
LOCALITY**



**TABLE 4.6
YEARLY INCOME**

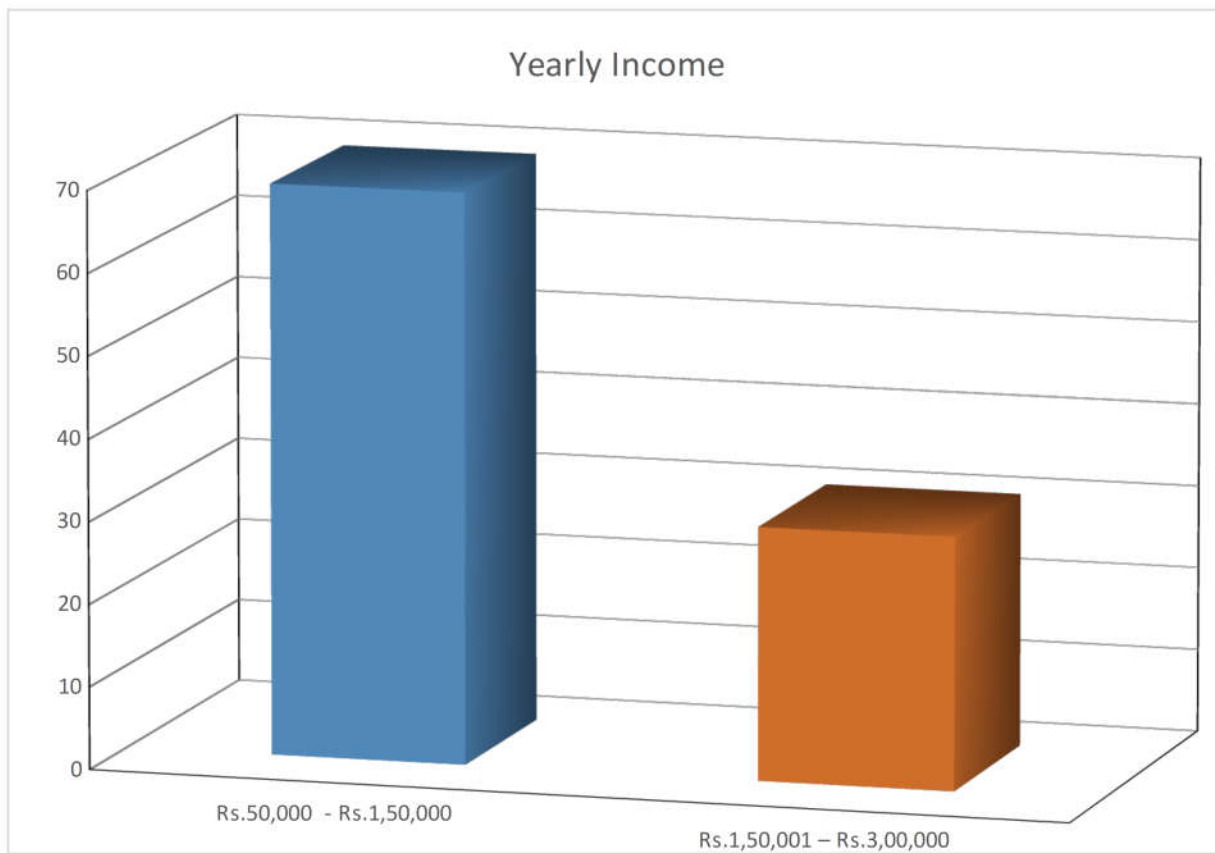
Yearly Income	Frequency	Percent
Rs.50,000 - Rs.1,50,000	194	69.3
Rs.1,50,001 – Rs.3,00,000	86	30.7
Total	280	100.0

Source: Primary Data

INTERPRETATION:

The above table 4.6 depicts that 69.3% of the respondents' yearly income is between 'Rs.50000 to Rs.150000' and 30.7% of the respondents' yearly income is between 'Rs.1,50,001 – Rs.3,00,000'.

CHART 4.6
PARENTAL INCOME



4.2 TESTING THE HYPOTHESES

HYPOTHESIS: 1

There is no significant difference between learning styles of teacher trainees based on their age.

Table 4.7-‘t’ values between learning style of teacher trainees based on their age.

	Age Group	Number	Mean	S.D	df	t value	p-value	Remarks
Combined Four Stages of Learning Styles	20 to 25 years	238	122.37	13.81	237	-1.82	0.03	Significant
	Above 25 years	42	126.50	11.54	41			
Concrete Experience (CE) stage	20 to 25 years	238	30.04	5.20	237	2.07	0.019	Significant
	Above 25 years	42	31.83	4.98	41			
Reflective Observation - (RO) stage	20 to 25 years	238	31.14	4.77	237	-1.29	0.09	Not Significant
	Above 25 years	42	32.17	4.54	41			
Abstract Conceptualization - (AC) Stage	20 to 25 years	238	30.59	4.54	237	-0.52	0.30	Not Significant
	Above 25 years	42	30.98	3.49	41			
Active Experimentation - (AE) Stage	20 to 25 years	238	30.60	4.56	237	-1.239	0.108	Not Significant
	Above 25 years	42	31.52	3.89	41			

(at 0.05 significant level the table value of ‘t’ is 1.96)

INFERENCE:

From the table 4.8, the mean value of '20 to 25 years' for the combined four stages of learning styles is 122.37 and the mean value of 'Above 25 years' for the combined four stage of learning styles is 126.50.

