

Effect of Bloom's Mastery Learning Approach on Students' Academic Achievement in English at Secondary Level

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Abstract

Teaching method is the fundamental element of instructional process as fruitful and rewarding outcomes of instructional process depend upon effective teaching methods and that is why researchers from worldwide are trying to find out effective, successful and productive teaching methods at each level. The current study investigated the effect of Bloom's mastery learning approach on 9th grade students' academic achievement and retention in English. A sample of forty students of 9th grade randomly selected from Government Boys High School Khurram Karak was used. Due to experimental nature of the study, sample students were divided into two equal groups on the basis of pre-test scores. Pre-test post-test equivalent groups designed was used for data collection. Descriptive statistics i.e., mean, standard deviation and inferential statistics i.e., t-test were used for statistical analysis. After analyzing the data, it was come to light that Bloom's mastery learning approach has a positive effect on students' academic achievement and retention. Bloom's mastery learning approach was found more effective, successful and useful in teaching of English as compared to traditional learning approach at secondary level. Based on findings, it was strongly recommended that Bloom's mastery learning approach should be adopted by the teachers for enhancing students' performance in subject of English at secondary level.

Keywords: Mastery Learning; Bloom's Mastery Learning Approach; Secondary School Students; Academic Achievement; English

Introduction

It has been universally recognized that English has become the medium of all relevant social interactions and the ability to use English effectively is considered an absolute essential for honourable existence (Khattak, et al, 2011). English language is spoken in 188 countries and is the official language of 83 countries of the world. As a result, English is considered "world language" and is used as an official language for all international conferences (Wang, et al, 2013). In the long history of English teaching, teachers and others have made attempts to expedite and facilitate language learning process. With the increasing development of economy, people throughout the world get in touch with each other more frequently than ever. Consequently, leaning foreign language has become more and more important, especially English which is almost the international language (Li, 2012). Therefore, a number of teaching methods have been used to test the significance and effectiveness of the teaching process (Shyamlee, 2012). Throughout history, teachers have tried their best to solve the problems of how to make instructional process more effective and suitable for the learners. They believed that almost all of their students might be able to learn quite well by enhancing the worth and suitability of their teaching. This positive and optimistic outlook about instructional process can be found in the writings of such early educators as Comenius, Pestalozzi and Herbart (Bloom, 1974).

The issue regarding appropriateness of teaching methods and their effect on the academic achievement of secondary school students has been discussed and remained a very important concern in recent times (Lamidi, Oyelekan and Olorundare, 2015). Some psychologists and trainers believe that learning may be planned and organized in such a way that every student can perform and learn to achieve more academic achievement according to their capabilities. In order to achieve such goal, individual training methods are very suitable methods as in such type of methods, students learn according to their own capabilities. Mastery learning approach is one of these individual learning methods (Spencer, 1996).

Mastery learning has been familiarized since 80 years before. It was first proposed and suggested by John Carroll (Eisner, 2000). According to mastery learning approach, any teacher can help all the learners to learn excellently, speedily and self-confidently. Mastery learning believes that it can be that it can be initiated and instigated simply by transforming conventional group and teaching learning process to make sure that some students need more time and they receive proper additional teaching according to the result of the formative evaluation (Bloom, 1971). Mastery learning provides an influential and powerful new approach to student learning which can provide almost all students with the successful, effective and rewarding learning experiences (Mehtar and Rana, 2012).

A number of research studies have been conducted to compare mastery learning approach with traditional learning approach in various academic courses such, physics, chemistry athletic training education, biology, nursing education, mathematics and economics etc. and mastery learning approach was found more effective and successful (Mitee and Obaitan, 2015; Udo and Udofia, 2014; Sarita and Jyoti, 2014; Agboghorom, 2014; Adeyemo and Babajide, 2014; Sood, 2013; Achufusi and Mgbemena, 2012; Mehar and Rana, 2012; Wambugu and Changeiywo, 2008). But unfortunately, English has been ignored in this connection. Therefore, more and more research is needed in the subject of English as it is an international language. Therefore, the current study investigates the effect of Bloom's mastery learning approach on the academic achievement of 9th grade students in the subject of English. The researchers are hopeful that the findings of the study will be highly beneficial for English teachers as they will be able to improve their teaching outcomes by adopting Bloom's mastery learning approach as English teaching method. Further the study will be helpful for the curriculum developers, policy makers and ministry of education to review the curriculum in the light of Bloom's mastery learning approach and devise necessary strategies to introduce Bloom's Mastery Learning Approach to enhance teaching outcomes and students' academic achievement at secondary level.

