ABSTRACT
The main objectives of the study was to compare the mean scores of achievement of two groups of students taught Geography with the use of computer based mastery learning and traditional method of teaching. The study was conducted using experimental method of research. The sample for the study consisted of 60 Geography students studying in Xth class in two institutions of Lucknow City of UP. These students were divided into two groups after matching them on intelligence and socio-economic status. One group formed the experimental group and the other group as the control group. The data were collected by (i) Software packages on four units of Geography based on mastery learning, (ii) Group Test of General Mental Ability of Tandon (1971), (iii) SES Scale of Bhardwaj, Gupta and Chauhan (19880), (iv) Summative criterion test i.e. Achievement Test in Geography developed by the investigator, and (v) Formative Test for each unit developed by the investigator. The data collected by these instruments were analyzed using Mean, SD and t-test. The study revealed that there was significant difference in the Geography achievement scores of experimental group taught by computer assisted mastery learning and control group taught by traditional method of teaching where post-test, pre-test/mean gain scores of experimental group were higher as compared to control group.

Keywords: Computer, Mastery Learning, Geography, Achievement, Students

INTRODUCTION
An individual differs from another individual in terms of interest, attitude, achievement, etc. As a result of the impact of educational technology a few ideas have gained currency in education in order to cater to these individual differences. One idea is individualized instruction giving students opportunity to learn at their pace, taking their own time. This programme promotes the optimum of the potentialities of the individuals.

But individualized instruction cannot be carried out in the context of group instruction. Modern educators are eternally on the lookout for new time-saving effective methods. As the number of pupils is very large, it is not practicable to prepare individualized instructional materials to suit everyone’s needs. These problems can be solved with the help of Mastery Learning Strategy. It is an individualized instruction within the context of group instruction. Recent researches conducted in advanced countries show that mastery learning is one of the most effective technique for teaching difficult and skill subjects. Efforts to undertake studies in this line were attempted in India also. Bloom (1974) has suggested that the strategy is suitable for group based instruction and can be taken up by an ordinary teacher. Studies conducted in this area have revealed that computer based mastery of learning and other methodology of teaching are emerging as important area of educational research.
Mastery Learning

Mastery learning is based on two basic assumptions: Firstly, virtually all students can learn all important content to the level of excellence. Secondly, the primary function of school is to define learning objectives and to help all students to achieve them.

Mastery learning is a set of old and new individualized instructional ideas and practices that consistently help most students to learn excellently, quickly and self–confidently. These ideas and practices produce instruction that is systematic, provides help to students when and where they have learning difficulties, provides sufficient time for students to achieve mastery and provides a clear criterion of what constitutes mastery.

Mastery learning is defined as teaching–learning approach which asserts that under appropriate instructional conditions virtually all students can and will learn most of what is taught in school (Carrol, 1963). Block (1971) has pointed out two things: Mastery learning is an optimistic theory about teaching – learning, and Mastery learning is an effective set of individualized instructional practices that consistently help most students to learn excellent. Salvin (1987) defined mastery learning as the organization of time and resources to ensure that most students are able to master instructional objectives.

Any group of students will always enter a learning situation with great many individual differences in everything from preparation in the subject to learning style and to personality. Therefore, the advocates of mastery learning point out that there are two genotypic approaches of mastery learning. One is teacher based and group paced and another is learner based and individual paced. Group paced approach was advocated by Bloom (1974). It basically means trying to move whole class through a body of content together. It can include whole group presentations, work with small groups and help individual students. The overall objective will be for the class to master the content together.

Computer Assisted Instruction

Use of Computer Assisted learning (CAL) in education has increased in recent years (Price, 1991). Faced with increasing class sizes and heavier work load teachers are looking towards CAL as a means of supplementing class room instruction.

CAL is the use of a computer to interact directly for presenting lesson content and testing students’ progress. Because of computer’s flexibility and capacity to provide branching instruction, it can assume the guidance role of a potential teacher or instructor, while also providing students with necessary reference material, simulated laboratory facilities depending upon the capacities of computers and terminal used by the students. Some of the applications of CAL are to display lesson material, provide drill and practice, reinforce learning, stimulate environmental conditions, display relevant stimuli and administer tests.

Children differ widely in their abilities. They work at different rates and with different levels of accuracy and comprehension. So, CAL has an ability to provide individualized instruction. The computer assisted instruction whilst simultaneously handling many students, can allow each to proceed at own pace and level of achievement.