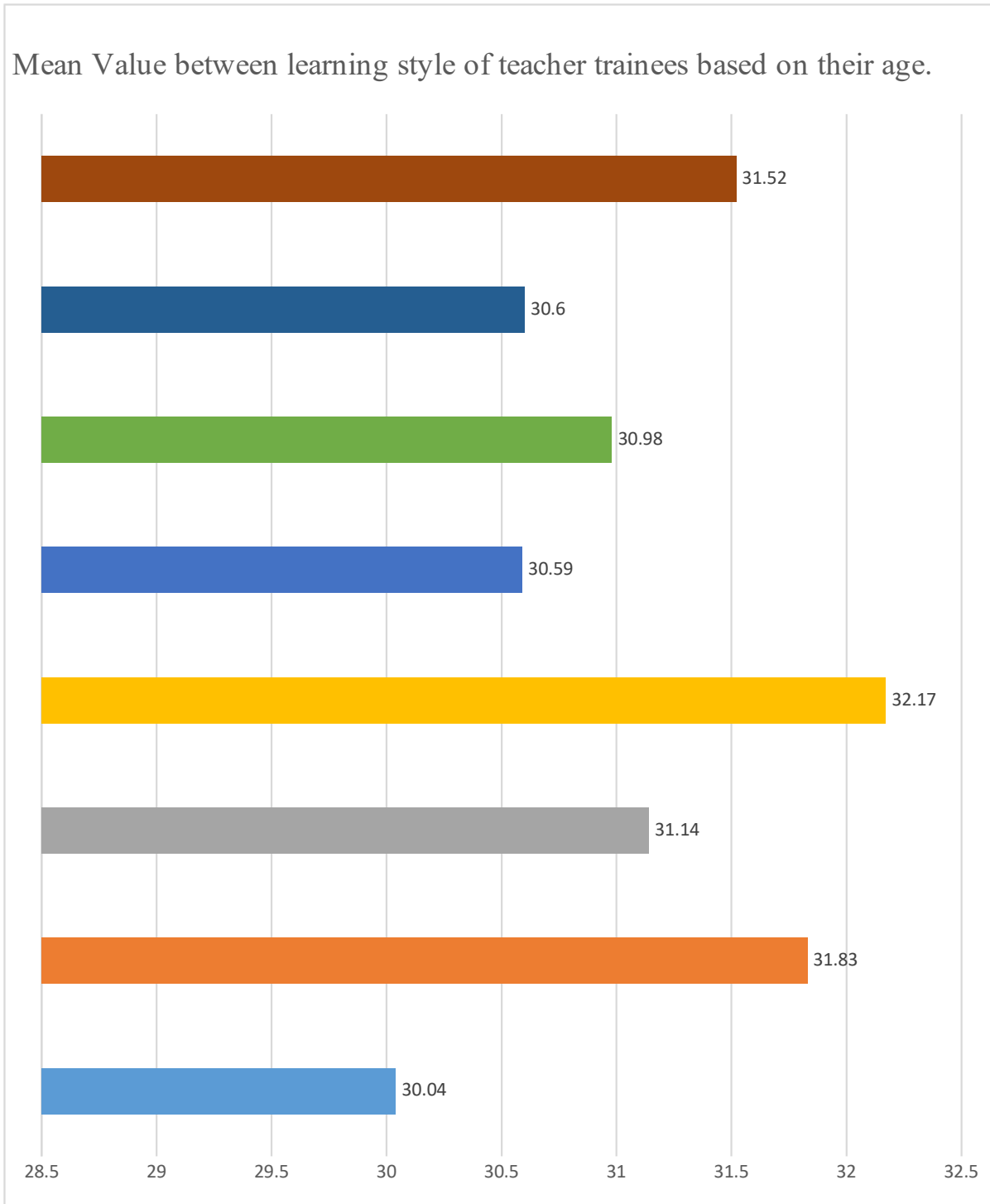
In the age group '20 to 25 years', the mean value of Reflective Observation (RO) learning style is 31.14 which is higher and stood at first followed by mean values of Active Experimentation - (AE) Stage (30.60) stood at second, Abstract Conceptualization - (AC) Stage (30.59) stood at third and at last Concrete Experience (CE) stage (30.04) stood at fourth.

In the age group 'Above 25 years', the mean value of Reflective Observation (RO) learning style is 32.17 which is higher and stood at first followed by mean values of Concrete Experience (CE) stage (31.83) stood at second, Active Experimentation - (AE) Stage (31.52) stood at third and at last Abstract Conceptualization - (AC) Stage (30.98) stood at fourth.

The calculated p-value for Combined Four Stages of learning styles is 0.03 and Concrete Experience (CE) Stage is 0.019 which is less than 0.05 significant level. The result implies that there is a significant difference between learning style of Teacher Trainees based on their age. And also there is a significant difference between concrete experience (CE) stage of Teacher Trainees based on their age.

Similarly the calculated p-value for Reflective Observation - (RO) stage is 0.09, Abstract Conceptualization - (AC) Stage is 0.30 and Active Experimentation - (AE) Stage is 0.108 which is greater than 0.05 significant level. The result implies that there is no significant difference between Reflective Observation - (RO) stage, Abstract Conceptualization - (AC) Stage and Active Experimentation - (AE) Stage of Teacher trainees based on their age.

Chart 4.7: Mean Value between learning style of Teacher Trainees based on their age.



HYPOTHESIS: 2

There is no significant difference between learning styles of teacher trainees based on their qualification.

Table 4.8-'t' values between learning style of teacher trainees based on their qualification.

	Qualification	Number	Mean	S.D	df	t value	p-value	Remarks
Combined Four Stages of Learning Styles	UG	201	123.22	14.03	200	0.45	0.325	Not Significant
	PG	79	122.41	12.34	78			
Concrete Experience (CE) stage	UG	201	30.41	5.15	200	0.52	0.30	Not Significant
	PG	79	30.05	5.35	78			
Reflective Observation - (RO) stage	UG	201	31.47	4.83	200	0.96	0.16	Not Significant
	PG	79	30.86	4.60	78			
Abstract Conceptualization - (AC) Stage	UG	201	30.62	4.49	200	-0.20	0.42	Not Significant
	PG	79	30.73	4.17	78			
Active Experimentation - (AE) Stage	UG	201	30.73	4.53	200	-0.05	0.47	Not Significant
	PG	79	30.76	4.34	78			

(at 0.05 significant level the table value of 't' is 1.96)

INFERENCE:

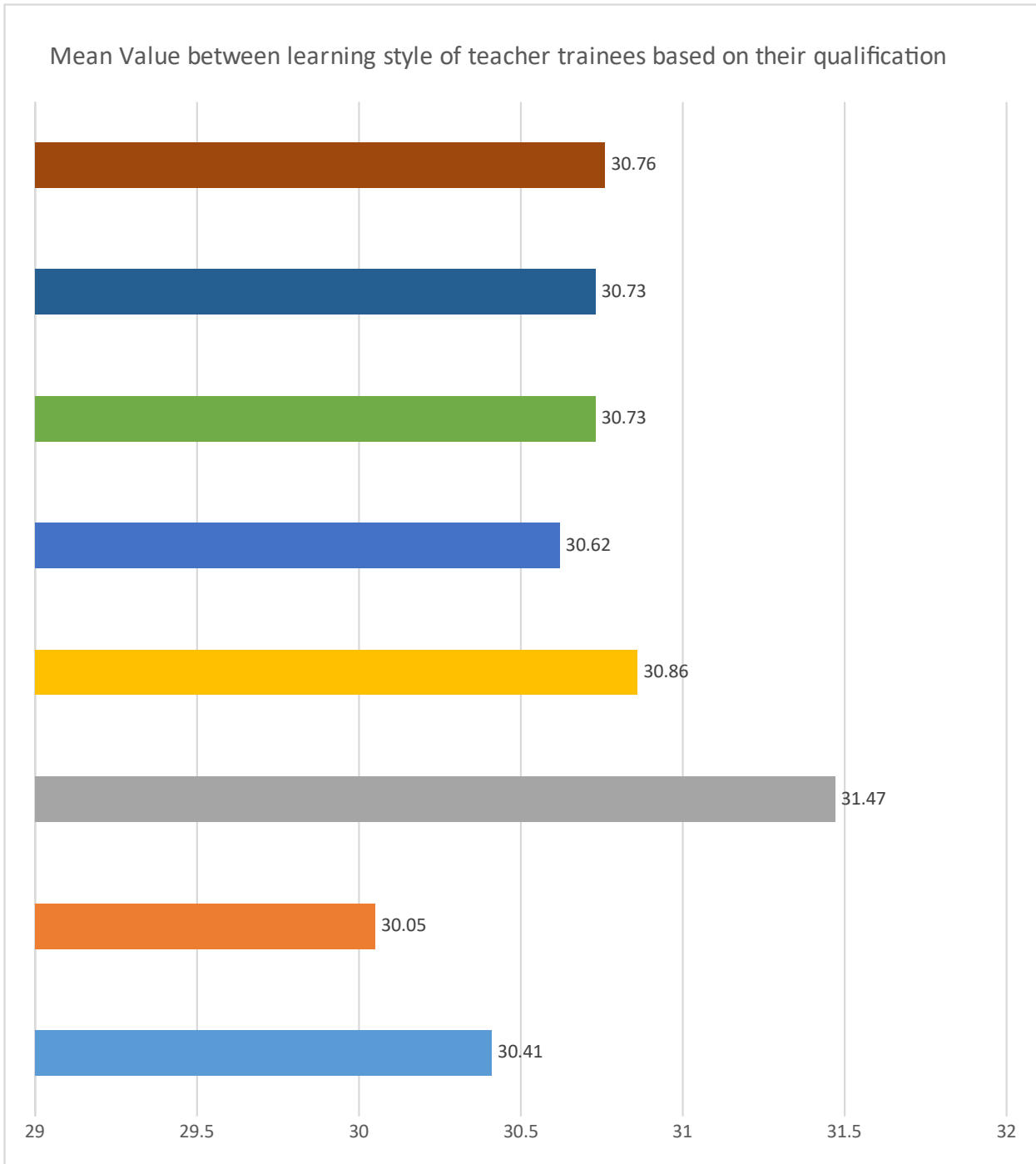
From the table 4.8, the mean value of 'UG' for the combined four stages of learning styles is 123.22 and the mean value of 'PG' for the combined four stage of learning styles is 122.41.

