Chapter VI

SUMMARY AND CONCLUSIONS

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SUMMARY AND CONCLUSIONS

This chapter of the research report provides an overview of the significant aspects of the different stages of the study.

6.1 The Study in Retrospect

The different aspects of the various stages of the present study are presented in the following heads:

6.1.1 Restatement of the Problem.

In terms of learning, experiential learning can be described as a process by which the experience of the learner is reflected upon, and from this emerge new insights of learning. Therefore the topic for investigation is entitled as **EFFECTIVENESS OF KOLB’S EXPERIENTIAL LEARNING MODEL ON ACHIEVEMENT IN MATHEMATICS OF STUDENTS AT SECONDARY LEVEL.**

6.1.2 Objectives of the Study

1. To identify the learning style of students at secondary level.

2. To find out the achievement in mathematics of students taught using Kolb’s Experiential Learning Model and Activity Oriented Method.
3. To compare the achievement in mathematics of students taught using Kolb’s Experiential Learning Model and Activity Oriented Method.

4. To compare the achievement in mathematics of students taught using Kolb’s Experiential Learning Model and Activity Oriented Method with respect to their learning styles.

5. To find out the mathematics interest of students taught using Kolb’s Experiential Learning Model and Activity Oriented Method.

6. To compare the mathematics interest of students taught using Kolb’s Experiential Learning Model and Activity Oriented Method.

7. To compare the mathematics interest of students taught using Kolb’s Experiential Learning Model and Activity Oriented Method with respect to their learning styles.

8. To find out the mathematics attitude of students taught using Kolb’s Experiential Learning Model and Activity Oriented Method.

9. To compare the mathematics attitude of students taught using Kolb’s Experiential Learning Model and Activity Oriented Method.
10. To compare the mathematics attitude of students taught using Kolb’s Experiential Learning Model and Activity Oriented Method with respect to their learning styles.

11. To assess the retention of achievement in mathematics of students taught using Kolb’s Experiential Learning Model and Activity Oriented Method.

6.1.3 Hypotheses of the Study

Keeping in view of the objectives of the study, the following hypotheses were formulated.

1. The students at secondary level belong to different learning style categories.

2. The achievement in mathematics of students taught using Kolb’s Experiential Learning Model is significantly higher than that of those taught using Activity Oriented Method.

3. The achievement in mathematics of students taught using Kolb’s Experiential Learning Model is significantly higher than that of those taught using Activity Oriented Method with respect to their learning styles.

4. The mathematics interest of students taught using Kolb’s Experiential Learning Model is significantly higher than that of those taught using Activity Oriented.
5. The mathematics interest of students taught using Kolb’s Experiential Learning Model is significantly higher than that of those taught using Activity Oriented Method with respect to their learning styles.

6. The mathematics attitude of students taught using Kolb’s Experiential learning Model is significantly higher than that of those taught using Activity Oriented Method.

7. The mathematics attitude of students taught using Kolb’s Experiential Learning Model is significantly higher than that of those taught using Activity Oriented Method with respect to their learning styles.

8. The students taught using Kolb’s Experiential Learning Model have better retention of achievement in mathematics than that of those taught using Activity Oriented Method.

6.1.4 Methodology in Brief

Experimental verification was necessary to determine the effectiveness of the Kolb’s Experiential Learning Model of teaching over the Activity Oriented Method. Thus the study was conducted by using experimental method and the design selected was pretest-post test non-equivalent group design.

For the experimental study, four schools were selected from Kottayam district, giving due weightage to gender, and type of
school. The sample for the experiment consisted of 326 students of standard IX from eight divisions of the four secondary schools (two divisions from each school) selected for the study. Four divisions (one from each school) were considered as experimental group and the other four divisions (one from each school) were considered as the control group. Both the experimental and control group consisted of 163 students each. These students were selected by considering the gender and type of schools. The experimental group was taught using the Kolb’s Experiential Learning Model and the control group was taught using Activity Oriented Method.