Review of Related Literature

Mastery Learning is an instructional strategy and educational philosophy, first formally proposed by Benjamin S. Bloom in 1968. Mastery Learning is based on the belief that students must attain a level of mastery (i.e. 90% on a knowledge test) in prerequisite information before moving forward to learn succeeding information. If a learners fail to attain mastery in the given test, they are provided with additional sources in learning and reviewing the information. Then they are evaluated again. This cycle will be continued until the learners attain mastery and then move on to the next unit (<https://en.wikipedia.org>). Mastery learning is a set of group-based and individualized instructional strategies based on the principle that learners will accomplish a high level of understanding in a given area if they are given sufficient time (Anderson, 1975).

According to Davis and Sorrel (1995): "The mastery learning method divides subject matter into units that have predetermined objectives or unit expectations. Students, alone or in groups, work through each unit in an organized fashion. Students must demonstrate mastery on unit exams, typically 80%, before moving on to new material. Students who do not achieve mastery receive remediation through tutoring, peer monitoring, small group discussions, or additional homework. Additional time for learning is prescribed for those requiring remediation. Students continue the cycle of studying and testing until mastery is met". In mastery learning classes, correctives techniques are adapted to the specific weaknesses of each individual student, while in the non-mastery or traditional classes, no additional opportunities are provided for students to improve the course work (Mevarech, 2001). Mastery learning had been proven to be positive and successful especially in the area of achievement, attitudes towards learning and the retention of the content (Davis and Sorrel, 1995).

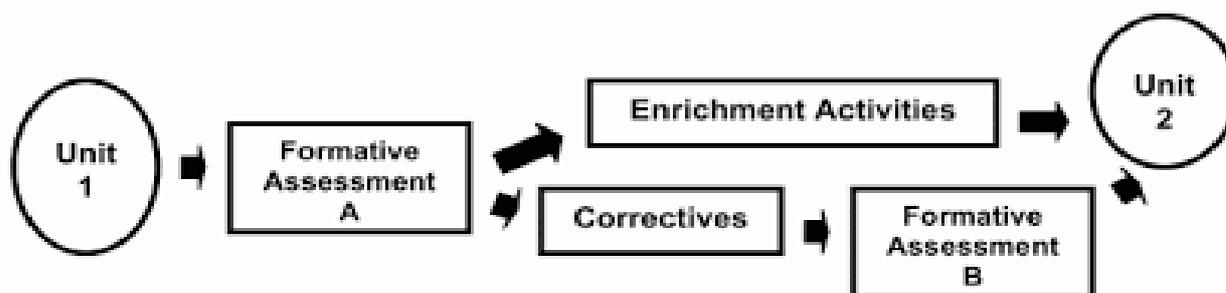


Figure 01: Mastery Learning Instruction Process (Guskey, 2005)

Bloom's Mastery Learning

During 1960's Benjamin S. Bloom started a series of inventions in order to adapt the most powerful and influential aspects of teaching and individualized instruction for improving student learning in a group-based classes. Bloom played a contributory role to change the conceptual model of school learning developed by Carroll into a working model for mastery learning. In Carroll's model aptitude was predictive of the rate at which, rather than the level to which, a student could learn. Therefore, it should be possible to fix the degree of learning expected of students at some mastery level and to systematically manipulate the relevant instructional variables such that all or almost all students attained mastery (Bloom, 1968).

