CHAPTER I
INTRODUCTION

The present study is attempted to study the students' achievement in learning through Instructional Design in different styles, Computer Assisted Instruction and Overhead Projector, to find out effectiveness of Instructional Design, Achievement Motivation and Personality Types.

Generally, educational technology is an intellectual and practical pursuit concerned with all aspects of the design and optimal organization of education systems and sub-systems and with the relation between their inputs and outputs between desired outcomes and the allocation of resources to achieve them.

According to Mehra (1995) Educational technology is of three types, viz.,
technology in education (Hardware or Media), technology of education (Software or Programmed Instruction) and management Technology (Systems Approach or Operating Systems).

- Technology in education gives us a number of devices (media) with tremendous capabilities to facilitate the learning process of a given group of students.
- Technology of education suggests us the best way to use those media to accomplish specific objectives.
- Systems approach refers to a systematic way of designing, carrying out and evaluating the total process of education to meet the pre-determined objectives.

Educational technology has a number of advantages. It helps to improve the effectiveness of instruction for individualizing instruction, providing equal educational opportunities, for preservation and transmission of knowledge, for pre-service and in-service teacher-education and for solving many educational problems.
1.1 BLOOM'S TAXONOMIC CATEGORIES

There are a number of educators who have formulated systematic taxonomic organization of objectives and Bloom taxonomic categorisation is the best we have known: Bloom (1956) assumed that in thinking about a problem or topic a hierarchy of cognitive processes is involved. He defined six main classes in the hierarchy each higher step encompassing those below in the cognitive domain: These were in ascending order of difficulty.

Table 1.1
Bloom's Taxonomy of Educational Objectives

<table>
<thead>
<tr>
<th>Taxonomy of Educational Objectives (Bloom's Taxonomy)</th>
<th>Mental Process or Abilities</th>
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<tbody>
<tr>
<td><strong>Objectives</strong></td>
<td><strong>Knowledge</strong></td>
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<td></td>
<td>- Recall</td>
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<td></td>
<td>- Recognise</td>
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<td></td>
<td><strong>Comprehension</strong></td>
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<td>- See relationship</td>
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<td>- Cite example</td>
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<td>- Discriminate</td>
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<td>- Classify</td>
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<td>- Interest</td>
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<td>- Verify</td>
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<td>- Generalise</td>
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<td><strong>Application</strong></td>
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<td>- Reason</td>
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<td><strong>Analysis</strong></td>
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<td>- Analyse</td>
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<td><strong>Synthesis</strong></td>
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<td>- Synthesise</td>
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<td><strong>Evaluation</strong></td>
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<td>- Evaluate</td>
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**Table 1.2**

Objectives in the Cognitive Domain and Associated Words

<table>
<thead>
<tr>
<th>Cognitive Objectives and Associated Words</th>
<th>Objectives</th>
<th>Associated Action Verbs</th>
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</thead>
<tbody>
<tr>
<td><strong>Knowledge</strong></td>
<td>1) Define</td>
<td>2) State 3) List 4) Name 5) Write</td>
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<tr>
<td></td>
<td>6) Recall</td>
<td>7) Recognise 8) Label 9) Underline</td>
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<td></td>
<td>10) Select</td>
<td>11) Reproduce 12) Measure</td>
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<tr>
<td><strong>Comprehension</strong></td>
<td>1) Identify</td>
<td>2) Justify 3) Select 4) Indicate</td>
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<td></td>
<td>5) Illustrate</td>
<td>6) Represent 7) Name</td>
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<td>8) Formulate</td>
<td>9) Explain 10) Judge</td>
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<td></td>
<td>11) Contrast</td>
<td>12) Classify</td>
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<td><strong>Application</strong></td>
<td>1) Predict</td>
<td>2) Select 3) Assess 4) Explain</td>
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<td></td>
<td>5) Choose</td>
<td>6) Find 7) Show 8) Demonstrate</td>
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<td></td>
<td>9) Construct</td>
<td>10) Compute 11) Use</td>
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<td></td>
<td>12) Perform</td>
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<tr>
<td><strong>Analysis</strong></td>
<td>1) Analyse</td>
<td>2) Identify 3) Conclude</td>
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<td></td>
<td>4) Differentiate</td>
<td>5) Select 6) Separate</td>
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<tr>
<td></td>
<td>7) Compare</td>
<td>8) Contrast 9) Justify 10) Resolve</td>
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<td></td>
<td>11) Breakdown</td>
<td>12) Criticise</td>
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<tr>
<td><strong>Synthesis</strong></td>
<td>1) Combine</td>
<td>2) Restate 3) Summarise</td>
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<tr>
<td></td>
<td>4) Precise</td>
<td>5) Argue 6) Discuss 7) Organise</td>
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<td></td>
<td>8) Derive</td>
<td>9) Select 10) Relate 11) Generalise</td>
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<tr>
<td></td>
<td>12) Conclude</td>
<td></td>
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<tr>
<td><strong>Evaluation</strong></td>
<td>1) Judge</td>
<td>2) Evaluate 3) Determine</td>
</tr>
<tr>
<td></td>
<td>4) Recognise</td>
<td>5) Support 6) Defend 7) Attack</td>
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<tr>
<td></td>
<td>8) Criticise</td>
<td>9) Identify 10) Avoid 11) Select</td>
</tr>
<tr>
<td></td>
<td>12) Choose</td>
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</table>
1.1.1 Major Categories in the Cognitive Domain of the Taxonomy of Educational Objectives (Bloom, 1956)

