CHAPTER I
1.00 CONCEPTUAL FRAME WORK

1.10 OVERVIEW

This chapter brings out the conceptual frame work of the study so as to provide the introductory phase of the report. It comprises nine sections. The first section outlines the overview of the entire chapter. The second section explores the various definitions of Education and also points out the importance of Education. The third section brings out the salient features of Teacher Education and Teacher Education in India. It also explains the functions of Resource and Training organization set up such as NCERT, NCTE, DTERT, DIET and TTI. This section also brings out Elementary education in India. The fourth section gives a general idea of Instruction, Assessment of Teaching, Teaching Competency and Competency Based Teacher Education. In the fifth section a genuine attempt has been made to find out what is science, and also the strategies in Teaching Science. The sixth section points out Psychology, Educational Psychology, Attitude, Attitude towards Teaching Science and Personality. The seventh section deals with the Philosophy, Educational philosophy and Values. The eighth section highlights the background of the study. The last one provides the documentary notes for the reference made in this chapter.

1.20 EDUCATION

Education is the aggregate of all the processes by means of which a person develops abilities, attitudes and other forms of behavior of positive value in the society in which he lives. Education is often regarded as synonymous with learning, as the acquired experience of any sort of intellectual, emotional or sensory-motor. John Dewey speaks of “Education as that reconstruction or reorganization of experience which adds to the meaning of experience and which increases ability to direct the course of subsequent experience”.

Education is a systematic Instruction, schooling or training given to the young in preparation for the work of life by extension, similar instruction or training obtained in adult age. Also, the whole course of scholastic instruction in which a person has received.

Education in broad terms means, the life-long process of acquiring new knowledge and skills through both formal and informal exposure to
information, ideas and experiences. Education in narrow terms means, systematic planned instruction that takes place in school. Education may be defined as a process of controlling and modifying the behavior of the young so as to produce a recognized type of behavior in the adult. Aristotle defined Education as a “Creation of a sound mind in a sound body”. Swami Vivekananda says, “Education is the manifestation of perfection already in man.” Education in ancient India took a new form. It was considered as Vidhya or Knowledge. Mahatma Gandhi said, “By education it means an all round drawing out of the best in the child and the man Body, Mind and Spirit.”

Education is individual development. In this definition it is important to emphasize first, the distinction between formal, informal, non-formal Education. Each of these is related differently to the process of development and each type of education requires different types of policies in terms of education and development goals and strategies. Second it is also important to distinguish between basic literacy, primary, secondary and tertiary education. The strength of the relationship between theses different levels of education and the development of a society requires specification. Finally, an enduring debate in formulating education policies for development is whether academic or vocational education Programs are more appropriate for development Strategies.

Education is a fundamental right of the population of a Nation and the Government of India has been fulfilling this noble cause through Ministry of Human Resource Development, the University Grants Commission and Association of Indian Universities by imparting education through Primary and Secondary level programmes to the ultimate level of Higher education.

Thus ‘Education’ means a gradual growth and development of an individual from infancy to maturity. It is the training for completeness of life. The completeness or perfection is measured in terms of the changes in the pupil’s behavior. In other words education should make student in terms of what can do or accomplish. Teaching should be aimed and designed to help the child to respond to his changing environment in an effective way. Hence it may be concluded that Education is a process of development in which every individual becomes a good citizen. Education means cultivation of the individual to become a knowledgeable person, having positive attitude and good values.
This view of education needs a fresh look at teacher preparation. Education is not a mechanical activity of transmission of information and teachers are not information dispensers. Teachers need to be looked at as crucial mediating agents through whom curriculum is transacted. Textbooks by themselves do not help in developing knowledge and understanding by vomiting the content in the classroom. Learning is not confined to the four walls of the classroom. So effective Teacher Education curriculum requires to connect knowledge and skills to the real future classroom situations.

1.30 TEACHER EDUCATION

Teacher Education means that all the formal and informal activities and experiences that help to qualify a person to assume the responsibilities of a member of the educational profession or to discharge his responsibilities more effectively.\textsuperscript{10} Teacher Education is the program of activities and experiences developed by an institution responsible for the preparation and growth of persons preparing themselves for educational work or engaging in the work of the educational profession.\textsuperscript{11}

Teacher Education is a social enterprise and has the dynamic qualities of social events. It involves a variety of factors, such as teacher-educator characteristics, training experiences, student –teacher characteristics, curriculum and textual materials, practicing schools, institutional characteristics, community characteristics and many more, which interact in complex combinations when it comes to understanding the teaching learning -process and learning outcomes.\textsuperscript{12} Teacher education programmes today train teachers to adjust to a system in which education is seen as the transmission of information.\textsuperscript{13} The part of education intended to impart the skill, techniques and knowledge base for the profession of teaching is Teacher Education. Though teachers are said to be born, they have to be made perfect through well defined courses of training in the art of educating.\textsuperscript{14}

Thus Teaching is the oldest, most indispensable and inevitable of all the professions in the world. In India teaching has been a recognized and reverend profession since the dawn of history. The teacher is expected not only to impart information and skills, but lead and guide his/her students
to ‘supreme knowledge’. Hence the qualities lay down for teachers are very high.

1.3.1 TEACHER EDUCATION IN INDIA

The indigenous system of education in India, popularly known as the “Gurukul,” emanated from the fact that the process of teaching learning occurred in the house of the Teacher or the “guru” clearly indicating the pivotal role of a teacher in the process of learning.

While the Gurukul system was replaced by a more formal system of teacher training with a view to enhance the capacities and skill sets of teachers, yet, several challenges face the formal system of teacher education in the country. The formal system of teacher education that encompasses aspects of teacher training, teacher selection, etc has a direct bearing of what the child would actually learn in class, thus directly impacts the “quality of teaching learning” in a school.15

Teacher education is largely impacted by the concerned stage of schooling (pre – school, elementary, secondary and senior secondary stages) and the mode of schooling namely formal, non formal and distance modes of imparting education. In addition to courses for pre –service education of teachers for teaching academic subjects specialized pre –service courses for teaching subjects such as physical education, art and aesthetics are also offered by teacher education institutions.

According to Rajput (1998) the constitutional amendment relating to Panchayat Raj, (local bodies) of 1993 prescribes for the decentralization of planning and administration of school education and teacher education.16 The two constitutional amendments have made education and teacher education critical factors in the Indian educational context, particularly the constitutional amendment initiated in 2001 makes primary education a fundamental right of the children in India.