Bloom's Mastery Learning was derived from Carroll's group-based mastery learning model which was only conceptual and theoretical. Bloom expanded and changed Carroll's model into an instructional and practical system for classroom learning in 1968 (Mitee and Obaitan, 2015). In Bloom's mastery learning approach, students learn with their class fellows cooperatively and the teacher controls the delivery and flow of instruction

(Sood, 2013). Bloom proposed a specific teaching learning strategy known as 'Learning for Mastery' and later it was condensed to simply 'Mastery Learning'. According to Bloom mastery learning approach, first the materials and concepts are divided into smaller units with predetermined objectives. Then instructional process begins to learn a unit by adopting appropriate teaching methods. After teaching the said unit, students' performance is assessed by giving a quiz assessment in order to provide information or feedback on their learning. Students must exhibit and achieve mastery on unit before moving on to next unit. Students who fail to achieve mastery are subjected to receive remediation through additional sources like tutoring, textbooks, alternative materials, peer monitoring, study guides, learner centered activities or additional assignment. Sufficient time for learning is provided for those needing remediation. Students continue the cycle of studying and testing until mastery is achieved and then move to the next unit (Bloom, 1968).

Previous Research Studies

Mitee and Obaitan (2015) conducted an experimental study to explore "the effect of mastery learning on senior secondary school students' cognitive learning outcome in quantitative chemistry and concluded that mastery learning is a very effective teaching method and better than the conventional teaching method. Hutcheson (2015) carried out an experimental study in order to find out the effect of mastery learning approach on student motivation in middle level science and arrived at the result that students showed an overall increase in their motivation and academic achievement when taught through mastery learning approach. Udo and Udofia (2014) conducted an experimental study to investigate the effects of mastery learning strategy on students' achievement in symbols, formulae and equations in chemistry and found that students taught using mastery learning strategy performed significantly better than those taught using the traditional expository method and that gender had a significant influence on the students' performance with the males outperforming their female counterparts. Likewise, a research study has been carried out by Sarita and Jyoti (2014) to examine the effectiveness of mastery learning model on achievement of pupils' of ix class in chemistry and they found that better gain scores were obtained by the students taught chemistry through the mastery learning model compared to those who were taught through conventional teaching (ii) Superior performance on the criterion achievement test showed by the group of students taught chemistry through Mastery Learning Model as compared those taught chemistry through conventional teaching. Agboghrom (2014) conducted an experimental study to investigate the effect of mastery learning approach on secondary students' integrated science achievement and concluded that Mastery learning approach resulted in higher achievement and found an effective teaching method. Adeyemo and Babajide (2014) carried out an experimental study to explore the effect of mastery learning approach on Students' Achievement in Physics and concluded that students showed better performance taught through mastery learning approach than those taught through traditional learning approach. An experimental study has been conducted by Sood (2013) to explore the effect of mastery learning strategies on concept attainment in geometry among high school students and found that Bloom's LFM and Keller's PSI were significantly found more effective in attainment of geometrical concepts as compared to conventional method of teaching but Bloom's LFM was significantly better in attainment than Keller's PSI. Achufusi and Mgbemena (2012) conducted an experimental study to examine the "effect of using mastery learning approach on academic achievement of senior secondary school II physics students" and found that the experimental group achieved significantly ($p < 0.05$) better than the control group. The female students achieved slightly better than their male counterparts but the difference was not significant at $P = 0.05$.

Statement of the Problem

Researches reveal that use of various teaching strategies give quite positive results in comparison to traditional teaching methodologies and traditional methods have proven ineffective (Sood, 2013; Agboghrom, 2014; Adeyemo and Babajide, 2014; Udo and Udofia, 2014). A number of research studies have been carried out to examine the effectiveness of mastery learning approach in various academic courses i.e., physics, chemistry, biology, nursing education, mathematics and economics etc. and mastery learning approach was found more effective and successful (Mitee and Obaitan, 2015; Udo and Udofia, 2014; Sarita and Jyoti, 2014; Adeyemo and Babajide, 2014; Achufusi and Mgbemena, 2012; Mehar and Rana, 2012; Wambugu and Changeiywo, 2008). But unfortunately, English has been ignored in this connection. Therefore, more and more research is needed in the subject of English as it is an international language. So, the researchers made an attempt to investigate the effect of Bloom's mastery learning approach on 9th grade students' academic achievement in the subject of English at secondary level.