- **Knowledge**, it is defined as the remembering of previously learned material. It represents the lowest level of learning outcomes in the cognitive domain. The knowledge objectives emphasise most the psychological process of remembering. Also the process of relation is involved in that a knowledge test situation requires the organisation and recognition of the problem such that it will finish the appropriate signals and cues for the information and knowledge the individual processes.

- **Comprehension**, it is defined as the ability to grasp the meaning of material. The learning outcomes go one step beyond the simple understanding of material and represent the lowest level of understanding.

- **Application**, it is the ability to use learned material in new and concrete situations. Learning outcomes in the area of application require higher level of understanding than that under the area of comprehension.

- **Analysis**, it refers to the ability to breakdown material into its component parts so that its organisational structure may be understood. Learning outcomes in this area represent a higher intellectual level than areas of comprehension and application because they require an understanding of both the content and the structure from the material.

- **Synthesis**, it refers to the ability to put parts together to form a new whole. Learning outcomes in this area stress creative behaviours with major emphasis on the formulation of new patterns or structures.

- **Evaluation**, it is concerned with the ability to judge the value or material (Statement, novel, poem, research report) for a given purpose. The judgements are to be based on definite criteria. Learning outcomes in this area are the highest in this cognitive hierarchy because they contain elements of all the other categories, plus conscious value judgements based on clearly defined criteria.
1.2 ACHIEVEMENT MOTIVATION

The term motivation is derived from the Latin word "Movex" or the "Motum", which means to move motor and motion. It is the move towards set goals; therefore, motivation is a force, which energizes the behaviour of learners. Motivation has come to be regarded as one of the major domains of psychology and education.

Motivation drives and directs behaviour; achievement motivation governs behaviour relevant to achievement and learning. An understanding of achievement motivation has implications for many aspects of human life, including how individuals develop new skills and how or whether they make use of existing skills.

Achievement motivation is relatively a new concept in the world of motivation. It is essentially a type of motivation that is personal in nature. The basis of achievement motivation is achievement motive i.e. a motive to achieve. Those who engage themselves in a task on account of an achievement motive are said to work under the spirit of achievement motivation. The desire of the learner to improve his achievement at school or to get a good grade or to become an engineer and so on is known as achievement motive.

The level of achievement motivation can be increased in an organisation where; Goal-setting behaviour is encouraged, Personal responsibility for task accomplishment is demanded, Performance feed back is given to worker, Workers are allowed to take moderate risks and rewards are given according to their performance (Stinger, 1966).

Adolescent self-concept is nourished and nurtured by these motives especially in setting up of future goals and ideals. It has been observed by Stiles and McCandless (1967) that even before the child starts his school, many of the interests begin to internalise as his own. He will be developing the motivation to achieve success in activities of values to his parents since he is, in part, a self decider, his
achievement behaviour will also indicate those areas of activity in which success will give him another important positive approval of self.

During adolescence, the growing need to actualisation is enhanced by striving for greater value in one's experiences, striving for self-enhancement, striving to develop one's capacities, striving to become a real person and striving to create rich association with one's world as suggested by Gale (1969).