In the Qualification 'UG', the mean value of Reflective Observation (RO) learning style is 31.47 which is higher and stood at first followed by mean values of Active Experimentation - (AE) Stage (30.73) stood at second, Abstract Conceptualization - (AC) Stage (30.62) stood at third and at last Concrete Experience (CE) stage (30.41) stood at fourth.

In the Qualification 'PG', the mean value of Reflective Observation (RO) learning style is 30.86 which is higher and stood at first followed by mean values of Active Experimentation - (AE) Stage (30.76) stood at second, Abstract Conceptualization - (AC) Stage (30.73) stood at third and at last Concrete Experience (CE) stage (30.05) stood at fourth.

The calculated p-value for Combined Four Stages of Learning Styles is 0.325, Concrete Experience (CE) stage is 0.30, Reflective Observation - (RO) stage is 0.16, Abstract Conceptualization - (AC) Stage is 0.42 and Active Experimentation - (AE) Stage is 0.47 which is greater than 0.05 significant level. The result implies that there is no significant difference between Combined Four Stages of Learning Styles, Concrete Experience (CE) stage, Reflective Observation - (RO) stage, Abstract Conceptualization - (AC) Stage and Active Experimentation - (AE) Stage of teacher trainees based on their qualification.

Chart 4.8: Mean Value between learning styles of teacher trainees based on their qualification.



HYPOTHESIS: 3

There is no significant difference between learning styles of teacher trainees based on their programme.

Table 4.9-‘t’ values between learning style of teacher trainees based on their programme.

	Program me	Numb er	Mea n	S.D	df	t value	p- value	Remarks
Combined Four Stages of Learning Styles	B.Ed	255	121.9 1	12.9 0	254	-4.39	<0.001	Significant
	M.Ed	25	134.0 0	15.3 6	24			
Concrete Experience (CE) stage	B.Ed	255	30.05	5.11	254	-2.65	0.004	Significant
	M.Ed	25	32.92	5.42	24			
Reflective Observation - (RO) stage	B.Ed	255	30.89	4.39	254	-4.74	<0.001	Significant
	M.Ed	25	35.44	6.17	24			
Abstract Conceptualization - (AC) Stage	B.Ed	255	30.57	4.47	254	-0.94	0.17	Not Significant
	M.Ed	25	31.44	3.55	24			
Active Experimentation - (AE) Stage	B.Ed	255	30.40	4.35	254	-4.17	<0.001	Significant
	M.Ed	25	34.20	4.27	24			

(at 0.05 significant level the table value of ‘t’ is 1.96)

INFERENCE:

From the table 4.9, the mean value of 'B.Ed' for the combined four stages of learning styles is 121.91 and the mean value of 'M.Ed' for the combined four stages of learning styles is 134.00.

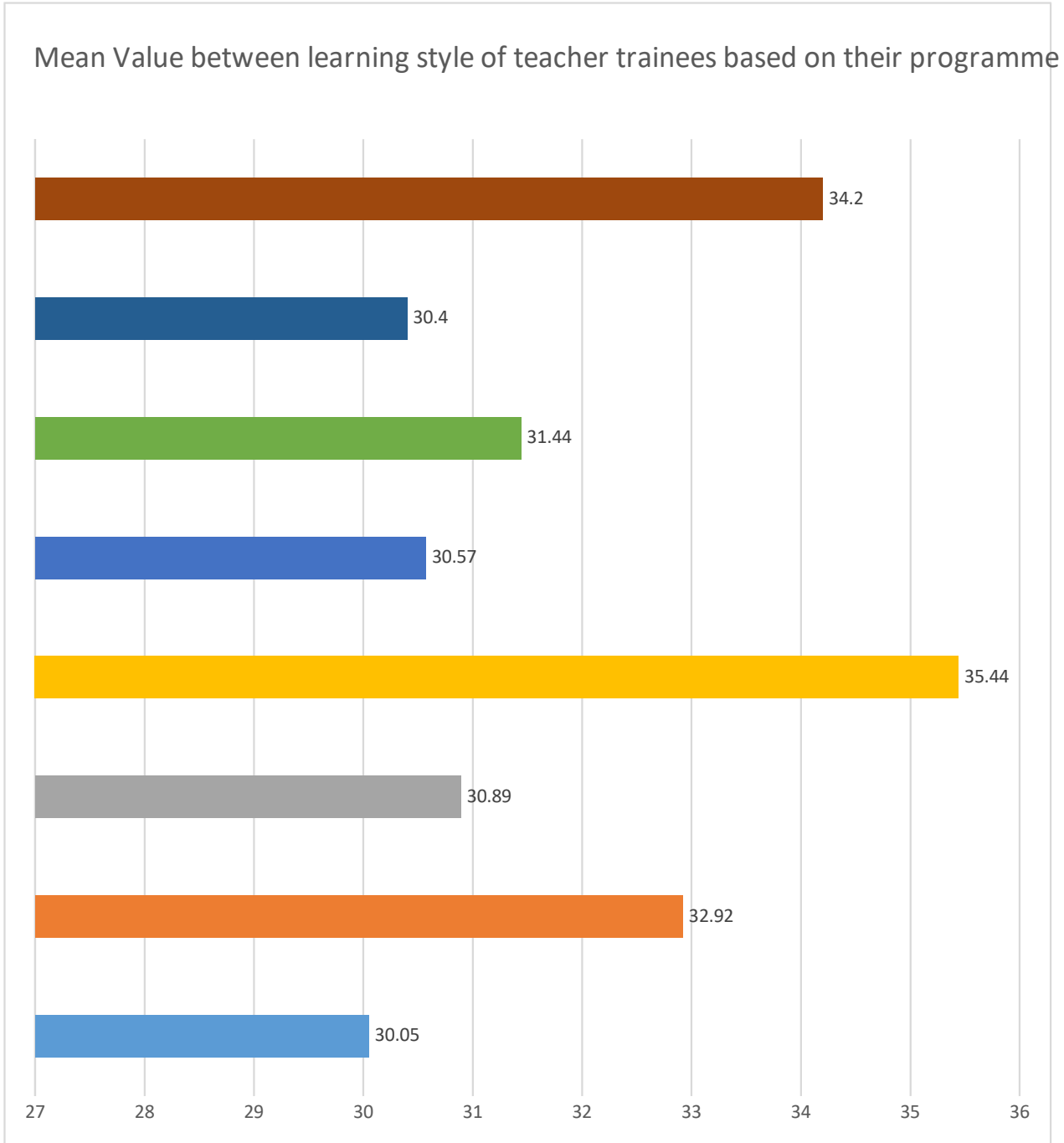
In the B.Ed Program, the mean value of Reflective Observation (RO) learning style is 30.89 which is higher and stood at first followed by mean values of Abstract Conceptualization - (AC) Stage (30.57) stood at second, Active Experimentation - (AE) Stage (30.40) stood at third and at last Concrete Experience (CE) stage (30.05) stood at fourth.

