Kenneth E. Brown and Theodore L. Abel, (1966) in their study "Research in the teaching of high school Mathematics" showed that students, using modern methods with modern text books, made a significantly greater gain in the understanding of basic mathematical concepts over the traditional way of teaching mathematics with traditional text book in a nine grade class. Use of the discovery method and deliberate planning for the nature of creativity were recommended to sustain student interest in Mathematics even with the traditional program.

This study also showed that the teaching mathematics by the conventional classroom instruction was no more effective than the use of programmed instruction covering the same topics of mathematics. The programmed instruction group used 66% of the average time used by the group with conventional treatment. Experimentation with nonverbal programming gave hope for teaching mathematics to students from varied population groups.

Programmed instruction used as a supplement to televised instruction was more effective than kadioscopic viewing of solutions of homework problems or teacher help solutions.

A review of the history, theory, implementation and possible outcomes of programmed learning led the researcher to conclude that the method might best be used as a research tool by the classroom teacher.

A comparison of the effectiveness of the linear and brach methods showed no significant difference in the amount of learning produced by each.

In another study the verbal deductive technique was found to be superior to other combinations of deductive, inductive, verbal and non-verbal modes.

When programmed materials in a teaching machine were used as a supplement to usual class instruction in elementary algebra, the better student made more use of the programmed material. The more able students made greater achievement gain.

A programmed supplement permitted more materials to be covered in less time. A study of programmed learning in 1st year algebra showed no appreciable gain over the traditional methods, although the high ability students proceeded more rapidly, completed more materials and achieved a higher level of mastery. There was some ground for believing that the method was disadvantageous for the slow learner.

A study of retention of factual knowledge learned by programmed instruction revealed no significant difference over that learned by the usual methods.

Another study showed that pupils do learn through programmed instruction. However, it does not show that programmed instruction is better than conventional instruction.

"Many researchers are more interested in the particular thing that can be best done through programmed instruction."
In the book 'Education Psychology' written by Robert S. Ellis made a reference regarding the efficiency of teaching methods. Monnor and Marks' had reviewed the experimental studies made of teaching methods and had attempted to evaluate their cumulative degree of efficiency. They pointed out that the experimental results were not often in agreement and that, because of the complexity of the conditions involved it had usually not been possible to control all of the important variables. Consequently when better or worse results were reported for a given teaching method, it could not be sure that the difference had not been due to some other factors. If good teachers were enthusiastic about the possibilities of a method and if they worked hard at the task and succeeded in arousing the enthusiasm among pupils, the result might be better regardless of whether the method was essentially better or not. A less competent and enthusiastic teacher with a less attractive personality might use the same method and got very poor result. In fact it is probably true that, in general the teachers was counted for more than the method."

Taken as a whole, these studies seemed to show that the most effective teaching made provision for individual differences and encouraged student's initiative and responsibility, but all methods depended on the teacher.

Rao T.G.(1983) in his study "A comparative study of programmed learning and conventional learning Methods in the instruction of Mathematics - a Psychological Approach" - showed the following findings.

1. The mean performance score of the programmed Learning group and conventional group on the achievement test were less than the normative mean of the test.

4. ROBERT S. ELLIS - "Educational Psychology" published by D.VAN NOSTARTED Company INC 1951.
2. The mean performance of all programmed learning groups were higher than those of the corresponding Conventional learning groups.
3. The performance of all programmed learning groups were higher than those of the corresponding conventional learning groups.
4. The performance of urban subjects was superior to the performance of the rural subjects under programmed learning method irrespective of grade.
5. The difference between the mean performance scores of the programmed learning and conventional learning groups was the highest in case of urban subjects of Grade X.
6. There existed no sex difference in the learning gain of the programmed learning groups separated on the basis of sex.
7. Subjects of grade X gained more by the programmed learning method than the subject of grade V.
8. The learning gains in mathematics were maximum by the programmed learning method in urban private schools.
9. The high general mental ability were the highest beneficiaries of the programmed learning method.

Rastogi, S (1983) in his research findings stated that the effectiveness of the programmed materials in inducing learning amongst the students. The programmed materials could be effectively used to teach the content of maths of class X.

Kothari, R.G.(1985) in his study 'An investigation into efficiency of different Instructional Media in the teaching of mathematics to the pupils of class IX in relation to certain variables showed the following major findings : (1) Visual projection was superior to programmed learning materials.
(2) For different topics the effect of approach of teaching was found to be different.

