CHAPTER II

RELATED LITERATURE

A review of literature related to the problem, is very essential to clearly understand the problem and to make predictions regarding outcome of the manipulation of the variables. In this chapter studies of the related literature in regard to the independent variables of Instructional Design, Achievement Motivation and Personality Types and their relation with the dependent variable of achievement of students have been given. The related of literature has been classified under the following headings:

- Studies on Academic Achievement in Bloom’s Taxonomic Categories.
- Studies on Instructional Design and Academic Achievement.
- Studies on Achievement Motivation and Academic Achievement.
- Studies on Personality Types and Academic Achievement.

2.1 STUDIES ON ACADEMIC ACHIEVEMENT IN BLOOM’S TAXONOMIC CATEGORIES

Ungerer (1984) described steps taken in initiating a programme for gifted students undertaken in 11 secondary schools in Cape Province, South Africa. The development of an identification model was made difficult because the fixed South African education system inhibits creativity and productive thinking abilities. Factors used to select students for the programme included previous and current academic achievement, intelligence quotient, behaviour characteristics, teacher and pupil nominations. Differentiated goals were developed for each participating school based on number of students and staff involved, facilities available and geographical area. Within each school, a steering committee of interested staff designed a prototype programme which used combinations of the four available teaching strategies:
enrichment, grouping, acceleration and guidance. The system of withdrawal was used heavily in all the 11 schools. Curriculum design presented the greatest difficulty for each school; the most popular model used was Bloom's Taxonomic Objectives.

Whiting (1985) reported on use of a tutorial programme written in STAF2 authoring to replace human teaching in an undergraduate biology mastery learning programme. Learning was assessed cognitively in terms of Bloom's Taxonomy. Students taught by the STAF2 computer programme attained significantly higher scores for Retention, Application and Evaluation of Knowledge.

Anderson (1992) discussed the assessing of student performance on simulation exercises focused on a study that examined the relationship between financial performance and various other measures of student learning in a business simulation. The use of Bloom's Taxonomy of learning was explained and further research was suggested (14 references).

Naval (1993) asserted that a group of nine Filipino children (age five to nine) from disadvantaged backgrounds received training in higher level cognitive thinking skills and this group was compared to a control group that received no training. The training programme was based on Benjamin Bloom's Cognitive Levels of thinking. Students receiving the training showed better performance on Knowledge, Comprehension, Evaluation and Creative Thinking.

Marran (1995) studied "An Action Vocabulary for Thinking Spatially : The National Geography Standards and Defining What Students should know" and asserted that the National Geography standards identity what students should know and be able to do as a result of geography instruction by identifying the action verbs used in the standards' activity statements. These action verbs were discussed in the context of Bloom's Cognitive Taxonomy.

Smith (1997) reviewed researches since the 1890s. The researcher studied the impact of teachers' characteristics and styles on their students' progress. Many
attempts to quantify basis of quality teaching were made. The research was concerned
with describing the characteristics of the effective teacher, although there was not any
attempt to determine whether the identified teacher qualities were actually correlated
with student learning outcomes. These studies led to the investigation of process-
product processes, as displayed in the development of teacher assessment instruments.
Researchers were currently trying to identify the interpersonal teaching styles of
teachers and to determine their effects on students' cognitive and effective outcomes.
Research had not yet addressed the effect of interpersonal teaching behaviour and
student cognitive outcomes at the six Taxonomic Levels of Cognition developed by
B.Bloom. Research to investigate the correlations and the significance of any
correlations among students' responses to the Questionnaire on Teacher Interaction,
Achievement test scores and Cognitive outcomes was proposed (Contains 50
references).

Chang (1999) investigated the effects of cooperative learning instruction
versus traditional teaching methods on students' earth science achievement in
secondary schools. Study results indicated that: (a) no significant differences were
found between the experimental groups and the control groups in Knowledge,
Comprehension and Overall Achievement. (b) students who worked cooperatively
performed significantly better than students who worked alone on the Application.
These findings suggest that cooperative learning strategies favour students' earth
science performance at higher but not lower levels of cognitive domains in the
secondary schools.