Edwards (1968) opined that motivation is not a particular behaviour or a thing or event which can be observed directly. Motivation is an invented construct, which describes certain aspects of behaviour. Two aspects of behaviour, which are described by motivation concepts, are the good direction of the behaviour and the relative energy put into the behaviour. Behaviour is usually identified as motivated either when it is aimed at some goal and when its intensity or apparent energy level is fairly strong or different than would be expected from the stimuli apparently evoking the behaviour. The energy is the source, which seems to compel the behaviour in a determined manner. What we mean by motivation there is the energy and directional aspects of observed behaviour.

Davidoff (1976) has summarised the achievement motivation as follows:

- The achievement motive, commonly considered a growth or social motive, is measured by having subjects construct stories about TAT pictures which are later scored for achievement related imagery.

- The achievement motive appears to be learning factors. An innate need for competence may also underline this motive.

- Men with high nAch generally persist in the laboratory and in real life. They also tend to prefer taking moderate risks as opposed to very high or very low ones to achieve success.

- To predict how specific individuals will perform in particular achievement situations it is necessary to consider their achievement motives,
expectations of success in that situation, values placed on task success and achievement related fears of failure.

- Women tend to perform differently than men on TAT measures of the achievement motive and in achievement situations. One explanation is that they are frequently more anxious than men in such settings because both failure and success have negative consequences.

According to Hawes (1982) the achievement motivation is a psychological need and energetic drive, that prompts an individual to strive for and work toward mastering his or her environment by the successful accomplishment of goal or goals, accompanied by a sense of satisfaction and self worth, also called achievement need.

Since the social motives, including the need for achievement, are largely learned, the general answer must be that differences in early life experiences lead to variations in the amount of achievement motivation and other social motives as well.

The expectations parents have for their children are also said to be important in the development of achievement motivation (Christian, 1983). Parents who expect their children to work hard and to strive for success will encourage them to do and praise them for achievement directed behaviour. A specific set of parental expectations related to achievement motivation concerns ideas about when children should become independent in skills such as "standing up for one's rights", "knowing one's way around town", "playing with minimal supervision" and "in general doing things for one's self."

Achievement motivation has been referred to as the need for achievement (and abbreviated as n-Ach), a wish to do well. It refers to the behaviour of an individual who strives to accomplish something, to do his best, to excel others in performance. This involves competition with a particular standard of the excellence of performance.
Achievement motivation is thus a learned motive to complete and to strive for success. Success becomes a goal, which must be achieved in one way or the other.

Achievement motivation can be seen in many areas of human endeavour such as on the job, in school, in home making or in athletic competition etc. (Morgan and colleagues, 2001).

1.3 PERSONALITY TYPES

The word personality has been described by many psychologists in different ways. Etymologically the word "Personality" has been derived from the Latin word "Persona" which means "to sound through". The term "Persona" refers to a mask through which an actor spoke his dialogues. In this sense it referred to external appearance or the role one plays.

The word personality has been used in different manner. Allport (1935) has given fifty different usages with theological, philosophical, legal and psychological meanings. All important definitions of personality can be classified in the classes as follows:

1) Personality is the attractiveness of the individual.
2) Personality is the response value (responsiveness) of the individual.
3) Personality is the stimulus value of the individual and
4) Personality is the general well built and health of the individual.

The definition of personality by Allport (1935) is "dynamic organisation within the individual of those psycho-physical systems that determine his unique adjustment to his environment." Allport emphasized the uniqueness of a person achieved through a distinctive organisation of "psychophysical systems that determine adjustment."

Good (1973) found personality as the total psychological and social reaction of an individual, the synthesis of his subjective, emotional and mental life, his
behaviour and his reactions to the environment; the unique or individual traits of a person are connoted to a lesser degree by personality than the term character.

Arndt (1974) defined that personality is the sum of a person's attributes. These definitions by enumeration of qualities and acquired mental qualities. Since qualities are added together, this position denies the significance of the relations or interactions that may obtain among the stated qualities. Personality is seen as an aggregate, not as an organization or configuration.

Wilson (1976) described structure of personality as that described by the earliest theories of personality by Hippocrates, which was extended and popularised by Galen in the second century A.D. They supported that there are four temperamental types corresponding to four "humours" (a bit like homones); the names given to these types as melancholic, choleric, phlegmatic and sanguine still survive in common usage. The descriptive part of this theory is an over simplification in that people can not be pigeon holed into four clear cut categories. Most of us exhibit some mixture of these characteristics.