Need and Significance of the Study

Traditional method of teaching has led to a majority of students using rote memory, making use of cheap notes and guides and training to private tuitions to appear in the tests and examinations. The academic standard in the subject of Geography is deteriorating and there is an urgent need to reform methods of teaching this subject. There is urgent need to find effective methods of teaching that will develop spirit of enquiry, provide training in problem solving skills, independent thinking, develop the skill of establishing and studying relationship, analyzing the data and verifying the results among the students. The chalk and talk traditional lectures delivered by the teachers are monotonous for the students and hence do not appeal to the senses of the students. This traditional method develops
frustration among the students. Therefore, research in the field of methods of teaching will reveal which is the most effective method as compared to other, which suits to the present situation. The conventional methods of class room instruction are under the fire from all sides. Therefore, it becomes imperative to look for a method which would replace the lecture model of instruction without involving extra expenditure and waiting for new technology. Mastery learning strategy is being advocated as a viable alternative to the conventional method of instruction. The present study was an attempt in this direction.

**OBJECTIVES**

The main objectives of the study were as follows:

i. To compare the mean scores of achievement of two groups of students taught Geography with the use of computer based mastery learning and traditional method of teaching.

ii. To compare the mean gain scores of achievement of two groups of students taught Geography with the use of computer based mastery learning and traditional method of teaching after the treatment.

iii. To find which method is more effective than others in terms of students’ achievement in Geography.

**Hypotheses**

The study was forwarded on the basis of the following hypotheses:

i. There will be significant difference in the mean achievement scores of students taught Geography through computer based mastery learning before and after the treatment.

ii. There will be significant difference in the mean achievement scores of students taught Geography through traditional method before and after the treatment.

iii. There will be significant difference in the achievement scores of experimental and control groups of students taught Geography through computer based mastery learning and traditional method of teaching.

iv. There will be significant difference in the mean gain achievement scores of experimental and control groups of students taught Geography through computer based mastery learning and traditional method of teaching.

**Method and Procedure**

The study was conducted using experimental method of research. This was conducted in six phases. In the first phase, ten units based on fundamental concepts of Geography were selected for preparing mastery learning packages. In the second phase, construction and standardization of achievement test in Geography was completed. Third phase involved administration of intelligence test and SES Scale for the purpose of matching two groups. Fourth phase involved pre-testing of two groups of students on achievement test. In the fifth phase, treatment of 04 weeks was given to two groups. Sixth phase involved post-testing of two groups of students on achievement test.

**Sample**

The sample for the study consisted of 60 Geography group students studying in X class in two institutions of Lucknow City of UP. These students were divided into two groups after matching them on intelligence and socio-economic status. One group formed the experimental group and the other group as the control group.

**Tools of Data Collection**

The data were collected by (i) Software packages on four units of Geography based on mastery learning, (ii) Group Test of General Mental Ability of Tandon (1971), and (v) Formative Test for each
unit developed by the investigator, (iii) SES Scale of Bhardwaj, Gupta and Chauhan (1980), (iv) Summative criterion test, i.e. Achievement Test in Geography developed by the investigator.

Statistical Techniques Used

The data collected by the instruments as mentioned above were analyzed using Mean, SD and t test, since the purpose was to compare experimental and control groups of students on their achievement in Geography.

Analysis of Data and Interpretation

Table 1: Comparison of Pre-test and Post-test Experimental Groups of Students on Achievement in Geography

<table>
<thead>
<tr>
<th>Experimental Group</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>t-ratio</th>
<th>LS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-test Group</td>
<td>30</td>
<td>26.18</td>
<td>3.13</td>
<td>8.93</td>
<td>.01</td>
</tr>
<tr>
<td>Post-test Group</td>
<td>30</td>
<td>34.75</td>
<td>4.18</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 1 reveals that there is significant difference between pre-test and post-test experimental groups of students on achievement in Geography, because the t value is significant at .01 level of significance. Since the mean value of Post-test experimental group is higher than the mean value of pre-test experimental group of students, so it is clear that post-test experimental group of students achieved higher than pre-test experimental group of students. Thus, hypothesis No.1 that ‘There will be significant difference in the mean achievement scores of students taught Geography through computer based mastery learning before and after the treatment’, is retained.

Table 2: Comparison of Pre-test and Post-test Control Groups of Students on Achievement in Geography

<table>
<thead>
<tr>
<th>Control Group</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>t-ratio</th>
<th>LS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-test Group</td>
<td>30</td>
<td>27.01</td>
<td>3.75</td>
<td>2.28</td>
<td>.05</td>
</tr>
<tr>
<td>Post-test Group</td>
<td>30</td>
<td>29.27</td>
<td>3.94</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2 reveals that there is significant difference between pre-test and post-test control groups of students on achievement in Geography, because the t value is significant at .05 level of significance. Since the mean value of post-test control group is higher than the mean value of pre-test control group of students, so it is clear that post-test control group of students achieved higher than pre-test control group of students. Thus, hypothesis No.2 that ‘There will be significant difference in the mean achievement scores of students taught Geography through traditional method before and after the treatment’, is retained.