Yuthim (2001) found that mean gain score of Academic Achievement of
students learning through Linear Programme was higher in the areas of Knowledge,
Comprehension, Application and also in the Total Academic Achievement of Bloom's
Taxonomic Categories than that of the students learning through Adjunct Programme.
2.2 STUDIES ON INSTRUCTIONAL DESIGN AND ACADEMIC ACHIEVEMENT

Cohen (1980) indicated that computer based instruction versus traditional teaching in past-secondary classrooms revealed higher student examination scores in favour of Computer Assisted Instruction (CAI) approach. Kulik (1983) also reported a small effect size favouring the use of computer materials over traditional methods.

Kumar (1981) conducted an experimental study having three methods and two levels of intelligence in 3 x 2 factorial design. He had two groups of 90 students each of classed IX and X and exposed one group to the programmed learning method and the other to the multi-media method. The latter tended to be more effective than the programmed learning method.

Several recent meta-analysts have examined the research literature on Computer Assisted Instruction (CAI) specifically in science education. Willet (1983) found a gain achievement score measures (mean effect size of + 0.13) as a result of the use of Computer Assisted Instruction (CAI).

Wise (1983) found that students using personal computers enjoyed significantly higher course average, improved performance and positive attitudes toward the use of computers in their course work.

One unpublished study reported significant learning gains for computerised learning in college biology and another study claimed positive feedback by students using computer-based instruction (Olstad, 1983).

Rabindradas (1984) found that the self instructional material on health education developed by him for school students resulted in better learning than the conventional classroom teaching.

Brag (1985) studied the effect of Computer Assisted Instruction (CAI) upon reading achievement with selected fourth grade children and it was concluded that from the educational point of view, the experimental group (CAI) made a significant
gain in reading achievement, matching the software to the objective being taught in the traditional reading curriculum appeared to be an effective educational practice. Also Okey (1985) claimed that Computer Assisted Instruction (CAI) significantly improved learning in the science classroom.

Kothari (1985) comparing the efficacy of different instructional media in teaching algebra to the pupils of class IX, reported that the visual projection was more effective than activities on experiments or programmed learning material.

Thormson (1985) carried out a study on achievement as a function of learning style preferences in beginning computer programme. The result was that achievement in beginning computer programming classes was not a function of learning style and that last week learning was significantly dependent on first week learning style where a change in learning style occurred, the change seemed to be related to course content or achievement.

West (1985) conducted a study to enhance mathematics ability in sixth grade females via computer based graphics and problem solving and the findings of the study indicated that the educators could enhance mathematics ability of sixth grade students via computer based graphics and problem solving, they emphasised the need of supplementing the classroom mathematics programme with the use of computer programme designed to develop these skills.

Hayes (1987) based upon his findings reported that Computer Assisted Instruction (CAI) could increase the academic gains of middle school students in both reading and mathematics when delivered in an organised and well planned way, covering the same essential elements of the curriculum as presented through traditional instruction. The several variables introduced into the study provided some useful data regarding the type of students who might benefit most from such programme.
Trilidtzke (1988) studied the comparison of the effectiveness of Computer Assisted Instruction (CAI) on three selected topics in a college algebra course. The results showed that the use of the software package was as effective as classroom instruction on the three topics used in the study.

Estes (1990) examined the effects of implementing graphics calculator and computer technologies as instructional tools in applied calculator. He compared the experimental group with the control group which was taught by traditional methods. The experimental group scored significantly higher on conceptual achievement while there was no significant difference in procedural achievement. The calculator and computer technologies appeared to have positive impact on conceptual achievement.

Grossen (1990) indicated that 11 of the subjects were field dependent learners and 14 were independent learners. The males were split evenly among field dependence/independence, while two of the females were field dependent and five were field independent. The mean score for the variable learning style was 11.4 which approximates the national norm. In addition, the range of scores was from the minimum possible score to the maximum possible score. From the data collected, one may immediately conclude that in this sample, female subjects tended to be more independent than male subjects. The related literature would suggest the opposite to be the case. Furthermore, with the range of score found within the sample, the teacher must ensure that the teaching behaviours exhibited vary such that all learners and learning styles are included in the lesson.

Grossen (1994) revealed that the students who used a version of the software that instructed them to generate a diagram before choosing the correct one significantly outperformed students who used a version that did not include this embedded strategy. Furthermore, the embedded strategy group also significantly outscored the others on more difficult logic tasks.
Lee (1990) found that computer programming had a moderate positive effect on achievement, a slight positive effect on problem solving skills and attitudes toward Mathematics instruction and a great positive effect on attitudes toward computers for elementary and secondary students.