Objectives of the Study

The objectives of the study were:

1. to examine the effect of Bloom's mastery learning approach on 9th grade students' academic achievement in the subject of English

2. to assess the effect of Bloom's mastery learning approach on 9th grade students' academic achievement in different level of cognitive domain i.e., knowledge, comprehension, application, analysis, synthesis and evaluation in the subject of English.
3. to explore the effect of Bloom's mastery learning approach on 9th grade students' retention in the subject of English

Hypotheses of the Study

The following hypotheses were tested to achieve the above mentioned objectives:

- H₀1: There is no significant difference in students' academic achievement of control and experimental groups on pre-test.
- H₀2: There is no significant difference in students' academic achievement of students who were taught through Bloom's mastery learning approach and the academic achievement of students who were taught through traditional learning approach on post-test.
- H₀3: There is no significant difference in students' academic achievement of experimental and control groups in different level of cognitive domain i.e., knowledge, comprehension, application, analysis, synthesis and evaluation on post-test.
- H₀4: There is no significant difference in the retention of students who were taught through Bloom's mastery learning approach and the retention of students who were taught through traditional learning approach on retention test.

Research Methodology

All the 9th grade students studying in all Government Boys High Schools in Karak District, Khyber Pakhtunkhwa (Pakistan) constituted the population of the study. Keeping in view the feasibility of infrastructure, facilities, accessibility, and easiness for researchers, the study was delimited to the students of Government Boys High School Khurram (Karak). Furthermore, the study was delimited to five units of English i.e., The Last Address of the Holy Prophet (SAW); The Two Bargains; A Visit to Swat Valley; The Farm; and A New Microbe.

As the study was experimental in nature as well as a complete list of subjects was available on the record therefore simple random sampling technique was used for drawing sample subjects. Forty students of grade 09 were randomly selected for conducting experiment. The design selected for the study was "Pre-test Post-test Equivalent Groups Design". According to the selected design, sample subjects were classified into two equal groups i.e., experimental and control groups on the basis of pre-test scores. Reliability analysis was conducted to ensure validity and consistency of the items in the given tests. Validity of the tests was checked through five experts in the field of education having doctorate degrees. Spearman-Brown Prophecy formula was used to find out the reliability of the tests.

In order to conduct experiment successfully, pre-test was given to identify the existing knowledge of students before experimental process. The test was consisted of 50 multiple choices questions prepared with help of experts. Based on the results of the same test, sample subjects were classified into two equal groups i.e., experimental and control groups. There were total 40 students in both the groups. Both the groups possess the same number of sample subjects and this was 20. In order to control extraneous variables, same instructor was appointed for teaching to both groups. In addition, similar classrooms with similar physical and educational facilities were arranged for both groups.

Before conducting experiment, proper permission was sought from the principal of the concerned school regarding conduction of experiment/collection of data. Students of experimental group were taught through Bloom's mastery learning approach while students of control group were taught through traditional learning approach. The experiment was continued for seven weeks. After completion of the experiment, a post-test was administered among the participants of the two groups immediately to examine their level of achievement. The test was composed of 50 multiple choices questions having 100 marks in total. Then the same post-test with slight modification in sequence of the items was given after a week to the students of both groups as retention test. So in this way the data was collected, tabulated, organized and analyzed. For statistical analysis, proper descriptive statistical tools i.e., mean, standard deviation, percentage and inferential statistical tools i.e., t-tests were employed. In addition, the results were elaborated through bar graphs for better understanding.

Analysis and Data Interpretation

The purpose of the study was to examine the effects of Bloom's mastery learning approach on 9th grade students' academic achievement and retention in the subject of English. Experimental pre-test post-test equivalent groups design was used for data collection. Raw data was organized, tabulated and analyzed on the basis of descriptive statistics i.e., mean, standard deviation and inferential statistics i.e., t-test. Statistical process is described as under:

Ho 1: There is no significant difference in students' academic achievement of control and experimental groups on pre-test.

Table 1: Descriptive and Inferential Analysis of Academic Achievement of Experimental and Control Group on Pre-Test

Groups	n	Mean	St. Dev.	SE	t-value	p-value
Control	20	70.21	1.28	0.41	0.486	0.629
Experimental	20	70.01	1.32			

Non-Significant **df = 38** **table value of t at 0.05 = 2.02**

It was evident from table 1 that the computed t value was found to be 0.486 which is considered statistically non-significant ($p > 0.05$) because this computed value of t is less than the tabulated value of t at 0.05 level of confidence. Hence, on the basis of the findings from above table, the null hypothesis "There is no significant difference in students' academic achievement of control and experimental groups on pre-test" was accepted. The mean values clearly indicate that there is no significant difference between the performance of control (mean=70.21, SD=1.28) and experimental (mean=70.01, SD=1.32) groups on pre-test.