(3) The visual projection was superior to the traditional method of teaching.

(4) Finally the visual projection was comparatively more effective than any other media like activities and experiments or even programmed learning materials.

(5) The low achievers were comparatively more benefited by programmed learning materials than the high average achievers.

Mehta, J.M. (1985) found that the programmed Instruction method is more efficient than any other methods of teaching mathematics.

In M.E.d. level, the following dissertations were studied about the teaching methodologies in Mathematics. There were six studies on teaching different methods of teaching different topics in algebra, one was by Mehta D.V. (1958).

Regarding the traditional method of teaching and the modern approach of teaching mathematics:

Dr. Emory, P. Starke, visiting American Scientist in the Mathematics Institute for secondary School Teachers in New Delhi had expressed his views as follows:

Quote: "There are two major aspects in which the traditional pattern of secondary school instructions fails to give our students an adequate understanding of the nature, scope and accomplishments of mathematics. The subject is taught as though it consisted mainly of a series of stereotyped problem with solutions handed down by teachers in text books to be memorised by the students and reproduced upon demand. On the contrary, the major emphasis should be

5. Dr. Emory, P. Starke, Visiting American Scientist, in Mathematics Institute for secondary school teacher, New Delhi.
placed upon developing a real understanding of the foundation of and
the logical relationship within mathematics. The main purpose of
problem should be to test whether the student has sufficient grasp
of basic concepts and relations to be able to workout his own
applications and solutions. Seldom should the teacher teach the
student what to think, and what to do, should rather present
experiences through which the student can discover for himself the
significant relationship and methods"(6).

Several studies have been conducted to compare the
effects of different teaching methods and strategies on mathematical
creativity of children. The programmed solving method was found more
effective than programmed instruction by Crutch Field and Corrington
(1966) and Treffinger (1969). Sequenced brainstorming was found more
effective than traditional teaching approach reported by Edward (1976)
Springer (1969) found that group counselling was more effective than
lecture method in developing creative thinking abilities among
children. Moganon (1971) conducted an experimental study to compare the
effect of two teaching methods namely rigorous and initiative. He
taught mathematics to two groups of children through the use of these
two methods and reported no significant differences between these two
teaching methods. Mainvills (1972) did not support Me Gennon's findings.
He reported that initiative teaching method was more
effective than rigorous method in the development of mathematical
creative thinking abilities among children. Nirpharake (1977) trained
the teachers to teach pupils on the following four principles viz,(1) Cognitive Objective (2) Evaluation (3) appreciation and (4)
creative, problem solving. He reported significant gains among
experimental group children on mathematical creative abilities.

(6) Bingham, N. Eldred: 'Modern Mathematics in a School
Curriculum': TEACHER EDUCATION, VOL, NO. 1, 19-5
The role of classroom interaction between the teacher and the taught had also been found very important for the development of mathematical abilities among children and had been reported by Flander (1970), Ripple (1970), Martin (1971).

During 1939-1961, the following research had been carried out relating to teaching mathematics at the secondary level of school education. In M.Ed. level dissertations and others, the investigations in the teaching of mathematics were related to (1) Comparison of methods of teaching mathematics and its various branches.

(2) On teaching of mathematics at Ahmedabad, AG Teachers Training College, there were six studies.


From the analysis of various research studies conducted in the area of teaching methodology of mathematics it did not indicate straight away which method would be effective for better and higher achievement of pupils in mathematics; but in most of the research studies, it was found that the traditional approach of teaching school mathematics had less effective and efficient under the new curriculum of school mathematics. Mehta, J.M. (1985) found that the programmed instruction method was more efficient than any other methods of teaching mathematics. Mannor and Marks, while carrying out their experimental study on efficiency of teaching method, expressed the view that the teacher was counted for more than the method. Hence the main purpose of the present study is to find out the effectiveness of new teaching methods to teach mathematics at the secondary level so that the pupils can attain better achievement in mathematics.
The review of related researchs and literatures did not indicate the existence of any study regarding the effectiveness of teaching methods in mathematics at the school level. In this study, the investigator proposes to find out the effectiveness of new teaching methods for the existing curriculum of mathematics at the school level. The investigator is expected to select a better and effective method of teaching mathematics at the school level of Arunachal Pradesh so that the performance of pupils in mathematics in the C.B.S.E. final examination would be better.