Vernon (1996) indicated that personality is an "organized system of traits, sentiments, complexes and habits (together with interests and abilities) that distinguishes the individual, as we see him, from other individuals."

- Characteristics of Personality

On the basis of definitions, it becomes every clear that the term "Personality" has got certain important characteristics, they are:

- Personality is always dynamic.
- Personality determines our thinking, reasoning and action.
- Personality is both physical and psychological (outer and inner).
- Personality has organised and integrated system.
- Personality develops through social interaction.
- Every personality has some uniqueness.
- Personality refers to the process of adjustment to our environment.
- Personality is self-conscious.

Each letter of the term personality also indicates the various qualities of personality.

P = Perception capacity
E = Emotional maturity
R = Responsiveness to situations
S = Self-expression or sociability
O = Organised
N = Not permanent (flexible)
A = Appearance
L = Leadership feeling
I = Integrated
T = Tendencies, Impulses, Dispositions, Innate and Acquired
Y = Young, Vital and Unique

- **Types of Personality**

There are many types of personality given by different psychologists. Jung (1971) classified the various types of human personality in the following manner:

**Extrovert**, the extrovert has a tendency to remain involved in worldly material activities and affairs. He tends to be social and to take special interest in social affairs. He increases acquaintance with others, takes interest in sports and games and pays little attention to his personal wealth or state of health. He achieves quick adjustment with new situations. His self-confidence is noticeable, almost overpowering. Through propaganda, publications or through his art of speaking, he is easily able to impose his views on to others.
Introvert, the opposite is the case with the introvert, most of whose attention is centred upon himself. He has little interest in worldly affairs or things. He is characterised by a tendency to isolate himself from material objects and situations, love of poetry, hesitation in expressing his views before others, dutifulness, ignorance of social behaviour etc. Such an individual is deeply interested in, almost lost in himself. He likes to have as little conversation and contact with others as possible. He is easily saddened. Reading of book is one of his commonest habits. His behaviours possess very little flexibility. He has more skill in his work than the extrovert because without caring for the world's opinion he devotes himself to his own work and thus progresses rapidly along his chosen path.

Ambivert, individuals of this kind exhibit the characteristics of the introvert in some situations and those of the extrovert in other circumstances. For instance individual may be a good speaker and an expressive writer but he prefers to work in solitude.

1.4 INSTRUCTIONAL DESIGN

Instructional design has been considered very important in education. It stimulates the students to understand and learn more. Also, it helps the teachers to know whether teaching methods are effective or not and helps them in bringing improvement accordingly.

Kulik and Kulik's meta-analysis of 254 controlled studies of students from kindergarten through higher education found that computer-based instruction (CBI) had an average of ES of 0.30; for individual studies in which differences in achievement were statistically significant, the difference favoured CBI in 94 percent of the cases (Kulik,1994). In a follow-up analysis of 97 of these 254 studies, kulik found an average ES of 0.38 for CBI involving drill and practice and tutorial software. Ryan's meta-analysis of 40 comparative studies of the use of computers in
elementary schools yielded an average ES of 0.309 and demonstrated that the amount of technology-related teacher training was significantly related to the achievement of students receiving CBI (Ryan, 1994). Another meta-analysis (Drowns, 1994) suggested that the incorporation of word processing into writing instruction could help students produce higher quality writing.

Bialo (1995) revealed educational technology has demonstrated significant positive effect on achievement. Positive effects have been found for all major subject areas, in preschool through higher education, and for both regular education and special needs students. Evidence suggested that interactive video was especially effective when the skills and concept to be learned had a visual component and when the software incorporated a research-based instructional design.

Khanna and Lamba (1997) described that instructional designs were the sums of teaching-learning structures, teaching theories and structures of content. They are concerned with the application of modern skills and techniques for the requirement of education and training.

Instructional Designs have the following characteristics:
- They emphasise structure of the task. Content is analysed for structure.
- They analyse learner’s response in view of objectives and levels of learning.
- They consider entering behaviour for providing new stimuli to have desired responses from the learners.
- They involve the selection of appropriate teaching strategies, techniques and tactics for generating desired learning structures.
- They employ the technique of motivation for leading the teaching.
- They involve the construction of the measuring instrument for evaluating the performance level of the learners.