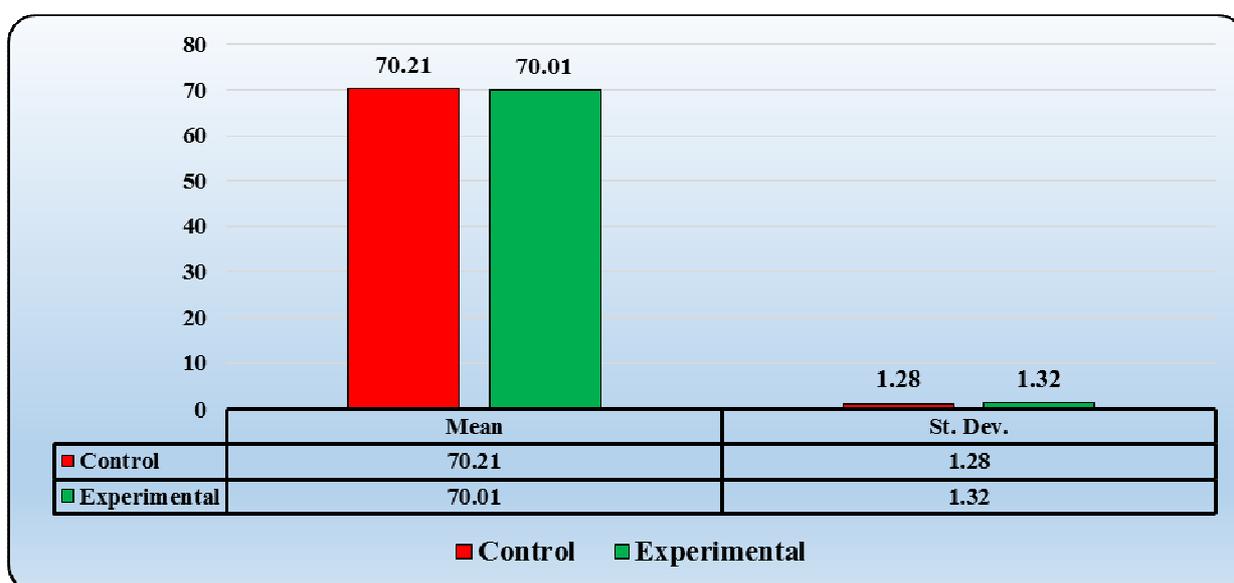


Fig 02: Showing the Mean & Standard Deviation of the Performance of Control and Experimental Groups on Pre-test

Ho 2: There is no significant difference in the academic achievement of students who were taught through Bloom's mastery leaning approach and the academic achievement of students who were taught through traditional leaning approach on post-test.

Table 2: Descriptive and Inferential Analysis of Students' Academic Achievement of Experimental and Control Group on Post-Test

Groups	n	Mean	St. Dev.	SE	t-value	p-value
Control	20	74.42	1.24	0.36	-35.71	0.000
Experimental	20	87.24	1.02			

*** Significant** **df = 38** **table value of t at 0.05 = 2.02**

Table 2 depicts that the computed t value was found to be -35.71 which is considered statistically significant ($p < 0.05$) because this computed value of t is greater than the tabulated value of t at 0.05 level of confidence. Hence, the null hypothesis "There is no significant difference in the academic achievement of students who were taught through Bloom's mastery leaning approach and the academic achievement of students who were taught through traditional leaning approach on post-test" was rejected. The mean values unambiguously show that there is significant difference between the performance of control (mean=74.42, SD=1.24) and experimental (mean=87.24, SD=1.02) groups on post-test.