This has had considerable implications such as Decentralization of teacher education, Pre-and in-service categories as two sub-systems of teacher development and Establishment of bimodal institutions like Colleges of Teacher Education and Institute of Advance Studies in Education. Thus one can see, in India, a chain of bimodal institutions from district to state level in the form of District Institute of Education and
Training, College of Teacher Education, and Institute of Advance Studies in Education.  

Stage-specific teacher education has been receiving serious attention in India. At the moment there are separate programmes for each stage, one for pre-primary teachers, and another for elementary teachers and another one for secondary teachers. There is a great debate going on in the country to have at least two more categories of programmes; one for the primary teachers (teachers teaching class 1-5) and second for teachers teaching senior secondary classes (i.e. class 11 and 12). Specific policy actions, however, have yet to be taken. Indian educationists are critically thinking of the enhancement of culture specific pedagogies such as puppetry, folk plays and story telling, which can be used for different target group of learners; after all the child in the tribal society processes information differently from the child in metropolitan city.

Though the professional preparation of teachers has been recognized as crucially important since the 1960’s, the ground reality remains a matter of great concern. The Kothari Commission (1964-66) emphasized the need for teacher education to be brought into mainstream academic life; but teacher education institutes continue to exist as insular organizations. The Chattropadhyaya Committee (1983-85) recommended that the length of training for a secondary teacher should be five years following completion of class 12; it also suggested that colleges of science and arts introduce an Education Department to allow students to opt for teacher Education. The Yashpal Committee Report (1993), Learning without Burden, noted: “The emphasis in these programmes should be on enabling trainees to acquire the ability for self-learning and independent thinking”.

Teacher Education Institutions such as NCERT and NCTE at national level, DTERT and boards of education at State level, DIETs and TTIs at the district level should establish effective linkages both horizontally and vertically, establishing ‘net-working complexes’, or forming comprehensive institutions of teacher education under one management, whatever feasible.
1.3.2 NATIONAL COUNCIL OF EDUCATIONAL RESEARCH AND TRAINING

The National Council of Educational Research and Training (NCERT) is an apex resource organization set up by the Government of India with headquarters at New Delhi to assist and advise the Central and State Governments on academic matters related to school education.

The objective of NCERT is to assist and advise the Ministry of Education and Social Welfare in the implementation of its policies and major programmes in the field of education, particularly school education. The NCERT provides academic and technical support for improvement of school education through its various constituents, which are National Institute of Education, New Delhi, Central Institute of Educational Technology, New Delhi, Pandit Sunderlal Sharma Central Institute of Vocational Education, Bhopal, Regional Institute of Education, Ajmer, Regional Institute of Education, Bhopal, Regional Institute of Education, Bhubaneswar, Regional Institute of Education, Mysore and North Eastern-Regional Institute of Education, Shillong.

Functions of NCERT include Research, Development, Training, Extension, Publication and Dissemination and Exchange Programmes. The NCERT also drafts, publishes and recommends school text books (from Class I to Class XII) of various subjects based on the recommendations of knowledgeable faculty in the subject. The top priorities of NCERT are Implementation of National Curriculum Framework, Universalisation of Elementary Education (UEE), Vocational education, Education of groups with special needs, Early childhood education, Evaluation and examination reform information technology (IT) education, Value education, Educational technology, Development of exemplary text books/workbooks/teacher’s guide/supplementary reading materials, Production of teaching-learning materials, Education of the girl child, Identification and nurturing of talent, Guidance and counseling, Improvement in teacher education and International relations.¹⁹

Thus NCERT has been functioning as national Resource Centres for School and Teacher Education and are striving for academic excellence, innovation, professional competencies, commitment and the sharing of experiences and expertise to improve the quality of education of the country.
1.3.3 NATIONAL COUNCIL FOR TEACHER EDUCATION (NCTE)

The National Council for Teacher Education, in its previous status since 1973, was an advisory body for the Central and State Governments on all matters pertaining to teacher education, with its Secretariat in the Department of Teacher Education of the National Council of Educational Research and Training (NCERT). Despite its commendable work in the academic fields, it could not perform essential regulatory functions, to ensure maintenance of standards in teacher education and preventing proliferation of substandard teacher education institutions. The National Policy on Education (NPE), 1986 and the Programme of Action there under, envisaged a National Council for Teacher Education with statutory status and necessary resources as a first step for overhauling the system of teacher education. The National Council for Teacher Education as a statutory body came into existence in pursuance of the National Council for Teacher Education Act, 1993 (No. 73 of 1993) on the 17th August, 1995.

The main objective of the NCTE is to achieve planned and coordinated development of the teacher education system throughout the country, the regulation and proper maintenance of Norms and Standards in the teacher education system and for matters connected therewith. The mandate given to the NCTE is very broad and covers the whole gamut of teacher education programmes including research and training of persons for equipping them to teach at pre-primary, primary, secondary and senior secondary stages in schools, and non-formal education, part-time education, adult education and distance (correspondence) education courses.

NCTE has its headquarter at New Delhi and four Regional Committees at Bangalore, Bhopal, Bhubaneshwar and Jaipur to look after its statutory responsibilities. In order to enable the NCTE to perform the assigned functions including planned and co-ordinated development and initiating innovations in teacher education, the NCTE in Delhi as well as its four Reginal Committees have administrative and academic wings to deal respectively with finance, establishment and legal matters and with research, policy planning, monitoring, curriculum, innovations, co-ordination, library and documentation, inservice programmes. The NCTE Headquarters is headed by the Chairperson, while each Regional Committee is headed by a Regional Director.
The National Council for Teacher Education (NCTE) awards the teaching professionals for their outstanding performance. The 'Teacher Educator' awards, at national level, serve the purpose of promoting best professionals involved in the teaching. The awards also attract new breed to the teaching sector.21

The NCTE has laid down guidelines to initiate the processing of innovative programmes in teacher education, adjudging their innovative character on five-point criteria, namely Promoting creative teaching approach, Understanding action research, Using ICT for innovative learning, Learner – centered paradigms-their designing and application and Value – based involvement of and for the community.22

The NCTE undertakes a major exercise of developing a new National curriculum Framework for Teacher Education which is both contextual and in tune with the emerging concerns and imperatives of the fast changing canvas of education both nationally and globally and also maintaining quality in teacher education.

1.3.4 DIRECTORATE OF TEACHER EDUCATION RESEARCH AND TRAINING

In Tamil Nadu, there was a system of annual collection of Educational Statistics, publication of reports on public instruction and periodical surveys. No sustained research was undertaken by the State Education Department. Training schools for primary school teachers were inspected by the District Educational Officers and there were no specialists specifically assigned to look after teacher education. Likewise colleges of education (training colleges) were supervised by the Director of Public Instruction till 1965 and later by the Director of Collegiate Education.