Bialo and Kachala (1999) indicated that fourth and fifth graders who had engaged in telecommunications based science activities made significant gains in
such skills as the use of graphs for organising observations, the interpretation of data, and the identification of map locations. Weir (1992) revealed that several of the studies related to interactive video, discs and particularly one that investigated students' abilities to extract relevant information for problem solving also underscored the link between information use and student achievement. Grossen and Lee (1994) indicated that as students engaged more and more frequently with these information rich technologies their abilities to identify, evaluate and use information would become increasingly important to their achievement.

- **Computer Assisted Instruction (CAI)**

In the present day technologies have been vastly developed, specially the computer and its use in all sectors of life. Computer has emerged as an effective and efficient medium of instruction in the advanced countries of the world. It is being used to impart formal and non-formal education at all levels and in all the areas.

Speaking broadly, CAI is the use of a computer to interact directly with the students for learning and testing students' achievement. Due to the computers' flexibility and capacity to provide branching instructing, it can assume the guidance role of the teachers, while also providing the students with necessary reference materials, simulated laboratory facilities, services depending upon the capabilities of the computer and the terminal used by the students. Some of the applications of CAI are to display lesson material, provide drill and practice, reinforce learning, simulate environmental conditions and display relevant stimuli and administer tests. (Sood, 1994).

- **Advantages of Computer Assisted Instruction, CAI (Kumar, 2000).**

The basic tenets of computer assisted instruction offer the following advantages over other systems of instruction:

- Each student receives instruction at his own pace.
Each student responds continuously as he receives instruction.
Each student receives rapid feedback for his response.
All units of learning are broken down into sub-units and small elements of learning in accordance with Skinner's approach of teaching in small steps.
Reinforcement of learning is achieved by personal messages, i.e., "Yes, that is right", etc.
Learning sessions are kept manageable by designing the duration between half an hour to one hour.
Lessons from the theories of learning are taken into account at the stage of instructional design.
Students can access the computers at any place, e.g., in their hostel rooms, in the tutorial rooms or at another place.
Students can learn in their own styles and ways, i.e., through examples, through case studies or through problems.
Students can test their own learning at any time of progress. End of unit learning may also be timed at one's convenience.
Teacher-time is saved from the routine information-giving activity and employed in innovative instruction-design and student guidance, etc.,
Advantages of different modes of learning are accrued by employing them appropriately, wherever desirable, i.e., lesson presentation, tutorial, exercise, simulation, etc.

According to the recent review of literature, Canady (1990) compared three instructional approaches CAI, Co-operative Learning and Teacher Directed Instructions. It was found that no significant differences existed between the three groups on improving student performance on mathematical concepts, problems, computation and total.
Dungan (1991) found that students who received traditional instructions along with CAI achieved significantly higher level on reading than the students who received only traditional instruction.

Nwaizu (1991) indicated that in terms of achievement gains, CAI intervention was slightly more effective than TAI intervention over their baseline means, both interventions were equally effective in terms of relative number of problems completed by each student.

Mahajan (1993) indicated that the CAI for teaching singulars and plurals was found to be more effective in terms of achievement of students belonging to experimental group at the 0.05 level. In another experiment he found Computer Assisted Linear Programming on Geometry to be more effective in terms of achievement of students belonging to experimental group than that of control group at 0.05 level.

- **Overhead Projector (OHP)**

Overhead projectors (OHP) are useful alternatives to black board. Writings or pictures on transparencies are projected into a screen. They are used to present model sentences, explanations, pictures etc. Teaching by Overhead projectors can be made easy and interesting of learning (Antony, 1993).

Bennett (1996) indicated that there is more use of traditional media such as overhead projector and filmstrip projectors in schools, rather than more advanced (high-tech) media and that computers are still used more for lower level activities, such as computer literacy.

Herman (1997) studied “teacher use of and beliefs about media in the elementary school classrooms of Texas” and showed that tape recorders, VCRs, computers and overhead projectors are the most frequently used media.
Advantages of Overhead Projector, OHP (Sampath, 1987)

1. Large image: A very large projected image in a minimum of projection distance is obtainable.

2. Face the audience: The teacher can always face the class, maintaining eye contact with the pupils. There is no "back and forth" action when using the OHP as in the case of chalkboard.

3. Lighted room: This equipment can be used in a well-lighted room which enables the teacher to develop a sort of "circuit of understanding" by watching the expression of others.