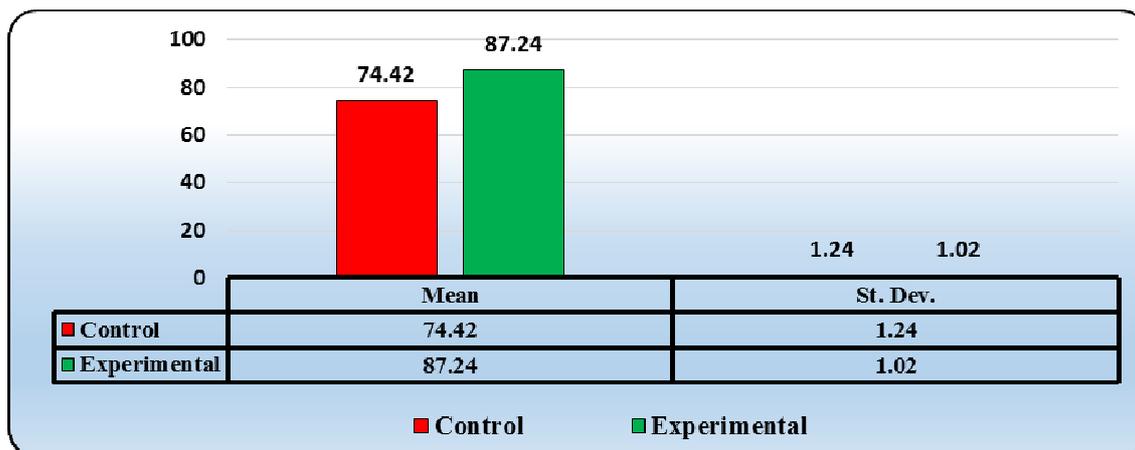


Fig 03: Showing the Mean & Standard Deviation of the Performance of Control and Experimental Groups on Post-test

H₀₃: There is no significant difference in students' academic achievement of experimental and control groups in different level of cognitive domain i.e., knowledge, comprehension, application, analysis, synthesis and evaluation on post-test.

Table 03: Descriptive and Inferential Analysis of academic achievement of students of experimental and control groups in different level of cognitive domain i.e., knowledge, comprehension, application, analysis, synthesis and evaluation on post-test.

Level of Cognitive Domain	Experimental Group		Control Group		t-value	p-value
	Mean	St. Dev.	Mean	St. Dev.		
Knowledge	16.50	0.96	14.73	0.92	5.953*	0.000
Comprehension	16.93	0.98	14.49	1.12	7.332*	0.000
Application	12.69	1.02	10.89	1.09	5.392*	0.000
Analysis	13.40	1.05	11.64	0.94	5.585*	0.000
Synthesis	13.86	0.89	11.86	0.86	7.227*	0.000
Evaluation	12.86	0.93	11.91	0.97	3.162*	0.003

* Significant **df = 38** **table value of t at 0.05 = 2.02**

Table 3 indicates that the calculated t values in each case were found to be 5.953, 7.332, 5.392, 5.585, 7.227 and 3.162 which are considered significant ($p < 0.05$) because these calculated values of t are greater than the tabulated value of t at 0.05 level of confidence. So, the null hypothesis "There is no significant difference in students' academic achievement of experimental and control groups in different level of cognitive domain i.e., knowledge, comprehension, application, analysis, synthesis and evaluation on post-test" was rejected. The mean values clearly show that there is significant difference between the performance of control (mean= 14.73, 14.49, 10.89, 11.64, 11.86, 11.91) and experimental (mean= 16.50, 16.93, 12.69, 13.40, 13.86, 12.86) groups in different level of cognitive domain i.e., knowledge, comprehension, application, analysis, synthesis and evaluation respectively on post-test. Hence, it was concluded that the students of experimental group showed better performance in each level of cognitive domain as compared to the students of control group.