The State Institute of Education was established in 1965 to provide for systematic study of problems relating to school education. It was housed in a rented building in Nungambakkam. Lawrence was the first Director of the Institute. He was assisted by two Readers in the cadre of District Educational Officers and two Asst Professors. The State Institute of Education undertook studies about stagnation and wastage. For the first time, inspecting of Education published Madras Education (quarterly). Later it was stopped and a page Tamilaga Kalvi was published every month and distributed freely to all Government and Aided schools. The State Institute of Education was upgraded as State Council of Education Research and
Training in 1970 and was shifted to the Directorate of Public Instruction (DPI) complex.

The SCERT functioned with twelve Asst. Professors. It organized various courses to popularize new mathematics and new science. Several courses were conducted in Madras and in several colleges of education for teacher educators and schoolteacher. SCERT was actively involved in conducting seminars at various levels to familiarize personnel with the New Education Policy. It introduced training programmes in comprehensive Access to Primary Education (CAPE).

In 1990, the Government of Tamil Nadu created the Directorate of Teacher Education Research and Training and issued necessary orders vide G.O.748 Education (F 2) dated 04.06.90. The SCERT was renamed as Directorate of Teacher Education Research and Training and all teacher-training institutions including Government aided colleges of education were brought under its control. IASE Principal, Saidapet, Chennai was appointed as the first Director of DTERT and he assumed charge on 30.09.90. The DTERT undertook special programmes in popularizing population education. Early childhood Education and open school for dropouts were taken up for the first time. Computer Literacy Project (Class) was introduced for school teachers.

Thus under the centrally sponsored scheme, the DTERT is to provide more focused leadership and support to educational endeavours in state, as state partner institutions with NCERT. The DTERT is expected to organize in-service education and extension programmes for all categories of educational personnel through DIET’s which are its constituent units.

1.3.5 DISTRICT INSTITUTE OF EDUCATION AND TRAINING (DIET)

About teachers, the Education Commission (1964-66) had observed, “of all the factors that influence the quality of education... the quality, competence and character of teachers are undoubtedly the most significant”. But these in turn depend substantially on the quality of training and other support provided to them. Until the adoption of the National Policy on Education (NPE), this support in the area of elementary education was being provided largely at the national and State levels only by institutions like NCERT, NIEPA and SCERTs. Likewise in the area of adult education, this support was being provided by the Central Directorate of
Adult Education at the national level, and by State Resource Centres (SRCs) at the State level. Below the State level, there were elementary teacher education institutions but their activities were confined mostly to pre-service teacher education. The physical, human and academic resources of most of the institutions were inadequate even for this limited role. They also tended to adopt teaching practices, which were not in consonance with the ones they prescribed to prospective teachers.

By the time of adoption of the NPE, elementary and adult education systems were already too vast to be adequately supported by national and state level agencies alone. The NPE implied their further expansion as also considerable qualitative improvement. Provision of support to them in a decentralized manner had therefore become imperative. Pursuant to the provisions of NPE on teacher education, a centrally sponsored Scheme of Restructuring and Reorganization of Teacher Education was approved in October 1987. One of the five components of the Scheme was establishment of DIETs. Draft guidelines for implementing the DIET component were circulated to States in October 1987 and have, together with certain subsequent circulars, formed the basis for its implementation so far. Till January 2007, Central assistance had been sanctioned under the Scheme for setting up a total of 556 DIETs in 599 districts in the country.

**DIETs: Mission and Role**

A DIET's Mission could be briefly stated in the following terms:

“To provide academic and resource support at the grass-roots level for the success of the various strategies and programmes being undertaken in the areas of elementary and adult education, with special reference to the following objectives such as Universalisation of Primary/Elementary Education, Adult Education and NLM targets in regard to functional literacy in the 15-35 age group”.

The above is a general mission statement. It will have to be translated into specific goals for the DIET, so as to suit the needs of individual states and districts, and will be ultimately operationalised through specific performance norms set for individual DIETs.24

**DIETs: Linkages**

Not merely will every DIET establish a close and continuing dialogue with ‘the field’ (i.e. with elementary schools, school complexes, teachers,
head masters, school supervisors, instructors/supervisors/project officers of AE and NFE, and with District level officers in these three sectors), but will also establish officers in these three sectors), but will also establish close linkages with organizations and Institutions at the national, State, Divisional and district levels whose objectives and interests converge with its own.

Functions of a DIET

A DIET will have three main functions, viz.

1. Training and orientation of the following target groups such as Elementary school teachers (both pre-service and in-service Education), Head Master, Heads of School Complexes and officers of Education department up to Block level, Instructors and supervisors of Non-formal and Adult Education (induction level and continuing education) and Members of DBE and Village Education Committee (VECs), Community leaders, youth and other volunteers who wish to work as Educational activities.

2. Academic and resource support to the elementary and adult education systems in the district in other ways e.g. by extension activities and interaction with the field, provision of services of a resource and learning center for teachers and instructors, development of locally relevant materials teaching aids, evaluation tools etc., and Serving as an evaluation center for elementary school and programmes of NFE/AE.

3. Action research and experimentation to deal with specific problems of the district in achieving the objectives in the areas of elementary and adult education.

Thus the objective of establishing a DIET in each district under the centrally sponsored scheme is to improve the quality of elementary teacher education through innovative pre-service and in-service education at the district level. The vision of a DIET as planned under the scheme is to restructure and reorganize the elementary teacher education to make it more responsive, and to realize universalisation of elementary education.