4. Identity with the user: Whether in a teaching or a presentation situation, the audience sees the visualisation from the same point of view as the communicator. The feeling of oneness with the communicator is created.

5. Light weight: The comparative lighter weight of equipment makes it portable.

6. Flexibility and versatility: The "user operated" visualisation may be integrated into the total presentation with complete flexibility. The teacher maintains complete class control and interest in a lesson by turning a switch on or off.

7. Personalised presentation: A personal approach is possible because projector materials may be tailor-made by the person who will use them. By employing some of the techniques like pointing method, revelation technique, silhouette technique and presentation of visuals step by step with the help of overlays, the teacher can enhance the interest in the lesson and maintain attention.

8. Home-made materials: Effective visuals can be made in a minimum of time and at low cost. Once a transparency is made, it is permanent. It need not be erased as in a chalkboard.
1.5 ACADEMIC ACHIEVEMENT

In the present study academic achievement is the dependent variable of study and is restricted to the achievement of the students in Technical Colleges of Thailand.

Achievement in the area of academics is a complex behaviour, it is a resultant of factors interacting with each other. There are many reasons that have been advanced to the enhancement rate of failure and under-achievement. Many believe that faulty study habits, Low I.Q., faulty teaching methods, erroneous examination system, social and economic disparities are considered important contributing factors in failure and poor achievement.

The researches carried out during the last few decades have shown that students' academic deficiency is not due to a single factor like intelligence but a host of other relevant factors. Stagner (1961) observed that, the relationships between academic achievement and intelligence were dependent upon certain personality factors. Investigations by Frenkel (1960) have shown that superior or even gifted children as identified by various tests may be underachievers (Gupta, 1978).

Mehta (1969) expressed the view that the word "performance" was a wider term, which included both the Academic and Co-curricular performance of an individual. Achievement was the learning outcome of a student. A level of Academic Achievement, in the academic field of a student, is included in the performance of an individual.

In view of other authors, such as Good (1973) and Aggarwal (1974) there seems to be considerable similarities in as much as, all of them place emphasis on knowledge attained or skills developed in the academic subjects and usually designated by test scores. It was different from proficiency in the area of different arts or physical skills. Academic or educational age, accomplishment quotient or achievement quotient were the most commonly used means to interpret the "level" of Academic Achievement of pupils in general or in specific given subject matter.
Academic Achievement is often referred to as the degree of level of success or proficiency attained in some academic work. According to Christian (1977) the word achievement indicated the learning outcome of students. As a result of learning different subjects, the behaviour pattern of the students changes. Learning affects three major areas of behaviour of students: 1) Cognitive, 2) Affective, and 3) Psychomotor. Christian (1983) revealed that all these three levels were not affected in equal measure at a time, a student may be at a higher level in one domain and lower in another.

Good (1973) referred to Academic Achievement as "the knowledge attained or skills developed in the school subjects, usually designated by test scores or marks assigned by the teacher." Bradley (1984) summarised, in the studies on factors of Academic Achievement. All these consistently emphasised the role of non-intellectual and dynamic factors in student performance.

DeBello (1990) indicated some models were multidimensional, encompassing cognitive, affective and psychological characteristics, and others were limited to a single variable, most frequently from the cognitive or psychological domain.

Dunn (1990) stated that each person was unique, could learn and had an individual learning style. Learning style was a combination of affective, cognitive, environmental and physiological responses and was a function of heredity and experience, including strengths and limitations, and develops individually over the lifespan. Individual information processing was fundamental to a learning style and could be strengthened over time.

Torres (1994) defined Academic Achievement as "the attained ability or degree of competence in school tasks, usually measured by standardised test and expressed in grades or units based on norms, derived from a wide sampling of pupils' performance."
Hein (1995) emphasized that many of the studies on learning styles have been based on the study of moderate to large groups of people. Thus the definition of "type" and "style" have been arrived at to some extent, based on the average of the groups. As an instructor it is fine to use these results when considering the class as a whole, however averages do not represent an individual. Furthermore, we need to embrace the fact that each student is a unique individual and be prepared to adjust our teaching strategies appropriately.

Assessing an individual's learning style is vital to the teaching and learning process. Many different learning style assessment models and instruments are available (Hein and Budny, 1999).