In the M.Ed Program, the mean value of Reflective Observation (RO) learning style is 35.44 which is higher and stood at first followed by mean values of Active Experimentation - (AE) Stage (34.20) stood at second, Concrete Experience (CE) stage (32.92) stood at third and at last Abstract Conceptualization - (AC) Stage (31.44) stood at fourth.

The calculated p-value for Combined Four Stages of Learning Styles is <0.001 , Concrete Experience (CE) stage is 0.004, Reflective Observation - (RO) stage is <0.001 , and Active Experimentation - (AE) Stage is <0.001 which is less than 0.05 significant level. The result implies that there is a significant difference between Combined Four Stages of Learning Styles, Concrete Experience (CE) stage, Reflective Observation - (RO) stage, and Active Experimentation - (AE) Stage of teacher trainees based on their program.

Similarly the calculated p-value for Abstract Conceptualization - (AC) Stage is 0.017 which is greater than 0.05 significant level. The result implies that there is no significant difference between Abstract Conceptualization - (AC) Stage of teacher trainees based on their programme.

Chart 4.9: Mean Value between learning style of Teacher Trainees based on their programme



HYPOTHESIS: 4

There is no significant difference between learning styles of teacher trainees based on their subject.

Table 4.10 Mean Score difference between learning style of teacher trainees based on their subject

	Subject	Mean	N	Std. Deviation
Combined Four stages of Learning	Group1- Maths, Physical Science , Bio Science, home science	111.22	112	9.38
	Group 2 - History , Economic, English	124.31	45	7.82
	Group 3 - Special Education HI ,VI	136.96	123	8.34
Concrete Experience (CE) stage	Group1- Maths, Physical Science , Bio Science, home science	26.33	112	3.85
	Group 2 - History , Economic, English,	32.82	45	4.68
	Group 3 - Special Education HI ,VI	36.75	123	3.72
Reflective Observation (RO) stage	Group1- Maths, Physical Science , Bio Science, - home science	28.50	112	4.36
	Group 2 - History , Economic, English,	32.36	45	3.13
	Group 3 - Special Education HI ,VI	37.19	123	3.84
Abstract Conceptualization - (AC) Stage	Group1- Maths, Physical Science , Bio Science, home science	27.78	112	4.11
	Group 2 - History , Economic, English	33.00	45	3.63
	Group 3 - Special Education HI ,VI	36.14	123	3.19
Active Experimentation - (AE) Stage	Group1- Maths, Physical Science , Bio Science, home science	28.62	112	4.32
	Group 2 - History , Economic, English	32.13	45	3.51
	Group 3 - Special Education HI ,VI	35.89	123	3.93

From the table 4.10, the mean value of Group1 is 111.22 whereas the mean value of Group 2 is 124.31 and the mean value of Group 3 is 136.96. The result inferred that the subject which belongs to ‘Group3’ are having high mean value compare to others.

In the Group 1, the mean value of Active Experimentation - (AE) Stage is high compared to other learning style of teacher trainees. In the Group 2 , the mean value of Abstract Conceptualization - (AC) Stage is high compared to other learning style of teacher trainees. In the Group 3, the mean value of Reflective Observation - (RO) stage is high compared to other learning style of teacher trainees.

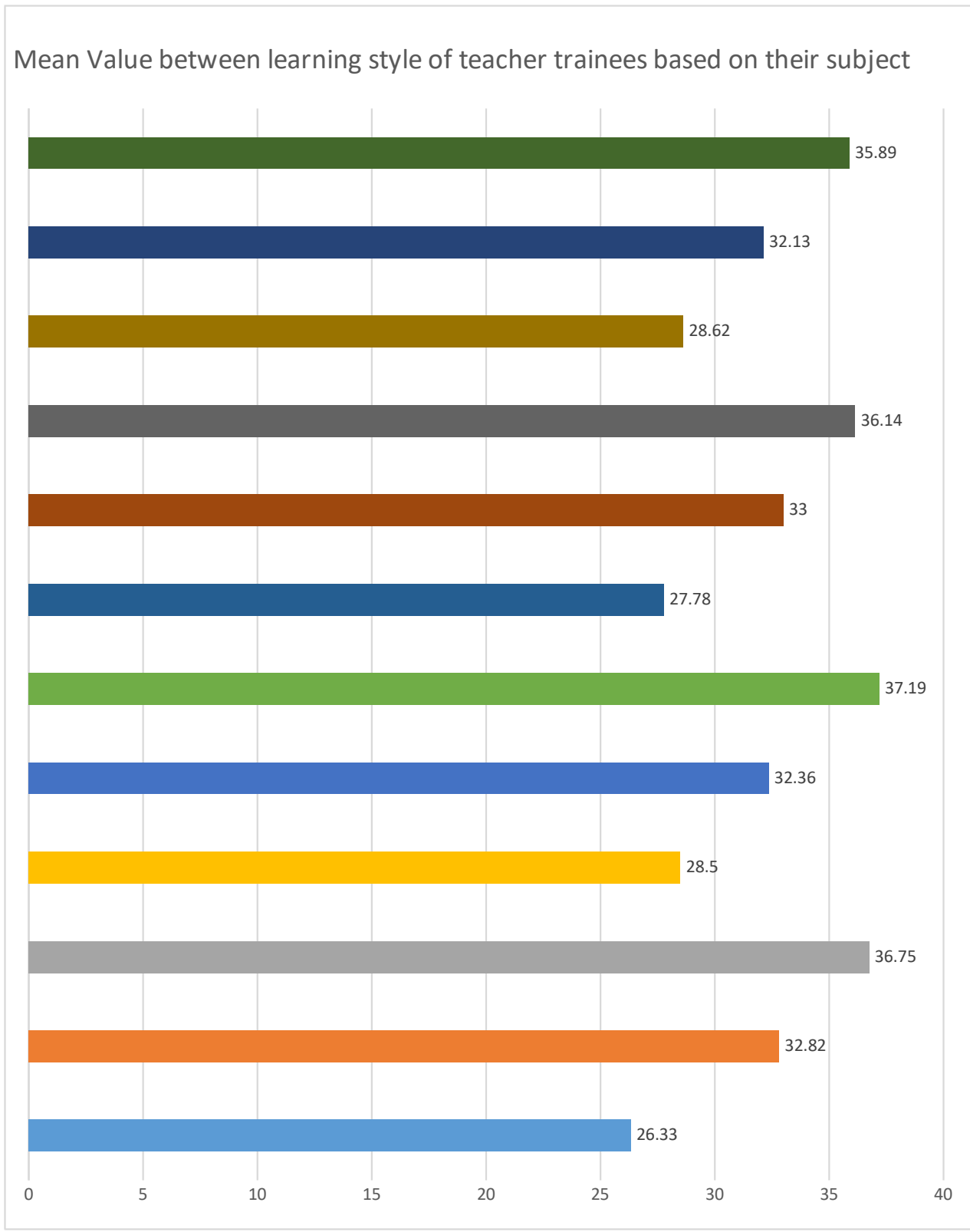
Table 4.11 ‘F’ values towards Subjects in relation to learning style of teacher trainees