Clarke (1993) found that the "mobility" learning preferences were not favoured by those who improved whether, working with Computer Assisted Instruction (CAI) or Non-CAI educational setting. Also, those students within the control group, not preferring "mobility" to a significant extent, out performed those who did.

Kinzie (1993) indicated that positive results have also been reported for education technology based science learning: for example, in a comparison between high school biology students who used only a videodisc based simulation of frog dissection and those who performed a dissection but did not use the videodisc. On a test of anatomical identification, there was no significant difference between the two groups, suggesting that learning at least some kinds of information by simulation can be as effective as learning it through hands on experience. Perhaps more importantly a group of students who used the simulation as preparation for an actual dissection significantly outperformed those who did the dissection only.

O'Banian (1993) compared the effects of audio-only and computer controlled multimedia on the story comprehension abilities of kindergarten students and found that the students who had received the multimedia version made significantly more summary and inference statements and offered a wider variety of information than did the audio-only group. These students were also more likely to include the story's key components: the beginning, the problem, the attempt to resolve the problem and the final resolution. The researchers concluded that the audio included in the multimedia version helped students to form mental representations for stories and suggested that
such representations might help students develop their general sense of story structure an important pre-reading skill.

Sullivian (1993) revealed that the consistent effects of treatment across mediators and demonstrated learning style preferences to an appropriate instructional treatment, augmented learning outcomes. An additional finding was that as the degree of learning preference increased, the effect size and mean standardised difference also increased, giving support to the positions that learning styles preferences may be learning strengths.

Somewhat interesting research findings were reported by Baylor (1997). The study was experimental and evaluated the adage that "you learn it better when you teach it" by attempting to identify learning outcomes of designing instruction from text. One hundred and twenty-three community college students at a Southeastern Technical College participated and were randomly assigned to a treatment. After reading a textual passage, students were instructed to either design instruction or traditionally learn the content. The passage also differed with regard to structure, operationalised by the presence of headings and italics. Following the treatment, students answered two questions to elicit example generation based on the information in the passage. Next, students created concept maps to represent their knowledge structure of the content and finally, they answered questions regarding task engagement. Two weeks later, students recalled as many ideas as possible from the passage.

The following three independent variables were studied in a 2 x 2 x 2 design of condition (instructional design, traditional learning) passage structure (ill structured, well structured) and achievement (high, low). Dependent variables included example generation, delayed recall and task engagement. Additionally, knowledge organisation in the two conditions was assessed through the production of concept maps. It was predicted that the instructional design condition would facilitate
performance in example generation, delayed recall and lead to increased task engagement. Additionally, it was predicted that the concept maps would indicate differences in knowledge organisation between the two conditions. Contrary to the predictions, results indicated that learners generated more examples than instructional designer. Interestingly, a series of interactions of condition of condition and passage structure existed, where the well-structured passage was beneficial for the designers to generate examples but was detrimental for the learners. This effect was even more pronounced with high achievers. There was no effect on delayed knowledge organisation. While participants overall did not rate the instructional design task more favourably than traditional learning, there was an interaction indicating that low achievers preferred the instructional design task and high achievers preferred the traditional learning task. Implications for theory, research and practice were discussed.

Harris (1994) compared two methods of instruction—combination of Computer Assisted Instruction (CAI) with Micro-computer and software and printed reading materials. The results indicated that there was no significant difference favouring Computer Assisted Instruction (CAI) over self-paced individualised instruction (Non-CAI).

Madigan (1994) concluded that there were no statistically significant differences in learning as a result of two approaches—direct instruction with visual displays and direct instruction without visual displays.

Sclafani (1994) found that achievement of students was similar whether instruction was Computer Assisted or text-book. When the same teacher taught the same material in the same organised way via both media the same learning was achieved in both groups.

Torres (1994) concluded that Computer Assisted Instruction (CAI) with reinforcement resulted in significantly greater improvement in handwriting skills than
did traditional instruction. Computer instruction greatly enhanced the learning of handwriting skills.

Bialo (1995) indicated that students using hypermedia software benefit from an interface that included a graphical browser or navigation tools. This allowed the links among the various screens of information and also in their research. Bialo (1999) revealed that education technology had been found to have positive effects on student attitudes toward learning and on student self-concepts. Students who felt more successful in school were more motivated to learn and had increased self-confidence and self-esteem when using computer-based instruction. This was particularly true when the technology allowed learners to control their own learning.