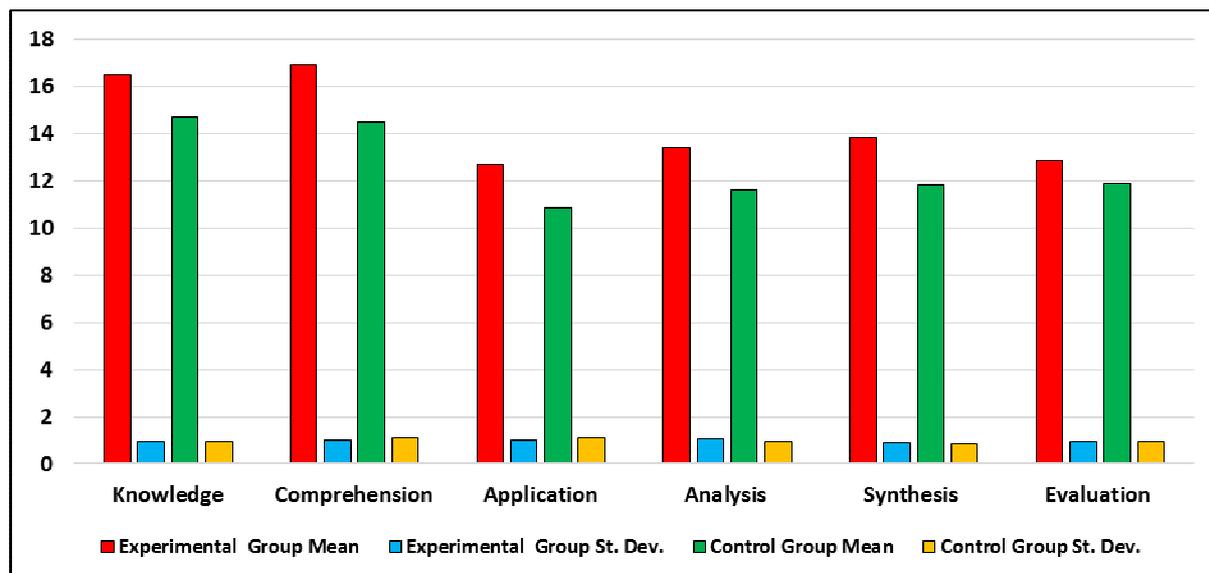


Fig 04: Showing the Mean & Standard Deviation of the Performance of Control And Experimental Groups in levels of Cognitive Domain on Post test

Ho 4: There is no significant difference in the retention of students who were taught through Bloom’s leaning approach and the retention of students who were taught through traditional leaning approach on retention test.

Table 4: Descriptive and Inferential Analysis of Academic Achievement of Experimental and Control Group on Retention Test

Groups	n	Mean	St. Dev.	SE	t-value	p-value
Control	20	72.36	1.16	0.35	-38.43	0.000
Experimental	20	85.92	1.07			

* Significant **df = 38** **table value of t at 0.05 = 2.02**

Table 4 illustrates that the computed t value was found to be -38.43 which is considered statistically significant ($p < 0.05$) because this computed value of t is greater than the tabulated value of t at 0.05 level of confidence. Hence, the null hypothesis “There is no significant difference in the retention of students who were taught through Bloom’s leaning approach and the retention of students who were taught through traditional leaning approach on retention test” was rejected. The mean values explicitly indicate that there is significant difference between the performance of control (mean=72.36, SD=1.16) and experimental (mean=85.92, SD=1.07) groups on retention test. Experimental group performed better as compared to the control group on retention test.

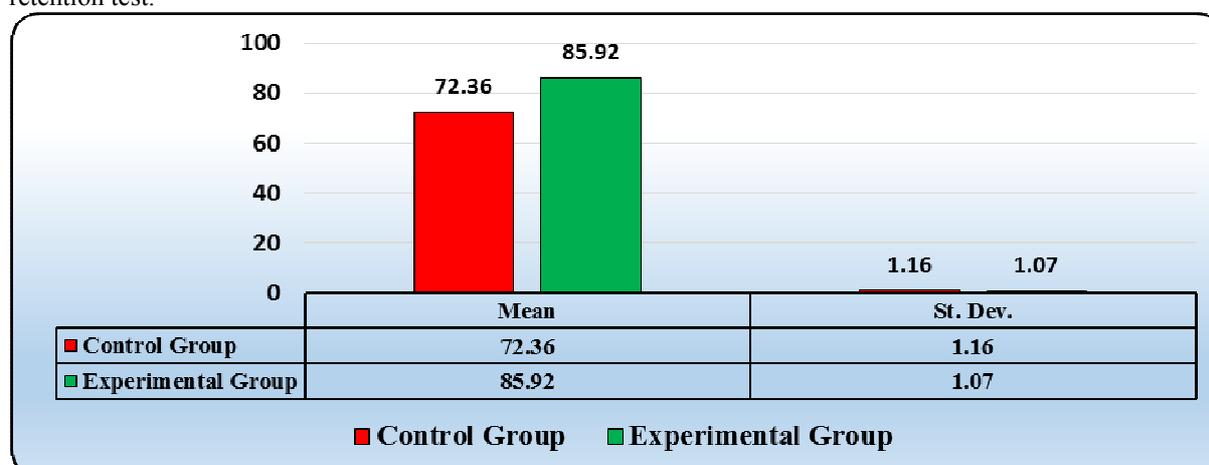


Fig 05: Showing the Mean & Standard Deviation of the Performance of Control And Experimental Groups on Retention test