Subject	Sum of Squares	Df	Mean Square	F	p-value	Remarks
Between Groups	38833.2499	2	19416.6249	256.85	<0.001	Significant
Within Groups	20939.8608	277	75.5952			
Total	59773.1107	279				

(at 0.05 significant level the table value of ‘F’ is 2.65)

From the table 4.12, the calculated p-value is <0.001 which is less than 0.05 significant level, the Null hypothesis is rejected. It is inferred from the above table that there is a significant difference between learning style of teacher trainees based on their subject specialisation.

Chart 4.11- Mean Value between learning style of teacher trainees based on their subject.



HYPOTHESIS: 5

There is no significant difference between learning styles of teacher trainees based on their locality.

Table 4.12

't' values between learning style of teacher trainees based on their locality.

	Locality	Num ber	Mean	S.D	df	t valu e	p- value	Remarks
Combined Four Stages of Learning Styles	Rural	165	122.76	13.63	164	-4.39	<0.00 1	Significant
	Urban	115	123.33	13.49	114			
Concrete Experience (CE) stage	Rural	165	30.22	5.21	164	-0.33	0.36	Not Significant
	Urban	115	30.43	5.21	114			
Reflective Observation - (RO) stage	Rural	165	31.24	4.55	164	-0.25	0.40	Not Significant
	Urban	115	31.38	5.03	114			
Abstract Conceptualization (AC) Stage	Rural	165	30.64	4.57	164	-0.06	0.47	Not Significant
	Urban	115	30.67	4.14	114			
Active Experimentation (AE) Stage	Rural	165	30.66	4.61	164	-0.33	0.36	Not Significant
	Urban	115	30.84	4.28	114			

(at 0.05 significant level the table value of 't' is 1.96)

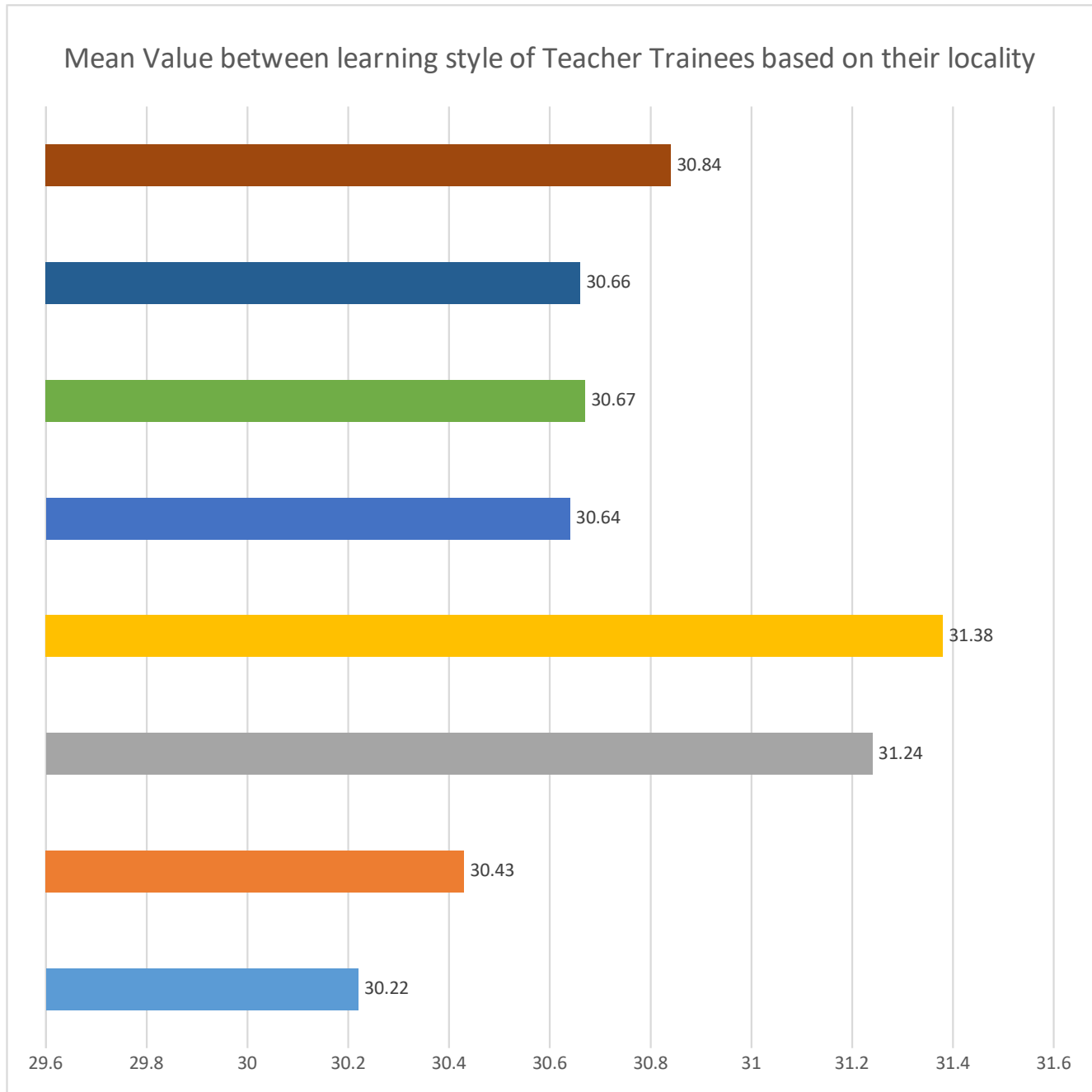
INFERENCE:

From the table 4.12, the mean value of 'Rural locality' for the combined four stages of learning styles is 122.76 and the mean value of 'Urban locality' for the combined four stage of learning styles is 123.33.

In the Rural and Urban locality, the mean value of Reflective Observation (RO) learning style of Teacher Trainees is higher than the other three learning styles.

The calculated p-value for Combined Four Stages of Learning Styles is <0.001 which implies that there is a significant difference between Combined Four Stages of Learning Styles of Teacher Trainees based on their locality.