1.3.6 TEACHER TRAINING INSTITUTE (TTI)

The main purpose of the Teacher Training Institute is to meet the unique curriculum and reform needs of schools throughout the country. Today's teachers are expected to play a variety of roles in the classroom:
educators, motivators, guide, counselors, coaches and disciplinarians. In addition, teachers must continually educate themselves, learning about new advances in education, new technologies and new ways to encourage their students to reach their full potential. The Institute meets the above demands by offering three types of training such as General Training, Specialized Training and Oriented Training. The General Training consists of training new teachers for the different levels and disciplines. Updating in-service teachers and preparing teachers to work as part of a team in applying effective interdisciplinary curricula. The Specialized Training used to updating teachers in the subject matter area of their specialization. The Oriented Training used to training teachers to integrate current trends into the educational reality in its multiple magnitudes.26

Thus teacher training institutions of various types prepare prospective teachers for quality elementary education

1.3.7 ELEMENTARY EDUCATION

The term primary is derived from Latin word ‘Primarius’ or ‘Primus’ and English word ‘Prime’ which means ‘first’, ‘first in time’, ‘earliest’, ‘primitive’, ‘first in order of sequence’. Primary education is a prime education, the most important component of educational system. It has different names in different parts of the world, namely prime education; elementary education, fundamental education and basic education etc. United Nations Educational, Scientific and Cultural Organization (UNESCO) after carefully analyzing the various nomenclatures applied to the yearly stage of education recommended it a new name as the first stage of education.27

Education is important not only for the full development of one's personality, but also for the sustained growth of the nation. Elementary education in India, therefore, is the foundation on which the development of every citizen and the nation as a whole hinges. But making primary education available for all in India has also been one of the major challenges for the government. Moreover, the quality of elementary education in India has also been a major cause of worry for the government. In fact, making elementary education in India accessible, universal and relevant has been a goal since the eighth five-year plan.

Elementary education which is the foundation stone, on which the whole edifice of education stands, is only the first step towards the ultimate goal of
lifelong learning and is a main gateway to higher education. Elementary education develops the capacity to learn, read and write and channelise the child’s energy in a proper direction.\(^\text{28}\)

Elementary education in India means eight years of schooling from the age of six. The government has made elementary education compulsory and free. But, the goal of universal elementary education in India has been very difficult to achieve till now. Therefore it has introduced innovative ways of universalizing elementary education in India. The country’s commitment to the goal of providing “Education for All (EFA)” needs no reiteration. This has been made clear in various policy statements, including the NPE (1986) which explicitly mentioned the importance in the direction of EFA such as universal enrolment and universal retention of children up to 14 years of age and a substantial improvement in quality of education.\(^\text{29}\)

After the District Primary Education Programme (DPEP) of 1994, the government has now launched the "Sarva Shiksha Abhiyan" (SSA). Sarva Shiksha Abhiyan was launched in 2001 to universalize and improve the quality of elementary education in India through community ownership of elementary education. In order to effectively decentralize the management, it has involved Panchayat Raj institutions, School Management Committees, Village and Urban Slum Level Education Committees, Parents’ Teachers’ Associations, Mother Teacher Associations, Tribal Autonomous Councils and other grassroots level structures.

SSA, apart from being a programme with clear time frame for Elementary Education, also offers opportunities to the states to develop their own vision of elementary education. It has set 2007 as the deadline for providing primary education in India and 2010 as the deadline for providing useful and relevant elementary education to all children in the 6 to 14 age group. In order to improve the quality of elementary education in India, the SSA has emphasized on improving the student teacher ratio, teachers training, academic support, facilitating development of teaching learning material and providing textbooks to children from special focus groups etc.

In spite of all the efforts of the government of India, universalization of elementary education in India remains a distant dream. This is because of the persistent poverty and various prejudices prevailing in the Indian society. While the growth in female literacy is increasing at a faster rate than male literacy, the gap in the male female literacy has been a major
hindrance in the universalization of elementary education in India. While the total literacy rate is 65.38% according to 2001 census, the female literacy rate is only 54.16%. Another area of concern is to reduce the gap between the rural and urban literacy rate. While 80.3% urban people are literate, only 59.4% of the rural population is literate according to 2001 census data. Thus reduction in poverty, promotion of female education, emphasis on rural education, providing incentives for retaining the children from weaker sections of the society would have to go together so that it can achieve the goal set by the Sarva Shiksha Abhiyan and also the Millennium Development goal by 2015 set by the UNESCO.  

The Elementary Education system in India is one of the largest in the world. There has been massive expansion of Elementary Education during the post-independence period; however the goal on Universalization of Elementary Education (UEE) is yet to be achieved. Thus reduction in poverty, promotion of female education, emphasis on rural education, providing incentives for retaining the children from weaker sections of the society would have to go together so that Elementary Education can achieve the goal set by the Sarva Shiksha Abhiyan and also the Millennium Development goal by 2015 set by the UNESCO.

1.40 INSTRUCTION

In education a teacher is a person who educates others. A teacher who educates an individual student may also be described as a personal tutor. The role of teacher is often formal and ongoing, carried out by way of occupation or profession at a school or other place of formal education. In many countries, a person wishing to become a teacher at state-funded schools must first obtain professional qualifications or credentials from a university or college. These professional qualifications may include the study of pedagogy, the science of teaching. Teachers may use a lesson plan to facilitate student learning, providing a course of study which covers a standardized curriculum. A teacher’s role may vary between cultures. Teachers teach literacy and numeracy, or some of the other school subjects. Other teachers may provide instruction in craftsmanship or vocational training, the Arts, religion or spirituality, civics, community roles, or life skills. In some countries, formal education can take place through home schooling.
Informal learning may be assisted by a teacher occupying a transient or ongoing role, such as a parent or sibling or within a family, or by anyone with knowledge or skills in the wider community setting. In education, teachers facilitate student learning, often in a school or academy or perhaps in another environment such as outdoors. A teacher who teaches on an individual basis may be described as tutor.

The objective is typically accomplished through either an informal or formal approach to learning, including a course of study and lesson plan that teaches skills, knowledge and/or thinking skills. Different ways to teach are often referred to as pedagogy. When deciding what teaching method to use teachers consider students' background knowledge, environment, and their learning goals as well as standardized curricula as determined by the relevant authority. Many times, teachers assist in learning outside of the classroom by accompanying students on field trips. The increasing use of technology, specifically the rise of the internet over the past decade, has begun to shape the way teachers approach their roles in the classroom.

The objective is typically a course of study, lesson plan or a practical skill. A teacher may follow standardized curricula as determined by the relevant authority. The teacher may interact with students of different ages, from infants to adults, students with different abilities and students with learning disabilities.31

Teaching using pedagogy also involve assessing the educational levels of the students on particular skills. Understanding the pedagogy of the students in a classroom involves using differentiated instruction, as well as, supervision to meet the needs of all students in the classroom. Pedagogy can be thought of in two manners. First, teaching itself can be taught in many different ways, hence, using pedagogy of teaching styles. Second, the pedagogy of the learners comes into play when a teacher assesses the pedagogic diversity of his/her students and differentiates for the individual student's accordingly. Thus instruction with objectives plays an important role in developing knowledge and skill among the learners.
1.4.1 ASSESSMENT OF TEACHING

Assessment is being used for educational improvement, increased school effectiveness and curriculum reform, and is being used for political control of teachers, students and curricula. Assessment of teaching and learning is the process of evaluating the quality and appropriateness of the learning process, including teacher performance and pedagogic approach.