Table 3: Comparison of Post-test Experimental Group of Students Taught Geography through Computer based Mastery Learning and Post-test Control Group of Students Taught Geography through Traditional Method on Achievement in Geography

<table>
<thead>
<tr>
<th>Experimental/Control Groups</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>t-ratio</th>
<th>LS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post-test Experimental Group</td>
<td>30</td>
<td>34.75</td>
<td>4.18</td>
<td>5.22</td>
<td>.01</td>
</tr>
<tr>
<td>Post-test Control Group</td>
<td>30</td>
<td>29.27</td>
<td>3.94</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 3 reveals that there is significant difference between post-test experimental and control groups of students on achievement in Geography, because the t value is significant at .01 level of significance. Since the mean value of post-test experimental group is higher than the mean value of post-test control group of students, so it is clear that post-test experimental group of students achieved higher than post-test control group of students. Thus, hypothesis No.3 that ‘There will be significant difference in the
achievement scores of experimental and control groups of students taught Geography through computer based mastery learning and traditional method of teaching’, is retained.

**Table 4:** Comparison of Post-test Experimental Group of Students Taught Geography through Computer based Mastery Learning and Post-test Control Group of Students taught Geography through Traditional Method on Mean Gain Achievement Score in Geography

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>t-ratio</th>
<th>LS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Post-test Experimental Group</strong></td>
<td>30</td>
<td>8.57</td>
<td>1.79</td>
<td>18.03</td>
<td>.01</td>
</tr>
<tr>
<td><strong>Post-test Control Group</strong></td>
<td>30</td>
<td>2.26</td>
<td>0.68</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4 reveals that there is significant difference between post-test experimental and control groups of students on their mean gain achievement score in Geography, because the t value is significant at .01 level of significance. Since the mean value of post-test mean gain achievement score of experimental group is higher than the mean value of post-test mean gain achievement score of control group of students taught through Computer based mastery learning, so it is clear that post-test experimental group of students achieved higher than post-test control group of students taught through traditional method. Thus, hypothesis No.4 that ‘There will be significant difference in the mean gain achievement scores of experimental and control groups of students taught Geography through computer based mastery learning and traditional method of teaching’, is retained.

**RESULTS OF THE STUDY**

The major findings of the study were as follows:

i. There was significant difference in the pre-test and post-test achievement scores of experimental group where the post-test achievement scores were higher than the pre-test scores.

ii. There was significant difference in the pre-test and post-test achievement scores of control group where the post-test achievement scores were higher than the pre-test scores.

iii. There was significant difference in the Geography achievement scores of experimental group taught by computer assisted mastery learning and control group taught by traditional method of teaching where the achievement scores of experimental group were higher as compared to control group.

iv. There was significant difference in the mean gain achievement scores of experimental and control groups where achievement scores of experimental group taught by computer assisted mastery learning were higher than the achievement scores of control group taught by traditional method.

**DISCUSSION OF RESULTS**

The reasons for the higher achievement scores of students in geography in favour of computer based mastery learning may be due to the fact that under this model students become more systematic and assertive and their intellect and inquiry skills may be sharpened through systematic training. Moreover, computer assisted mastery learning provides individual attention and special remedial help which suits to the rate of learning of each and every student. This is individualized instruction giving opportunity to students to learn to their own pace taking their own time and get the feedback from the teacher. In contrast to this, in traditional learning, students become slow and unmotivated. Here is no individual attention and no feedback from teacher’s side. Similar results have been obtained by Block and Burns(1976), Yadava (1984), Patadia (1987) and Gulati (2001).

**CONCLUSION**

On the basis of the results of the study it was concluded that computer based mastery learning is effective on students’ achievement in Geography, because there was significant difference in the
effectiveness of two teaching methods: computer assisted mastery learning and traditional method of teaching in terms of students’ achievement in Geography.

Educational Implications

The results of the present study clearly confirms that achievement of the students by learning with the help of computer assisted mastery learning strategy is much higher as compared to traditional method (lecture method) of teaching Geography at the higher secondary level, therefore it becomes obligatory on the part of the principals and managers of the schools to provide sufficient number of computers and software packages as well as the trained persons who have sufficient computer background to help both teachers and students to make the teaching-learning process more relevant, easy, meaningful, productive and effective. The present age of information and communication technology it is imperative that each teacher is trained in using computer in the classroom.

REFERENCES