**Tools Used**

The most important tools used for the study are

1. Lesson Transcripts Based on Kolb’s Experiential Learning Model of teaching (prepared by the Investigator)
2. Lesson Transcripts Based on Activity Oriented Method of teaching (prepared by the Investigator).
3. Kolb Learning Style Inventory (Adapted version).
4. Raven’s Standard Progressive Matrices.
5. Achievement Test in Mathematics (prepared by the Investigator)
6. Mathematics Interest Inventory (prepared by the Investigator)
7. Mathematics Attitude Scale (prepared by the Investigator)
(8) Delayed Memory Achievement test (prepared by the Investigator)

The investigator himself conducted classes in both the groups. Before the experimental treatment, the investigator compared the previous achievement in mathematics of students and their general mental ability. The different learning styles of students were identified using Kolb Learning Style Inventory (Adapted version). Pre-tests were also conducted by administering the achievement test, mathematical interest inventory and mathematical attitude scale in both the groups. After the experiment, the tests given as pre-test were administered again to both the groups as post tests. In addition to that a delayed memory achievement test was also administered to both the groups about one month after the completion of the experiment.

Statistical Techniques Used

The scores obtained by the students in the pre-test and post-test were classified, tabulated and subjected to statistical analysis. This includes comparison of mean scores of pre-test scores, post-test scores, gain scores and post delayed achievement test scores using ‘t’ test with a view to get a formal conclusion of the comparative effectiveness of the treatment. More precise conclusion was arrived at using the technique - Analysis of covariance.
6.2 **Major Findings**

The important findings that have emerged from the study are

6.2.1 While identifying the learning styles of students in experimental and control groups using the Kolb Learning Style Inventory (adapted version), comparatively majority of students of experimental group belong to Accommodating (30.67%) and Diverging (30.06%) learning style categories. 20.86% and 18.4% of students belong to the Converging and Assimilating learning Style categories respectively. The distribution of students in control group is also similar to that of experimental group. That is 33.13% and 32.52% of students in the control group belong to the Accommodating and diverging learning style categories. The percentage of students belong to Converging and Assimilating learning style categories in control group are 17.79% and 16.56% respectively. This shows that students are more or less evenly distributed with respect to their learning styles in both experimental and control groups.

6.2.2 When compared the post-test scores of the experimental and control groups with respect to Mathematics Achievement, it was revealed that the experimental and control group differ significantly at 0.01 level (t = 16.17). The ‘t’ value and the mean difference reveal that the Kolb’s Experiential Learning Model is
more effective than the Activity Oriented Method with respect to mathematics achievement.

When compared the gain scores of the experimental and control groups with respect to Mathematics Achievement to substantiate the findings obtained while comparing the post-test scores, it was revealed that the experimental and control group differ significantly at 0.01 level \((t=19.96)\). The ‘t’ value and the mean difference reveal that the Kolb’s Experiential Learning Model is more effective than the Activity Oriented Method with respect to gain mathematics achievement.

When comparing the experimental and control group with respect to pre-test and post-test scores using ANOVA, the obtained value of Fx is 1.59, which is not significant (Table F for df 1/325 is 3.86 at 0.05 level and 6.70 at 0.01 level). It shows that there is no significant difference between pre-test scores of experimental (KEM) and control (AOM) groups with respect to their mathematics achievement. The obtained Fy value is 261.35, which is significant at 0.01 level. This shows that the groups differ significantly on mathematics achievement in the post-test scores.

When comparing the experimental and control group with respect to post-test scores using ANCOVA, Since the Fyx ratio is greater than the Table value, it is significant \((Fyx=383.48, p < 0.01)\). The significant ratio for the adjusted post-test scores
show that the mean scores of students in the experimental group and in the control group differ significantly after they were adjusted for the difference in the pre-test scores.

The difference in adjusted means for post-test scores of the experimental and control groups is tested for significance for df 1/323 (t=20.96). It is significant at 0.01 level since ‘t’ value from table D is 1.97 and 2.59 at 0.05 and 0.01 levels respectively. It shows that in case of attaining mathematics Achievement, Kolb’s Experiential Learning Model (KEM) is better than Activity Oriented Method (AOM).