Assessment of teaching and learning can include assessment of how well the teacher performs as a teacher/learning facilitator, the appropriateness of pedagogic processes and practices including the suitability of methods of assessing student progress and development. This is also referred to as evaluation of teaching (and learning).

Kristoffersen (2003) states that Evaluations of teaching typically assess the quality of the forms and methods of teaching and learning within one or more programme areas.

Classroom assessment is both a teaching approach and a set of techniques. The approach is that the more you know about what and how students are learning; the better you can plan learning activities to structure your teaching. The techniques are mostly simple, non-graded, anonymous, in-class activities that give both teacher and his/her students’ useful feedback on the teaching-learning process. Classroom assessment differs from tests and other forms of student assessment in that it is aimed at course improvement, rather than at assigning grades. The primary goal is to better understand your students’ learning and so to improve your teaching.

Student Assessment is used to find out, what the students know (knowledge) and what the students can do, and how well they can do it (skill; performance). And also used to find out how students go about the task of doing their work (process) and how students feel about their work (motivation, effort).

The diagnostic function of assessment tells us what the student needs to learn. The formative function of assessment tells us how well the student is doing as work progresses. The summative function of assessment tells us how well the student did at the end of a unit/task.

**The Differences between Assessment and Evaluation:**

Assessment is the gathering of information about something, such as student performance. It is information and is qualitative. Assessment
pinpoints specific strengths and weaknesses. It is diagnostic and formative, as well as summative and is most useful to teachers and students'. It focuses on the individual student. Assessment is an educational measure. It is referenced by criterion.

Evaluation is a much more comprehensive and inclusive term than measurement. Evaluation includes both qualitative and quantitative descriptions of pupils behavior plus value judgement concerning the desirability of that behavior.

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\text{Evaluation} = \text{Qualitative descriptions of pupils (measurement) + Value judgement.}
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\text{Evaluation} = \text{Quantitative descriptions of pupils (non measurement) + Value judgement.}
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Thus the teaching assessment is used to assess the student’s work at all stages of development, but particularly at the end, student’s process, acquisition of knowledge and skills and finally the development of sophistication and complexity in student work. The assessment carried out by day-to-day observation, tests and quizzes, rubrics, rating scales, project work and portfolios. It uses to improve the focus of teaching (diagnosis) and also focus the student attention on strengths and weaknesses (motivation). It is used to improve program planning (program assessment) and for reporting to parents.

### 1.4.2 TEACHING COMPETENCY

Bigge (1968), remarks “Teaching may be poor or good, but nevertheless it simply is a process within which a teacher selects subject matter to be learned and performs a series of operations whose purpose is to transit this subject matter to students. These operations include assigning, explaining requiring various forms of practice and testing.”

Competencies are “those concepts, skills and attitudes which are highly specialized and relate directly to (a) the single job classification in which the student learner is interested and (b) the specific requirements of the Student –Learner’s training station position.”

According to Gage (1995), “teacher engage in explaining activities, demonstration activities, order maintaining activities, record keeping activities, assignment making activities, curriculum planning activities, testing and evaluation activities and many kinds of activities.”
Competence refers to a state of being well qualified to perform an activity, task or job function. When a person is competent to do something, he or she has achieved a state of competence that is recognizable and verifiable to a particular community of practitioners. A competency, then, refers to the way that a state of competence can be demonstrated to the relevant community. According to the International Board of Standards for Training, Performance and Instruction (IBSTPI), a competency involves a related set of knowledge, skills and attitudes that enable a person to effectively perform the activities of a given occupation or function in such a way that meets or exceeds the standards expected in a particular profession or work setting (Richey, 2001).

The structure and assessment of competencies may differ from one community of practice to another and even within a community. To facilitate a common understanding of competencies in the context of online and distributed learning some specifications have been elaborated (IMS, 2001). Typically, a competency is divided into specific indicators describing the requisite knowledge, skills, attitudes and context of performance.

Thus there are different ways to validate that a person has demonstrated the relevant competencies. One of them is through a certification process. Teacher certification is a common practice, and the notion of teacher competencies is fairly well established. However, competencies are generally associated with highly formalized professional activities and not applied to ill-defined tasks. Ill-defined tasks certainly include many forms of teaching. This narrow view of competence runs counter to common sense and professional practice, but brings into attention the mainstream approach to elaboration of teacher competencies where it is essential to clearly identify the conditions of teaching. The delivery environment (classroom-based, Internet-based, laboratory-based, hybrid environments, and so on) is a particularly relevant condition to identify competencies for online teaching.

1.4.3 COMPETENCY BASED TEACHER EDUCATION

The domain of teacher competence which receives a great deal of attention from Science education researchers is the one pertaining to professional competencies. Professional competencies in teaching refer to the pedagogical knowledge and skills needed for the successful practice of teaching (Watts, 1982). Professional competencies also are regarded as
those competencies which distinguish teachers from other professions (Moss, 1971).

The essential objective of Competency Based Teacher Education is to be very specific in the Teacher Education process so that Teachers at all levels become very effective in facilitating student’s learning inside and outside the class rooms. Competency Based Teacher Education can develop all the knowledge, skills, and attitudes among the Teachers so that they can inculcate among the students all the life skills, essential to lead successful personal, professional, and social lives.

The typical route by which a teacher acquires professional competencies is a standard, preservice teacher education program. This route is sometimes referred to as the professional route. As far as preservice teacher preparation is concerned, there has been a variation in programs within and between countries. The United States, for instance, has a long-standing four-year, baccalaureate-level program of teacher education. In other countries such as Malaysia, preservice teacher education is provided in various forms of programs, ranging from as short as one year in duration to as long as four years in duration.

In India, two different streams of pre service teacher education programmes are provided. One for primary, which has two years duration and another for secondary/higher secondary, which has one year duration. In spite of the variation of pre service teacher education programs, the emphasis is still the same, which is to provide adequate preparation in pedagogical knowledge and skills for prospective teachers prior to being admitted into the teaching profession.

Pre service teacher education programs are not the sole means by which a teacher gains entry into the teaching profession. In another approach, persons aspiring to become teachers are not required to possess preservice teacher qualifications. These persons are employed as teachers based on their possession of an academic qualification in a chosen teaching subject or on their occupational experiences. This approach is widely practiced in the United States and Malaysia (Haberman, 1986). In India, this kind of practice is seen in Higher Education.