The research related to technology and student attitudes in specific curriculum areas and with specific technologies reinforces these general findings. For example, a number of studies in language arts suggest that integrating computers into the curriculum can help improve student attitudes toward writing and spelling practice; studies in mathematics, science, and social science echo these positive findings (Inman, 1994).

Bialo and Kachala (1999) described positive learning effects of technology for young children and for special needs students. Since effective instruction for any population involved a number of interacting elements, it was not surprising that research on these special populations looks at a complex of factors rather than only at the comparative effects of technology-based and traditional instruction. Much of the research in these areas thus focuses on instruction that is supplemented with computer experiences and the results suggested the utility of technology-based enrichment for these populations.

Ainley and Hidi (2002) revealed that our investigations were still in their early stages. The responses recorded to our emotion and goal probes across the course of a specific learning task showed meaningful associations with both prior learner
Suwannamalai (1971) found that there was no relationship at .05 level of significance between introvert and extrovert Personality Types on Academic Achievement.

Honess (1974) found that introversion was more important for success whereas, Gover (1976) could not find any relationship between two variables.

Mohan (1974) observed a positive correlation between Academic Achievement and extroversion for arts students. Nisha (1990) found significant positive correlation between extroversion and Academic Achievement.

Goh & Charles (1978) and Upmanyu (1980) concluded that academic success and introversion were significant positively related. In between these two extremes, are studies, which could not establish any significant relationship between these two factors.

Ahuja (1978) explored the interaction of Personality Characteristics of anxiety over and above the effectiveness of programmed approach. She did not find a significant effect of anxiety on the performance of 95 students of English medium girls' higher secondary schools. She also compared the effect of immediate and delayed feedback where no difference was detected. The achievement at the knowledge level was maximum and less at the comprehension and application levels. The categories of objectives had no interaction with anxiety and feedback tactics taken together. However, anxiety, feedback and categories of objectives had an effect on achievement independent from each other.

Pervin (1980) described personality in terms of response. According to him "Personality represents those characteristics of a person or of the people that generally account for consistent patterns of response to situations".

Malhotra (1981) did not find significant difference on extroversion and introversion of the students studying different subjects.
Khanam (1989) found no relationship between programme learning material as a means of learning and personality variables such as extraversion and neuroticism. She used a mixed programme for studying the relationship between some personality variables like intelligence creativity, neuroticism, extraversion and level of aspiration. She reported programmed learning material less effective than the teacher directed structural lessons for total achievement in learning concepts and rules.

Cano (1992) revealed that just as there were learning style differences found within the sample, many personality types were also identified. In the Extraversion-Introversion (EI) dimension 40% of the subjects were I, while 56% preferred the independent learning style based on their GEFT scores. Being intrinsic is one of the characteristics of the independent learner but it was not supported by the personality type data. However, the EI dimension was consistent with the teaching style preference data. With 60% of the subjects being E, one would expect the teaching style data to indicate towards student-centered teaching. On the Thinking-Feeling (TF) dimension, 56% were T which is consistent with the 56% independent learners on the GEFT. One of the characteristics of the independent learners is their ability to be "thinkers" rather than "feelers."

DeFrugt and Mervielde (1996) found conscientiousness and openness to experience were of special educational interest. Blickle (1996) accepted that particularly conscientiousness and openness were related to learning style. The student's personality was related to learning outcome mediated by learning strategies.

DeRaad and Schouwenburg (1996) indicated that personality traits are expressed in learning styles, which are in turn reflected in learning strategies, which eventually produce a certain learning outcome. Blickle (1996) revealed that personality traits serve as directors or blocks for motivation and learning strategies.

Limberg (1998) found relationships between search style and learning style. The first group in her study had an atomistic approach to information seeking
CHAPTER II
RELATED LITERATURE

concentrating on finding facts. They wanted information that was easy to find, understand and could be reached by right choice. The third group wanted more information to be able to analyse it. Their aim was to understand and critically reflect over the material. They used many different kinds of material and many different search paths. This group could be compared to the holistic learning style. There were different uses of information and for instance relevance judgment in the three groups as a result of different conceptions of information seeking.