6.2.3 The mean Computation level achievement scores on post-test of experimental (KEM) and control (AOM) groups are compared. The ‘t’ value obtained is 7.85 which are significant at 0.01 level. The mean post-test achievement scores of the two groups states that after the treatment, the experimental group scored better than the control group. This leads to the inference that the application of Kolb’s Experiential Learning Model is superior to that of Activity Oriented Method in Computation level achievement.

The ‘t’ value obtained is 5.15 which are significant at 0.01 level, when the gain scores of experimental and control groups on Computation level achievement scores are compared. The mean difference in gain scores and ‘t’ value states that after the
treatment the experimental group scored better than the control group. This substantiates the above inference.

The obtained value of Fx is 1.95, which is not significant but Fy value is 61.69, which is significant at 0.01 level (Table F for df 1/ 325 is 3.86 at 0.05 level and 6.70 at 0.01 level). It shows that there is no significant difference between pre-test scores of KEM and AOM with respect to their Computation scores but the difference between the post-test scores are significant at 0.01 level.

From the analysis using ANCOVA, the Fyx ratio is 60.39, which is greater than the Table value and is significant (p < 0.01). The significant ratio for the adjusted post-test scores show that the mean scores of students in the experimental group and in the control group differ significantly after they were adjusted for the difference in the pre-test scores.

The difference in adjusted means for post-test scores of the experimental and control groups tested for significance for df 1/323. The obtained ‘t’ value is 8.26 which is significant at 0.01 level since value from table D is 1.97 and 2.59 at 0.05 and 0.01 levels respectively. It shows that in case of Computation level achievement, the experimental group (KEM) is better than the control group (AOM).
This leads to the inference that the application of Kolb’s Experiential Learning Model (KEM) is superior to that of Activity Oriented Method (AOM) in Computation level achievement.

6.2.4 The mean Comprehension level achievement scores on post-test of experimental (KEM) and Control (AOM) groups are compared. The ‘t’ value obtained is 8.96 which are significant at 0.01 level. The mean post test scores of the two groups states that after the treatment the experimental group scored better than the control group.

The ‘t’ value obtained is 8.64 which are significant at 0.01 level, when the gain scores on Comprehension level achievement of experimental and control groups were compared. The ‘t’ value and the mean gain scores of the two group states that after the treatment the experimental group scored better than the control group.

From the analysis using ANOVA, the obtained value of Fx is 0.09, which is not significant, but the value of Fy is 80.39, which is significant at 0.01 level. It shows that there is no significant difference between pre-test scores of experimental (KEM) and Control (AOM) groups with respect to their Comprehension level achievement, but the difference between post-test scores are significant.
From the analysis using ANCOVA, the $F_{y.x}$ ratio is greater than the Table value, it is significant ($F_{y.x}=93.3, p < 0.01$). The significant ratio for the adjusted post-test scores show that the final mean scores of students in the experimental group and in the control group differ significantly after they were adjusted for the difference in the pre-test scores.

The difference in adjusted means for post-test scores of the experimental and control groups tested for significance for df $1/323$. The obtained ‘t’ value is 9.79 which is significant at 0.01 level. It shows that in case of comprehension level achievement, Kolb’s Experiential Learning Model (KEM) is better than Activity Oriented Method (AOM).

This leads to the inference that the application of Kolb’s Experiential Learning Model (KEM) is superior to that of Activity Oriented Method (AOM) with respect to Comprehension level achievement.

**6.2.5** The mean Application level achievement scores on post-test of experimental (KEM) and Control (AOM) were compared and the ‘t’ value obtained is 16.52 which is significant at 0.01 level. The mean post test scores of the two groups states that after the treatment the experimental group scored better than the control group.
The ‘t’ value obtained is 15.66 which are significant at 0.01 level when the gain scores of experimental and control groups on Application level achievement are compared. The mean gain scores of the two groups states that after the treatment the experimental group scored better than the control group.