Popham (1978) compared the professional competence of teachers who underwent different certification programs. In every case, teachers with pre service teacher preparation were found to be more professionally
competent than their counterparts who did not have such preparation. Meanwhile, pre service teacher qualifications have been shown to be one of the significant factors contributing to the high level of teacher competence in developing countries (Husen, Saha, & Noonan, 1978).47

**Competency Based Teaching (CBT)**

In a traditional educational system, the unit of progression is time and it is teacher-centered. In a CBT system, the unit of progression is mastery of specific knowledge and skills and is learner or participant-centered. Two key terms used in competency-based teaching are:

- **Skill**—A task or group of tasks performed to a specific level of competency or proficiency which often use motor functions and typically require the manipulation of instruments and equipment. Some skills, however, such as counseling, are knowledge and attitude based.

- **Competency**—a skill performed to a specific standard under specific conditions.48

Gangappa (1969) pointed out that, “In Competency Based Teacher Education greater emphasis has been laid on performance based competencies rather than cognitive based competencies. What the teachers know about teaching seems less important than their ability to teach and bring about a change in the pupils.”

Five types of competencies have been defined in Competency Based Teaching. They are:

The first—**Cognitive Based Competencies**—define knowledge and intellectual skills and abilities that are expected of the learner. For e.g.; the prospective teacher can list and illustrate five levels of questions.

Secondly, for **Performance Based Competencies**—the teacher demonstrates that he or she can do something rather than simply know something. While contingent upon knowledge are competencies that define skills and overt action.

The third class is referred to as **Consequence Based Competencies**. To demonstrate competence the person is required to bring about a change in others. The criterion for success is not what he knows or does but what one can accomplish of teachers competence, for e.g., it is assessed by examining the achievements of pupils being taught.
The fourth type is “Affective”. These affective competencies which define expected values and attitudes tend to resist the specificity and are more difficult to assess than the three types. The teacher values the contribution of all students in a classroom discussion. They are typically embedded in other competency statements.

The fifth type, “Exploratory Competency” does not fit well into the four types, since; the definition of desired learner outcomes is defaulted. Instead, activeness that promises significant learning is specified.49

Teachers, too, would be expected to demonstrate behaviours known to be generally bring about pupil learning, but would not be held accountable for pupil achievement. Thus in competency based teacher education; the trainee is expected to acquire the competencies such as Cognitive Based Competencies, Performance Based Competencies, Consequence Based Competencies, affective competencies and Exploratory Competencies. The investigator selects the three competencies for his study namely Knowledge competency, Performance competency and Consequence competency.

1.50 SCIENCE

Science refers to a system of acquiring knowledge. This system uses observation and experimentation to describe and explain natural phenomena. The term science also refers to the organized body of knowledge people have gained using that system. Less formally, the word science often describes any systematic field of study or the knowledge gained from it. 50

According to Good, Science is (i) activity carried on as an effort to make the diversity of our sense experiences correspond to a logically uniform system of thought; in this activity, experiences are correlated with a previously constructed theoretic structure of thought and understanding in an effort to make the resulting co ordination in agreement with all observed properties or behaviors (ii) in the personal experiences of an individual, science is an activity by means of which the person seeks to relate his current sense experiences to his total structure of understanding in a manner that is in agreement with all his pertinent observations of properties and behaviors; such activity is believed to be inherent in the behavior of individuals at all levels of maturity: the individual gains, through practice in his ability to correlate his current experience with his
previously conceived structure of understanding however sophisticated that structure may be (iii) Organized knowledge gained through science as activity, frequently used with a qualifying adjective to indicate a special branch of study.51

Thus, Science is a way of knowing, a method of learning about nature. Rooted in common sense, its formal, systematic method is called scientific inquiry. In doing scientific inquiry, scientists use a variety of empirical approaches, techniques, and procedures to collect data from nature, examine and analyze that data, and construct knowledge based on it. This knowledge relates to living organisms, non-living matter, energy, and events that occur naturally. To analyze data scientists often, but not always, use mathematics, and they always apply logical arguments that obey strict empirical standards and healthy skepticism.52

Science is a dynamic, expanding body of knowledge, covering ever-new domains of experience. In a progressive forward-looking society, science can play a truly liberating role, helping people escape from the vicious cycle of poverty, ignorance and superstition. 53

Thus Science is a branch of knowledge or study dealing with a body of facts or truths systematically arranged and showing the operation of general laws. It is a systematic knowledge of the physical or material world gained through observation and experimentation.

1.5.1 SCIENCE TEACHING

Science teaching in schools today has acquired a new and exciting dimension. It requires teachers to be open minded, innovative and ever alert in their approach to teaching. The teaching of science is concerned, with giving our pupils the skills of enquiry and investigation. Since skills cannot really be ‘given’ and because acquiring these skills involves practice, modern methods of science teaching are child-centered. They aim to give the pupils as much ‘hands on’ experience as possible. The teacher organizes these experiences through planned activities, or what we call ‘processes’ (Sundararajan, 1995).54

The teaching of science has always been haunted by the lingering doubts of its value in the human experience, and by the fuzzy image that emerges when we attempt to discern its nature. (Vaithya, 1996)55
Curiosity: The initial desire to learn with eagerness is an important aspect in science teaching. It is needed to develop ‘scientific thinking’, which is an essential quality for preciseness and exactitude. The lack of curiosity leads to dullness and indifference. The teacher should be able to kindle the curiosity among the wards with the profound knowledge of what is to be taught and with lucid expression. He/she should enable the students to participate in the learning process by encouraging questioning and interactive sessions. Models, equipments, pictures (photographs charts and maps) help in a long way to build curiosity among the students.

Creativity: Teaching is not just the transmission of knowledge. Students should be able to understand the subject and develop the ability to recall at the time of examination. The learning process must also lead to encountering problems and finding effective solutions. This is possible only when a person is able to think objectively and creatively. Imagination both by the teacher and students is essential in developing creativity. The contributions so made by the students must be given immediate recognition. Besides the development of creative power students also learn and develop socially desirable qualities.