Similarly the calculated p-value for Concrete Experience (CE) stage, Reflective Observation - (RO) stage, Abstract Conceptualization - (AC) Stage and Active Experimentation - (AE) Stage which is greater than 0.05 significant level. The result implies that there is no significant difference between Concrete Experience (CE) stage, Reflective Observation - (RO) stage, Abstract Conceptualization - (AC) Stage and Active Experimentation - (AE) Stage of Teacher Trainees based on their locality.

Chart 4.12: Mean Value between learning style of Teacher Trainees based on their locality.

HYPOTHESIS: 6

There is no significant difference between learning styles of teacher trainees based on their income.

Table 4.13-'t' values between learning style of teacher trainees based on their income.

	Income	Number	Mean	S.D	df	t value	p-value	Remarks
Combined Four Stages of Learning Styles	Rs.50000to Rs.150000	194	122.66	12.48	193	-0.607	0.272	Not Significant
	Rs.150001 to Rs.300000	86	123.73	15.77	85			
Concrete Experience (CE) stage	Rs.50000 to Rs.150000	194	30.22	5.21	193	-0.579	0.281	Not significant
	Rs.150001 to Rs.300000	86	30.43	5.21	85			
Reflective Observation - (RO) stage	Rs.50000 to Rs.150000	194	31.24	4.55	193	-0.80	0.21	Not significant
	Rs.150001 to Rs.300000	86	31.38	5.03	85			
Abstract Conceptualization - (AC) Stage	Rs.50000 to Rs.150000	194	30.64	4.57	193	-0.65	0.25	Not significant
	Rs.150001 to Rs.300000	86	30.67	4.14	85			
Active Experimentation - (AE) Stage	Rs.50000to Rs.150000	194	30.66	4.61	193	0.32	0.37	Not significant
	Rs.150001 to Rs.300000	86	30.84	4.28	85			

(at 0.05 significant level the table value of 't' is 1.96)

INFERENCE:

From the table 4.14, the mean value of income belongs to 'Rs.50000 to Rs.150000' for the combined four stages of learning styles is 122.66 and the mean value of 'Rs.150001 to Rs.300000' for the combined four stage of learning styles is 123.73.

In the income belongs to 'Rs.50000 to Rs.150000' and 'Rs.150001 to Rs.300000', the mean value of Reflective Observation (RO) learning style of teacher trainees is higher than the other three learning styles.

The calculated p-value for Combined Four Stages of Learning Styles is 0.272 which implies that there is a significant difference between Combined Four Stages of Learning Styles of teacher trainees based on their income.

Similarly the calculated p-value for Concrete Experience (CE) stage, Reflective Observation - (RO) stage, Abstract Conceptualization - (AC) Stage and Active Experimentation - (AE) Stage which is greater than 0.05 significant level. The result implies that there is no significant difference between Concrete Experience (CE) stage, Reflective Observation - (RO) stage, Abstract Conceptualization - (AC) Stage and Active Experimentation - (AE) Stage of teacher trainees based on their income.

HYPOTHESIS: 6

There is no significant difference between learning styles of teacher trainees based on their income.

Table 4.14-'t' values between learning styles of teacher trainees based on their income.

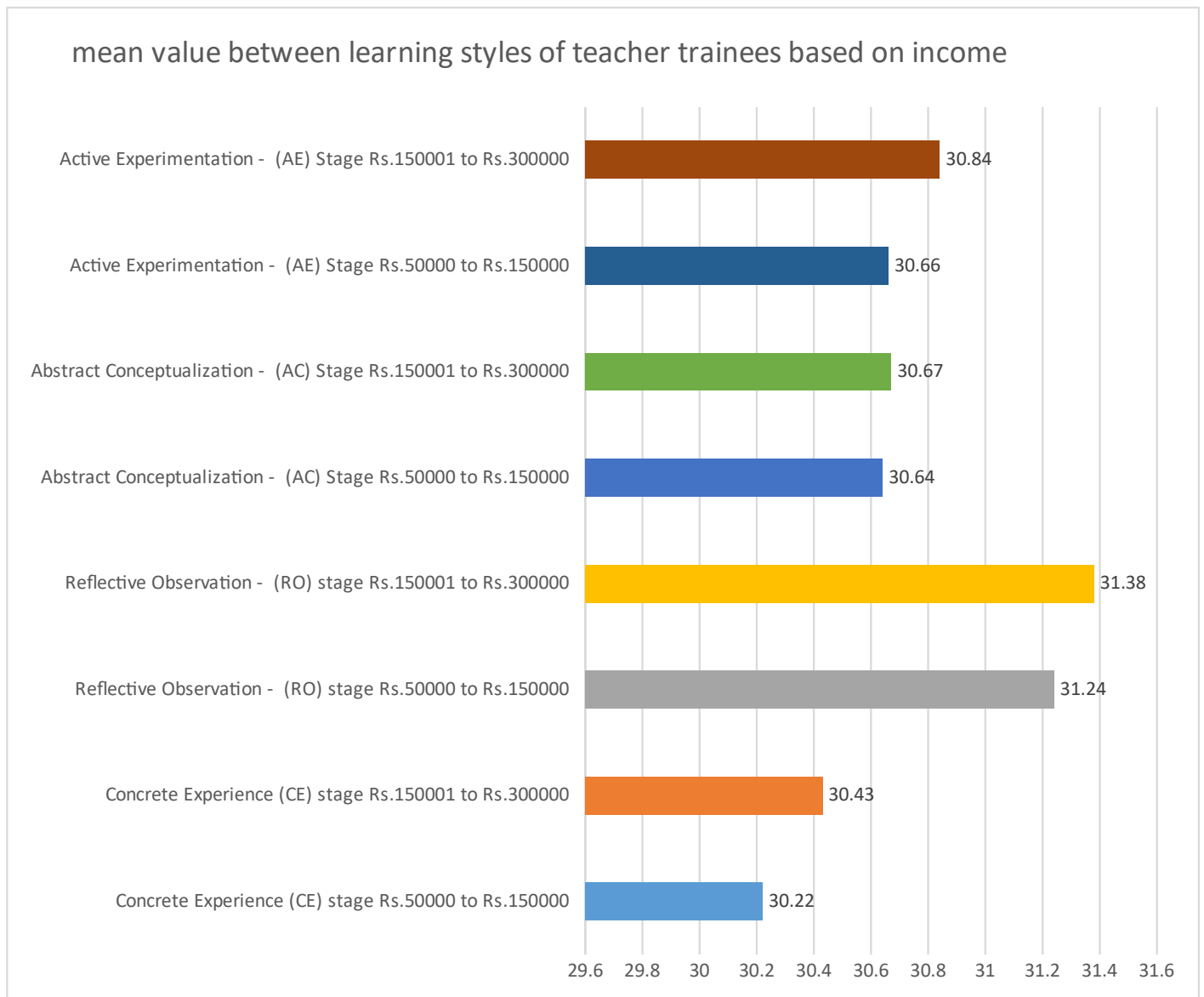
Income	Number	Mean	S.D	df	t value	p-value	Remarks
Rs.50000 to	194	122.66	12.48	193	-0.607	0.272	Not Significant
Rs.150001 to	86	123.73	15.77	85			
Rs.300000							

(at 0.05 significant level the table value of 't' is 1.96)

INFERENCE:

From the table 4.14, the calculated p-value is 0.272 which is greater than 0.05 significant level. Hence the null hypothesis is accepted. It is inferred from the above table that there is no significant difference between learning styles of teacher trainees based on their income.