From the analysis using ANOVA, the obtained value of Fx is 0.71, which is not significant. It shows that there is no significant difference between pre-test scores of KEM and AOM with respect to their Application scores. The obtained Fy value is 272.03, which is significant at 0.01 level. This shows that the groups differ significantly on Application level mathematics achievement in the post-test scores.

From the analysis using ANCOVA, the Fyx ratio is greater than the Table value, it is significant (Fyx=231.84, p < 0.01). The significant ratio for the adjusted post-test scores show that the final mean scores of students in the experimental group and in the control group differ significantly after they were adjusted for the difference in the pre-test scores.

The difference in adjusted means for post-test scores of the experimental and control groups tested for significance for df 1/323. The obtained ‘t’ value is 16.83 which is significant at 0.01 level. It shows that in case of Application level achievement, Kolb’s
Experiential Learning Model (KEM) is better than Activity Oriented method (AOM).

This leads to the inference that the application of Kolb’s Experiential Learning Model is superior to that of Activity Oriented Method with respect to Application level achievement.

6.2.6 The mean Analysis level achievement scores on post-test of experimental (KEM) and control (AOM) groups are compared. The ‘t’ value obtained is 13.12 which are significant at 0.01 level. The ‘t’ value and the mean post test scores of the two groups states that after the treatment the experimental group scored better than the control group.

The ‘t’ value obtained is 12.49 which are significant at 0.01 level, when the gain scores of experimental and control groups on Analysis level achievement are compared. The ‘t’ value and the mean gain scores of the two groups states that after the treatment the experimental group scored better than the control group.

From the analysis using ANOVA, the obtained value of Fx is 1.67, which is not significant. It shows that there is no significant difference between pre-test scores of experimental (KEM) and control (AOM) groups with respect to their Analysis level achievement scores. The obtained Fy value is 173.35, which is significant at 0.01 level. This shows that the groups differ
significantly on Analysis level mathematics achievement in the post-test scores

From the analysis using ANCOVA, the Fyx ratio is greater than the Table value, it is significant (Fyx=169.8, p < 0.01). The significant ratio for the adjusted post-test scores show that the final mean scores of students in the experimental group and in the control group differ significantly after they were adjusted for the difference in the pre-test scores.

The difference in adjusted means for post-test scores of the experimental and control groups tested for significance for df 1/323. The obtained ‘t’ value is 13.39 which is significant at 0.01 level. It shows that in case of Analysis level achievement, Kolb’s Experiential Learning Model (KEM) is better than Activity Oriented Method (AOM).

This leads to the inference that the application of Kolb’s Experiential Learning Model is superior to that of Activity Oriented Method with respect to Analysis level achievement in mathematics.

6.2.7 The analysis with respect to sub-sample categories namely gender and type of school revealed that the experimental group (KEM) scored significantly better than the control group (AOM) among Boys (t=15.61) & Girls (t=11.78) and students of Government (t=12.36) & Aided (t=15.98) schools.
6.2.8 From the analysis of objective-wise achievement with respect to gender, it is evident that the experimental and control group differ significantly at 0.01 level in all objectives in Boys category. This sought of a difference exists in Girls category also except at Computational level achievement (Table No: 5.42). It reveals that Kolb’s Experiential Learning Model is better than Activity Oriented Method in objectives namely Comprehension, Application, and Analysis in Boys & Girls categories. But such difference is seen only in Boys category of the objective – Computation.

6.2.9 From the Type of school-wise analysis it is evident that the experimental and control group differ significantly at 0.01 level in all objectives in both the category of the type of schools. It reveals that Kolb’s Experiential Learning Model is better than activity Oriented method in objectives namely Computation, Comprehension, Application, and Analysis in Government and Aided schools (Table No: 5.43).