Analytical ability: Performance in a project depends on the ability to analyse situations. Students should play an active role in the analysis of problems and data collected, to find solutions to those problems. The role of a teacher in developing the analytical ability of students lies in dividing the problem into number of work elements. Identification of work elements and providing proper explanation about these elements to the students is the responsibility of the teacher. It helps the students in understanding the problem in proper perspective and in general gives an idea on how to proceed in the project. Students are required to collect data from all possible sources (published and unpublished materials, interaction with the people concerned, data collected from experiments and seeking of the expert opinions.). The collected materials must be organized with the help of the teacher. The next step should be correlation of facts and ideas, similar situations and the arrived at conclusions at such situations and time. Meaningful conclusion of a project depends upon the extensiveness of the work of collection, organization and correlation of data. Then comes a stage known as interpretation. Guidance by the teacher and other experts in the field is very much required at this stage. The ideas provided by the students
must be discussed with an open mind. The places where students use irrelevant information in the interpretation of data must be identified and they must be given specific directions so that the relevancy of the project is fully realized and appreciated by all. Thus by working with the problem and the data collected, students stands to develop an attribute known as analytical ability.

Reasoning: Science teachers should also inculcate the reasoning ability among their students. Reaching an inference or conclusion by sound judgment in a good sense and, logical build up of the collected information is yet another important aspect of learning in science. The best way by which this trait is developed is by reflective questioning, which enhances critical thinking and arriving at conclusions in a meaningful way (Baskaran, 2002).

Thus imparting Curiosity, creativity, developing the quality to analyze things without any bias and to find reason in the proper perspective should be the ultimate aim of teaching science.

1.60 PSYCHOLOGY

The word ‘psychology’, from the Greek psyche, meaning mind or soul, describes an academic and clinical subject concerned with reason and emotion, conscious and unconscious mental processes. It has become an umbrella term for such a wide variety of ‘disciplines’, paradigms, and cults that it is not clearly definable.

The field of psychology plays an integral role in public health, providing treatment and education in the areas of substance abuse, addiction, and other health-related behaviors. Individuals suffering from addiction and other psychological disorders have a major impact on a community, and on the nation, causing financial loss, accidents, decreased business productivity, and numerous social and psychological effects. Therapeutic techniques for these individuals focus on development of coping skills, ego strength, improved self-esteem, and other traits needed to lead a healthy life. Assessment, community profiling, and creating and conducting prevention and treatment programs for the public also fall within the realm of psychology. In addition, psychologists conduct research in public health problems and serve as consultants in the development of solutions to these problems.
1.6.1 EDUCATIONAL PSYCHOLOGY

It seems too simple to say that educational psychology is the psychology of learning and teaching, and yet a majority of educational psychologists spend their time studying ways to describe and improve learning and teaching. After reviewing the historical literature in educational psychology, Glover and Ronning (1987) suggested that educational psychology includes topics that span human development, individual differences, measurement, learning, and motivation and is both a data-driven and a theory-driven discipline.

Thus, definition of educational psychology is the application of psychology and psychological methods to the study of development, learning, motivation, instruction, assessment, and related issues that influence the interaction of teaching and learning. This definition is broad because the potential applications of educational psychology to the learning process are immense.

Today educational psychology is a vital discipline that is contributing to the education of teachers and learners. For example, Bruner, an enduring figure in educational psychology, recently noted the need to rethink our ideas of development, teaching, and learning and the interactions among them. Specifically, Bruner (1996) urged educators and psychologists to see children as thinkers.

Educational psychology is the study of how humans learn in educational settings, the effectiveness of educational interventions, the psychology of teaching, and the social psychology of schools as organizations. Educational psychology is concerned with how students learn and develop; often focusing on subgroups such as gifted children and those subject to specific disabilities.

Research on classroom management and pedagogy is conducted to guide teaching practice and form a foundation for teacher education programs. The goals of classroom management are to create an environment conducive to learning and to develop students’ self-management skills. More specifically, classroom management strives to create positive teacher-student and peer relationships, manage student groups to sustain on-task behavior, and use counseling and other psychological methods to aid students who present persistent psychosocial problems.
Thus Educational psychology is to provide teachers with some basic skills related to teaching and also to give teachers guide-lines to solve problems of teaching learning process. It helps teachers to understand the scientific knowledge and to install in teachers a sprite of inquiry for their professional growth.

**1.6.2 ATTITUDE**

“An attitude is a relatively enduring organization of beliefs around an object or situation predisposing one to respond in some preferential manner”.\(^6^1\) Attitudes have been defined as ideas with emotional content, important beliefs, prejudices, biases, predispositions, appreciations and as states of readiness or set.\(^6^2\)

An attitude is also defined as a developmental state of organismic valence, created by psycho-biological processes, exerting a motivational influence upon the individual’s responsive behavior in situations directly and indirectly related to it.\(^6^3\)

Allport observes attitude as “a mental and neutral state of readiness organized through experience exerting a directive or dynamic influence upon the individual’s response to all objects and situations with which it is related.”\(^6^4\)

“Attitude is the predisposition or tendency to react specifically towards an object, situation or values, usually accompanied by feelings and emotions.” Some writers differentiate a verbal attitude (what the reacting person says) from a behavioral attitude (what he actually does when confronted with the affect-producing stimuli); attitude can not be directly observed but must be inferred from overt behavior, both verbal and nonverbal.\(^6^5\)

Thus attitude is not a behavior, but the precondition of behavior. It may exist in all degrees of readiness from the most talent dormant traces of forgotten habits to the tension or motion which actively determine a course conduct that is underway. Attitude can be changed by school experiences. They may be changed by the influence of a particular teacher, another child, the peer group, a single event, a curriculum material, a service of extracurricular event or any combination of these elements.
1.6.3 ATTITUDE TOWARDS SCIENCE TEACHING

Moore (1970) has rightly defined “Attitude towards science is the generalized attitude towards the universe of science content and being measured in terms of its favorableness estimated from the scores obtained by the subject on an attitude scale towards science.”

“Scientific Attitude is a set of emotionally toned ideas about science and scientific method and related directly or indirectly to a course of action”; in the literature of science education the term implies such qualities of mind as intellectual curiosity, passion for truth, respect for evidence and an appreciation of the necessity for free communication in science.

Development of scientific Attitude of mind is one of the objectives of science education. It is one of the significant outcomes of the process of science education. The teaching of science should not only enable the learners to master the facts, concepts and principles of science or develop instructional and problem solving skills but also develop Scientific Attitude of mind as well as interest and appreciation in them. Scientific Attitude of mind is essential to enable them to adjust themselves and live as efficient citizen in a scientific society.

Scientific Attitude can be developed only through personal experience and keen observation in the process of science learning. The teacher will have to provide situations in the class room or field environment where the students can experience see and feel the need for developing this attitude. For instance, the open mindedness of the learner is necessary in scientific persuits. The spirit of enquiry must prevail in scientific persuit. They should learn to observe and think critically and accurately. Intellectual honesty is indispensable in the study of science.