Discussion

The aim of the study was to explore the effect of Bloom's mastery learning approach on students' academic achievement and retention in the subject of English at secondary level. The study was experimental and pre-test post-test equivalent groups designed was used. A sample of forty students was drawn through simple random sampling technique. The sample students were divided in two equal groups i.e., control and experimental groups on the basis of pre-test scores in the previous knowledge in English.

Descriptive and inferential analysis of pre-test mentioned in table 1 shows that the calculated t value was found to be 0.486 which is statistically non-significant ($p > 0.05$) as this calculated t value is less than the tabulated t value at 0.05 level of confidence. Therefore, the null hypothesis "There is no significant difference in the students' achievement of experimental and control groups on pre-test" was accepted. The mean values undoubtedly indicate that students of control (mean=70.21, SD=1.28) and experimental groups (mean=70.01, SD=1.32) showed similar performance on pre-test. It was concluded that performance of the both groups was same before experimental process.

The statistical results of table 2 indicate that the computed t value was found to be -35.71 which is statistically significant ($p < 0.05$) because this computed value of t is greater than the tabulated value of t at 0.05 level. Thus, the null hypothesis "There is no significant difference in the academic achievement of students who were taught through Bloom's mastery leaning approach and the academic achievement of students who were taught through traditional leaning approach on post-test." was rejected. The mean values unambiguously show that there is significant difference between the performance of control (mean=74.42, SD=1.24) and experimental (mean=87.24, SD=1.02) groups on post-test. It revealed that Bloom's learning approach was found more effective on students' academic achievement as compared to traditional learning approach on post-test.

The findings of table 3 clearly reveal that the calculated t values in each case were found to be 5.953, 7.332, 5.392, 5.585, 7.227 and 3.162 which are considered significant ($p < 0.05$) because these calculated values are greater than the tabulated value of t at 0.05 level. So, the null hypothesis "There is no significant difference in academic achievement of students of experimental and control groups in different levels of cognitive domain i.e., knowledge, comprehension, application, analysis, synthesis and evaluation on post-test" was rejected. The mean values clearly shows that there is significant difference between the performance of control (14.73, 14.49, 10.89, 11.64, 11.86, 11.91) and experimental (16.50, 16.93, 12.69, 13.40, 13.86, 12.86) groups in different levels of cognitive domain on post-test. Hence, it was concluded that the students of experimental group showed better performance in each level of cognitive domain as compared to the students of control group.

In the light of descriptive and inferential analysis of table 4, it was revealed that the calculated t value was found to be -38.43 which is considered statistically significant ($p < 0.05$) as this computed value of t is greater than the tabulated value of t at 0.05 level of confidence. Hence, the null hypothesis "There is no significant difference in the retention of students who were taught through Bloom's mastery leaning approach and the retention of students who were taught through traditional leaning approach on retention test" was rejected. The mean values explicitly indicate that there is significant difference between the performance of control group (mean=72.36, SD=1.16) and experimental group (mean=85.92, SD=1.07) on retention test. The findings show that Bloom's learning approach was found more effective on student's retention as compared to traditional learning approach.

Conclusion

The findings revealed that Bloom's mastery learning approach has a positive effect on students' academic achievement and retention in the subject of English. Furthermore, Bloom's learning approach was found more effective, successful and useful in different level of cognitive domains i.e., knowledge, comprehension, application, analysis, synthesis and evaluation as compared to traditional learning approach in English at secondary level.

Recommendations

Based on findings and conclusion, it was recommended that secondary school teachers should adopt Bloom's mastery learning approach for teaching English as it is more effective and useful as compared to traditional learning approach. They should be trained for effective teaching methodologies such as Bloom's mastery learning approach to ensure effective and successful instructional process. They should have subject mastery as well as extraordinary knowledge of teaching methodologies. Furthermore, it is recommended that such type of study should be conducted at elementary, higher secondary and tertiary level as well as in other academic subjects.

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