Chart 4.12: Mean Value between learning style of teacher trainees based on their income.



4.2 CONCLUSION

Analysis and interpretation of data collected to test the hypothesis formulated were discussed based on this findings, summary and conclusion is derived and is given in the following chapter.

CHAPTER-V

SUMMARY AND CONCLUSION

5.1 INTRODUCTION

The summary and conclusion section is the widely used part of the research report because it review all the information that has been presented in its previous section. This chapter contains an overview of its conclusions based on findings, recommendations and suggestions for further research in this field. For the present study, the investigator selected 280 teacher trainees.

5.2 RESTATEMENT OF THE STUDY

The present study is entitled as “learning styles of teacher trainees learning through online mode”.

5.3 MAJOR FINDINGS OF THE STUDY

280 samples of teacher trainees are taken for the present study. The major findings are

1. There is a significant difference in the learning styles of teacher trainees based with respect to their age.
2. There is no significant difference in the learning style of teacher trainees based on their qualification.
3. There is a significant difference in the learning style of teacher trainees based on their programme.
4. There is no significant difference in the learning style of teacher trainees based on their subject study.
5. There is no significant difference in the learning style of teacher trainees based on their locality.
6. There is no significant difference in the learning style of teacher trainees based on their parental income.

5.2.1 DESCRIPTIVE STATISTICS

- ◆ Majority 85% of the respondents belongs to '20 to 25 years' of age group
- ◆ Majority 71.8% of the respondents belongs to 'UG'
- ◆ Majority 91.1% of the respondents belongs to 'B.Ed'
- ◆ 40% of the respondents belongs to 'Group 1 - 16.1% of the respondents belongs to 'Group 2 - 43.9% of the respondents belongs to 'Group 3.
- ◆ Majority 58.9% of the respondents are from 'Rural locality'
- ◆ Majority 69.3% of the respondents' yearly income is between 'Rs.50000 to Rs.150000'.

5.2.2 DIFFERENTIAL ANALYSIS

◆ The mean value of '20 to 25 years' for the combined four stages of learning styles is 122.37 and the mean value of 'Above 25 years' for the combined four stage of learning styles is 126.50.

◆ In the age group '20 to 25 years', the mean value of Reflective Observation (RO) learning style is 31.14 which is higher and stood at first followed by mean values of Active Experimentation - (AE) Stage (30.60) stood at second, Abstract Conceptualization - (AC) Stage (30.59) stood at third and at last Concrete Experience (CE) stage (30.04) stood at fourth.

◆ In the age group 'Above 25 years', the mean value of Reflective Observation (RO) learning style is 32.17 which is higher and stood at first followed by mean values of Concrete Experience (CE) stage (31.83) stood at second, Active Experimentation - (AE) Stage (31.52) stood at third and at last Abstract Conceptualization - (AC) Stage (30.98) stood at fourth.

◆ The calculated p-value for Combined Four Stages of learning styles is 0.03 and Concrete Experience (CE) Stage is 0.019 which is less than 0.05 significant level. The result implies that there is a significant difference between learning styles of teacher trainees based on their age. And also there is a significant difference between concrete experience (CE) stage of teacher trainees based on their age.

◆ Similarly the calculated p-value for Reflective Observation - (RO) stage is 0.09, Abstract Conceptualization - (AC) Stage is 0.30 and Active Experimentation - (AE) Stage is 0.108 which is greater than 0.05 significant level. The result implies that there is no significant difference between Reflective Observation - (RO) stage, Abstract Conceptualization - (AC) Stage and Active Experimentation - (AE) Stage of teacher trainees based on their age.

◆ The mean value of 'UG' for the combined four stages of learning styles is 123.22 and the mean value of 'PG' for the combined four stage of learning styles is 122.41.

◆ In the Qualification 'UG', the mean value of Reflective Observation (RO) learning style is 31.47 which is higher and stood at first followed by mean values of Active Experimentation - (AE) Stage (30.73) stood at second, Abstract Conceptualization - (AC) Stage (30.62) stood at third and at last Concrete Experience (CE) stage (30.41) stood at fourth.

◆In the Qualification 'PG', the mean value of Reflective Observation (RO) learning style is 30.86 which is higher and stood at first followed by mean values of Active Experimentation - (AE) Stage (30.76) stood at second, Abstract Conceptualization - (AC) Stage (30.73) stood at third and at last Concrete Experience (CE) stage (30.05) stood at fourth.

◆The calculated p-value for Combined Four Stages of Learning Styles is 0.325, Concrete Experience (CE) stage is 0.30, Reflective Observation - (RO) stage is 0.16, Abstract Conceptualization - (AC) Stage is 0.42 and Active Experimentation - (AE) Stage is 0.47 which is greater than 0.05 significant level. The result implies that there is no significant difference between Combined Four Stages of Learning Styles, Concrete Experience (CE) stage, Reflective Observation - (RO) stage, Abstract Conceptualization - (AC) Stage and Active Experimentation - (AE) Stage of teacher trainees based on their qualification.

◆The mean value of 'B.Ed' for the combined four stages of learning styles is 121.91 and the mean value of 'M.Ed' for the combined four stage of learning styles is 134.00.

◆In the B.Ed Programme, the mean value of Reflective Observation (RO) learning style is 30.89 which is higher and stood at first followed by mean values of Abstract Conceptualization - (AC) Stage (30.57) stood at second, Active Experimentation - (AE) Stage (30.40) stood at third and at last Concrete Experience (CE) stage (30.05) stood at fourth.

◆In the M.Ed Programme, the mean value of Reflective Observation (RO) learning style is 35.44 which is higher and stood at first followed by mean values of Active Experimentation - (AE) Stage (34.20) stood at second, Concrete Experience (CE) stage (32.92) stood at third and at last Abstract Conceptualization - (AC) Stage (31.44) stood at fourth.

◆The calculated p-value for Combined Four Stages of Learning Styles is <0.001 , Concrete Experience (CE) stage is 0.004, Reflective Observation - (RO) stage is <0.001 , and Active Experimentation - (AE) Stage is <0.001 which is less than 0.05 significant level. The result implies that there is a significant difference between Combined Four Stages of Learning Styles, Concrete Experience (CE) stage, Reflective Observation - (RO) stage, and Active Experimentation - (AE) Stage of teacher trainees based on their programme.

◆Similarly the calculated p-value for Abstract Conceptualization - (AC) Stage is 0.017 which is greater than 0.05 significant level. The result implies that there is no significant difference between Abstract Conceptualization - (AC) Stage of teacher trainees based on their programme.

◆The mean value of Group1 is 111.22 whereas the mean value of Group 2 is 124.31 and the mean value of Group 3 is 136.96. The result inferred that the subject which belongs to 'Group3' are having high mean value compare to others.

◆In the Group 1, the mean value of Active Experimentation - (AE) Stage is high compared to other learning style of teacher trainees. In the Group 2, the mean value of Abstract Conceptualization - (AC) Stage is high compared other learning style of teacher trainees. In the Group 3, the mean value of Reflective Observation - (RO) stage is high compared other learning styles of teacher trainees.