Democratic atmosphere in the classroom also help in developing certain desirable attitude towards science. Such an atmosphere will influence a spirist of healthy criticism. There will be no wishful or biased thinking on the part of the students. They are free to question and discuss. This will help to develop open mindedness and critical thinking.

Thus the attitude towards science teaching is defined as the attitude towards the teaching of the universe of science content and being measured in terms of its favorableness estimated from the scores obtained by the subject on an attitude scale towards science teaching. It includes developing scientific attitude through experiential learning.
1.6.4 PERSONALITY

Allport (1961) defines Personality “as the dynamic organizations within the individual of those psycho-physical systems that determines his unique adjustment to his environment.”

According to Chaube (1993), “Personality is no single trait or quality of a person. The entire pattern of behavior points to his personality. The personality of a person is a mirror of his whole organized behavior pattern.”

According to Cattell (1950), Personality is that which permits a prediction of what a person will do in a given situation. Warren’s Dictionary (1984) defines Personality as “the integrative organization of all the cognitive, affective, conative and physical characteristics of an individual as it manifests itself in focal distinction from others.”

Personality is the sum-total of all the biological innate dispositions, impulses, tendencies, appetites, and instincts of the individual, and the acquired dispositions and tendencies- acquired by experience. Personality is the entire mental organization of a human being at any stage of his development. It embraces every phase of human character: intellect, temperament, skill, morality, and every attitude that has been built up in the course of one’s life. Personality is the organized aggregate of Psychological processes and states pertaining to the individual.

Personality psychology is a branch of psychology that studies personality and individual differences. One emphasis in this area is to construct a coherent picture of a person and his or her major psychological processes. Another emphasis views personality as the study of individual differences, in other words, how people differ from each other. A third area of emphasis examines human nature and how all people are similar to one another. These three viewpoints merge together in the study of personality. Thus personality refers to the behaviour of an individual performed during a particular situation.

1.70 PHILOSOPHY

To the ancient Greeks we owe our love of wisdom. Or at least the word philosophy, which is the same thing, phil meaning “love” and sophy meaning “wisdom.” Combined, the two elements mean both a love of wisdom and a desire for it. In English, philosophy first appears in writing as
early as 1340, when it is explained for the benefit of readers unfamiliar with the word as "love of wisdom.” Wisdom is a word native to English, but we had no term for the love of learning or the desire to gain wisdom. Like the rest of the Western world, we learned that from the Greeks.  

"Philosophy is a study of problems which are ultimate, abstract and very general. These problems are concerned with the nature of existence, knowledge, morality, reason and human purpose." The aim of philosophical inquiry is to gain insight into questions about knowledge, truth, reason, reality, meaning, mind, and value.

Thus the philosophy of education is the study of the purpose, process, nature and ideals of education. This can be within the context of education as a social institution or more broadly as the process of human existential growth, i.e. how it is that our understanding of the world is continually transformed via physical, emotional, cognitive and transcendental experiences. It can naturally be considered a branch of both philosophy and education. The aim of the philosophy is to inculcate values to the human being. The following section gives the details about values, which should be inculcated in the Teacher Education.

1.7.1 VALUES

Good, defined value that “any characteristic deemed important because of psychological, social, moral, or aesthetic considerations commonly used in the plurals, as in counseling, to refer to built-in inner systems of beliefs from which one can again security or support”.  

Behaviour of any person is reflection of his values. Valueless life is meaningless. Society and Environment have a unique role in the formation of values. Since human beings cannot do without society. In this regard famous scholar Durkhen is of the opinion that Impact of society is fully reflected in the personality of a human being. This inner and outer behaviour reflects social consciousness of the society.

Great philosopher Plato defined education that education implies such training which develops good morality in the children through good habits. In the words of father of the nation Mahatma Gandhi- The whole function of education can be expressed one word i.e. morality. It means morality and moral education are key element without which education remains incomplete.
According to Prof. Das, “A value may be defined as something which one considers very dear, which one strives to acquire, preserve or protect and about which one can think and make judgement about the alternates of action available in a situation in relation to the value.”

There are different kinds of values which people acquire and support to different degrees and the value profile of one person differs from the value profile of another person. Values have been classified in various ways and tests have been constructed to measure the relative ranking given to these values by a person.

Values lie at the core of life and human action. These have been considered important and fundamental dimensions of an individual. Values may be regarded as importance ratings which people attach to things, conditions and circumstances. They may also be regarded as goal objects to which people orient their thinking, actions and feelings. As such they become important organizing themes in the behavior of individuals.

The values categories may be described briefly as follows:

1. Theoretical - characterized by a dominant interest in the discovery of truth and by an empirical, critical, rational, ‘Intellectual’ approach.
2. Economic – emphasizing useful and practical values, characterized by a dominant in money matters.
3. Aesthetic – placing the highest values on form and harmony, showing an interest in and enjoying fine arts and music etc.
4. Social – love of and service to people, consisting mainly of altruism and philanthropy.
5. Political – primarily interested in personal power, influence and renown.
6. Religious – faith in God and interest in activities and rituals concerned with one’s own religion.

Value has three aspects: an affective or emotional aspect, a conative or thinking aspects and a cognitive or doing aspect. One feels strongly about a value, can think of alternations of action that support a value and would like to take action to uphold the value. Thus value is the reflection of behaviour of an individual. Depending upon the context, they are classified as Theoretical, Economical, Aesthetic, Social, Political and Religious values.
1.80 BACKGROUND OF THE STUDY

The investigator has been a physics Teacher / Lecturer / Teacher Educator for the past 16 years and handling the classes for the students of different categories. The investigator has been the teacher educator in District Institute of Education and Training (DIET), Pudukkottai since 2000. In the year 2003, there were two categories of student teachers admitted in all DIETs in Tamil Nadu. One set of student teachers were regular students having age less than 25 years and having good academic record. The other set of student teachers were having age between 25 and 35 years. They had already studied their Diploma in Teacher education course in the unrecognized institutes in Tamil Nadu and discontinued their studies. The government of Tamil Nadu had ordered closure of these institutes due to lack of infrastructure, staff, etc. Later the government of Tamil Nadu provided an opportunity to all the student teachers who had studied in unrecognized institutes in all the districts. Hence two categories of different student teachers were admitted in the year 2003. The investigator has anxious to identify the difference between the above two categories of the student teachers interms of the Knowledge competency, Performance competency, Consequence competency, Attitude towards Teaching Science, Personal values and Personality factors. Hence this study.
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