1.6 JUSTIFICATION OF THE PROBLEM

Today's education is increasing range of audio-visual aids and is bombarded by conflicting views as to their educational effectiveness (Rodwell, 1978). The twentieth century has seen more changes in scientific, technological and communication development than had been achieved during all the earlier centuries. The teacher finds himself in the midst of a revolution in communications, classroom strategy and the very nature of his students (Wittich and Schuller, 1979).

In the present time many researches have been conducted to find out the effectiveness of teaching through different modes of instructional designs in relation to some independent variables. Anderson (1985), Okey (1985), Hayes (1987), Trilidtzke (1988) and Clarke (1993) studied the effectiveness of teaching through Computer Assisted Instruction (CAI) and the other styles of Instructional Designs. They revealed that Academic Achievement was related to Instructional Designs. Nevertheless, no study has been conducted to evaluate Academic Achievement in Bloom's Taxonomic Categories in relation to the two modes of Instructional Design:
CHAPTER I
INTRODUCTION

Computer Assisted Instructional (CAI) and Overhead Projector (OHP) along with the variables of Achievement Motivation and Personality types.

The present study is intended to study the achievement of the industrial education students in relation to the variables of Instructional Design, Achievement Motivation and Personality Types. For this, the diploma level students of three Technical Colleges from northern part of Thailand have been considered as the sample of research.

1.7 STATEMENT OF THE PROBLEM

The title of the present study may be stated as follows:

"An Investigation into the Achievement of the Industrial Education Students of Thailand in Taxonomic Categories in Relation to Instructional Design, Achievement Motivation and Personality Types"

1.8 OBJECTIVES OF THE STUDY

The following objectives have been formulated for the present study:

1 To study the effect of Instructional Design on the Achievement of the students in Taxonomic Categories of Knowledge, Comprehension, Application and on the Total of Taxonomic Categories.

2 To work out the effect of Achievement Motivation on students' Achievement in Taxonomic Categories of Knowledge, Comprehension, Application and the Total of these Taxonomic Categories.

3 To find out the effect of Personality Types on students' Achievement in Taxonomic Categories of Knowledge, Comprehension, Application and on the Total of Taxonomic Categories.

4 To study the interaction effects of Instructional Design, Achievement Motivation and Personality Types on the Achievement of the students in Taxonomic Categories.
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Categories of Knowledge, Comprehension, Application and the Total of Taxonomic Categories.

5 To study the intercorrelations among the variables of Instructional Design, Achievement Motivation, Personality Types and Academic Achievement in three areas of Bloom's Taxonomic Categories and Total of Taxonomic Categories.

1.9 HYPOTHESES OF THE STUDY

The hypotheses formulated for the present investigation are as follows:

1 The group learning through CAI will perform better in Achievement than the group learning through OHP in Knowledge, Comprehension, Application and Total of Taxonomic Categories.

2 High Achievement Motivation group will perform better in Achievement in all the Taxonomic Categories and the Total of Taxonomic Categories than the group with Low Achievement Motivation.

3 There will be no significant differences in the Achievement of Extrovert & Introvert students in the various Taxonomic Categories and the Total of Taxonomic Categories.

4 The interaction of the variables of Instructional Design, Achievement Motivation and Personality Types would significant on Achievement in three Taxonomic Categories as well as on the Total of Taxonomic Categories.

5 The intercorrelation among the variables of Instructional Design, Achievement Motivation, Personality Types and Achievement in the three Taxonomic Categories and their Total will be positive and significant.

1.10 DELIMITATION OF THE STUDY

The study is delimited to the technical colleges under Department of Vocational Education (DOVE) in the northern part of Thailand. The sample for the
present study consisted of 600 students, which was drawn from diploma level students of three technical colleges in northern part of Thailand in different stages. The investigation was conducted in respect of two levels of each variable as given below:

- **Achievement Motivation**
  - High-Achievement Motivation, $A_1$
  - Low-Achievement Motivation, $A_2$

- **Personality Types**
  - Introvert, $P_1$
  - Extrovert, $P_2$

- **Instructional Design**
  - Computer Assisted Instruction, $I_1$
  - Overhead Projector, $I_2$

- **Three levels of Taxonomic Categories given by Bloom (1956) were taken into consideration:**
  - Knowledge
  - Comprehension
  - Application

The Total score on all the Taxonomic Categories given above comprised the Total Academic Achievement of the learners.