◆The calculated p-value is <0.001 which is less than 0.05 significant level, the Null hypothesis is rejected. It is inferred from the above table that there is a significant difference between learning styles of teacher trainees based on their subject.

◆The mean value of 'Rural locality' for the combined four stages of learning styles is 122.76 and the mean value of 'Urban locality' for the combined four stage of learning styles is 123.33.

◆In the Rural and Urban locality, the mean value of Reflective Observation (RO) learning styles of teacher trainees is higher than the other three learning styles.

◆The calculated p-value for Combined Four Stages of Learning Styles is <0.001 which implies that there is a significant difference between Combined Four Stages of Learning Styles of teacher trainees based on their locality.

◆Similarly the calculated p-value for Concrete Experience (CE) stage, Reflective Observation - (RO) stage, Abstract Conceptualization - (AC) Stage and Active Experimentation - (AE) Stage which is greater than 0.05 significant level. The result implies that there is no significant difference between Concrete Experience (CE) stage, Reflective Observation - (RO) stage, Abstract Conceptualization - (AC) Stage and Active Experimentation - (AE) Stage of teacher trainees based on their locality.

◆The mean value of income belongs to 'Rs.50000 to Rs.150000' for the combined four stages of learning styles is 122.66 and the mean value of 'Rs.150001 to Rs.300000' for the combined four stage of learning styles is 123.73.

◆In the income belongs to 'Rs.50000 to Rs.150000' and 'Rs.150001 to Rs.300000', the mean value of Reflective Observation (RO) learning style of teacher trainees is higher than the other three learning styles.

◆The calculated p-value for Combined Four Stages of Learning Styles is 0.272 which implies that there is a significant difference between Combined Four Stages of Learning Styles of teacher trainees based on their income.

◆Similarly the calculated p-value for Concrete Experience (CE) stage, Reflective Observation - (RO) stage, Abstract Conceptualization - (AC) Stage and Active Experimentation - (AE) Stage which is greater than 0.05 significant level. The result implies that there is no significant difference between Concrete Experience (CE) stage, Reflective Observation - (RO) stage, Abstract Conceptualization - (AC) Stage and Active Experimentation - (AE) Stage of teacher trainees based on their income.

5.3 EDUCATIONAL IMPLICATIONS

So far there is no strong evidence to illustrate which learning style is better than another. According to Ellis, Learners manifest different learning styles but it is not yet clear whether some styles result in faster and more learning than others. Even though, the models of learning style can still shed some light to the complicated process of learning.

Learning style is important for students as well as for teachers. For students, if they learn what type of learner they are, they can have a clearer picture of the learning process, and more consciousness of learning. With more consciousness of learning style, they may understand why they feel comfortable in learning one aspect while uncomfortable in learning another. And they will know what they are good at and why they lag behind others in learning. Thus they can adjust or modify their learning a little to the learning setting or teaching methods.

Most importantly, they can decide to take their learning strategies on the basis of their learning style and analysis of their weaknesses and strengths. Learning strategies have more relation to the academic achievement than learning style. Besides, they can set practical learning goals suitable for themselves.

5.4 SCOPE FOR FUTURE WORK

Based on the results of the study the following recommendations are given by the investigator.

Kolb's (1984) learning stages and cycle could be used by teachers to critically evaluate the learning provision typically available to students, and to develop more appropriate learning opportunities.

Parents of professional students, administrators, teachers, and guidance counsellors must encourage students to use different learning style and effectiveness online learning to it promotes good interpersonal relationships.

Students must use online learning properly and not just for fun and entertainment, but also for communication with their families, friends and teachers.

Learning style should be used for the purpose of discussions on learning issues and also to share their own ideas and thoughts.

Also, individuals can be helped to learn more effectively by the identification of their lesser preferred learning styles and the strengthening of these through the application of the experiential learning cycle

Educators should ensure that activities are designed and carried out in ways that offer each learner the chance to engage in the manner that suits them best.

Ideally, activities and material should be developed in ways that draw on abilities from each stage of the experiential learning cycle and take the students through the whole process in sequence.

CONCLUSION

Kolb's theory provides a way at looking at how a person learns, thinks, and acts. His theory is not a be-all, end-all to understanding student learning and development, but it is a helpful tool. Yes, there are critiques of Kolb's theory (Tennant, 1997, and Jarvis, 1987). The criticisms are generally in the area of in applicability to a variety of ethnicities and global application to human development. These criticisms do tend to be valid, yet the theory is still worthy of consideration. Having an understanding of Kolb's learning theory can be beneficial to the educator or college counselor because when you understand the learning style of a student, you can better teach, counsel, or advise the student based on the style by which they learn or think.

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APPENDIX - I

Rating scale

PERSONAL DATA SHEET

Learning style of teacher trainees

Name :

age : 20 to 25, 25 and above

qualification : UG/ PG

program : B.Ed / M.Ed

year : I year / II year

subject : group 1 : maths, physical science, bio science

: group 2 : home science, history, economics, english

: special education (HI, VI)

locality : rural / urban

parental income : 50,000 to 1,50,000

1,50,000 to 3,00,000

APPENDIX – II
RATING SCALE

S .No	Content	Least like you	Less like you	More like you	Most like you
1.	When I learn...				
	1.1 I like to deal with feelings				
	1.2 I like to listen and watch				
	1.3 I like to think about ideas				
	1.4 I like to be doing things				
2.	I learn best when ...				
	2.1 I trust my hunches and feelings				
	2.2 I listen and watch carefully				
	2.3 I rely on logical thinking				
	2.4 I work hard to get things done				
3	When I am learning ...				
	3.1 I have strong feelings and reactions				
	3.2 I am quiet and reserved				
	3.3 I tend to reason things out				
	3.4 I am responsible about things				
4	I learn by...				
	4.1 Feeling				
	4.2 Watching				
	4.3 Thinking				
	4.4 Doing				
5	When I learn...				
	5.1 I am open to new experiences				
	5.2 I look at all sides of issues				
	5.3 I like to analyse, break things down				

	5.4 I like to try things out				
6	When I am learning ...				
	6.1 I am an intuitive person				
	6.2 I am an observing person				
	6.3 I am a logical person				
	6.4 I am an active person				
7	I learn best from ...				
	7.1 Personal relationships				
	7.2 Observation				
	7.3 Rational theories				
	7.3 A chance to try out and practice				
8	When I learn ...				
	8.1 I feel personally involved in				
	8.2 I take my time before acting				
	8.3 I like ideas and theories				
	8.4 I like to see results from my work				
9	I learn best when ...				
	9.1 I rely on my feelings				
	9.2 I rely on my observations				
	9.3 I rely on my ideas				
	9.4 I can try things out for myself				
10	When I am learning ...				
	10.1 I am an accepting person				
	10.2 I am a reserved person				
	10.3 I am a rational person				
	10.4 I am a responsible person				

11	When I learn...				
	11.1 I get involved				
	11.2 I like to observe				
	11.3 I evaluate things				
	11.4 I like to be active				
12	I learn best when ...				
	12.1 I am receptive and open-minded				
	12.2 I am careful				
	12.3 I analyse ideas				
	12.4 I am practical				
	SCORES				
		CE	RO	AC	AE