6.2.10 When the gain achievement scores with respect to the learning styles were compared, the ‘t’ value obtained in Assimilating, Accommodating, Converging, and Diverging learning style categories are 9.92, 10.19, 10.30, and 9.54 respectively. This shows that the experimental (KEM) and control (AOM) groups differ significantly on mathematics achievement in all the learning
style categories. The ‘t’ value and the mean difference reveal that the difference is in favour of the experimental group after treatment.

This leads to the inference that the application of Kolb’s Experiential Learning Model is superior to that of Activity Oriented Method in all the learning style categories.

6.2.11 It is evident from the Table 5.45 that while comparing the experimental (KEM) and control (AOM) groups on mathematics achievement among students of Assimilating learning style in objectives Computation, Comprehension, Application, and Analysis, the ‘t’ value obtained are 2.75, 3.83, 8.19, and 6.06 respectively. With respect to total mathematics achievement the ‘t’ value is 9.92. This shows that the experimental group (KEM) is superior to that of the control group (AOM) in all the four objectives among students having Assimilating learning style.

6.2.12 The ‘t’ value obtained while comparing the experimental (KEM) and control (AOM) groups on mathematics achievement among students of Accommodating learning style in objectives Computation, Comprehension, Application, and Analysis are 2.72, 4.51, 8.13, and 6.22 respectively. With respect to total mathematics achievement the ‘t’ value is 10.19. The mean difference and ‘t’ values show that the Kolb’s Experiential Learning Model is superior
to that of the Activity Oriented Method in all the four objectives among students having Accommodating learning style.

**6.2.13** The ‘t’ value obtained while comparing the experimental (KEM) and control (AOM) groups on mathematics achievement among students of Converging learning style in objectives Computation, Comprehension, Application, and Analysis are 2.14, 4.25, 7.87, and 7.34 respectively. With respect to total mathematics achievement the ‘t’ value is 10.30. All the ‘t’ values are significant at 0.01 levels. The ‘t’ values and the mean differences show that the differences are in favour of the KEM group. This shows that the Kolb’s Experiential Learning Model is superior to that of the Activity Oriented Method in all the four objectives among students having Converging learning style.

**6.2.14** The ‘t’ value obtained while comparing the experimental (KEM) and control (AOM) groups on mathematics achievement among Diverging learning style students in objectives Computation, Comprehension, Application, and Analysis are 2.99, 4.80, 2.59, and 5.82 respectively. With respect to total mathematics achievement the ‘t’ value is 9.54. The mean differences and the ‘t’ values observed are in favour of the KEM group. This shows that the Kolb’s Experiential Learning Model is superior to that of the Activity Oriented Method in all the four objectives among students having Diverging learning style.
6.2.15 The post-test scores of the experimental and control groups with respect to Mathematics Interest are compared. From the analysis, it is evident that the experimental (KEM) and control (AOM) groups differ significantly at 0.01 level (t=13.7). The ‘t’ value and the mean difference revealed that the Kolb’s Experiential Learning Model is more effective than the Activity Oriented Method in developing mathematics interest.

It is evident that the experimental and control group differ significantly at 0.01 level with respect to gain mathematics interest (t=22.57). Hence it can be concluded that the experimental group taught using Kolb’s Experiential Learning Model gained more than the control group taught using Activity Oriented Method with respect to mathematics interest. Thus it can be stated that the Kolb’s Experiential Learning Model (KEM) is more effective than the existing Activity Oriented Method (AOM).

From Table F for df 1/ 325 is 3.86 at 0.05 level and 6.70 at 0.01 level. The obtained value of Fx is 0.074, which is not significant. It shows that there is no significant difference between pre-test scores of KEM and AOM with respect to their Mathematics Interest. The obtained Fy value is 187.58, which is significant at 0.01 level. This shows that the groups differ significantly on mathematics interest in the post-test scores.
While computing ANCOVA, the Fyx ratio is greater than the Table value, it is significant (Fyx=599.37, p < 0.01). The significant ratio for the adjusted post-test scores show that the final mean scores of students in the experimental group and in the control group differ significantly after they were adjusted for the difference in the pre-test scores. The significant F-ratio necessitates proceeding to test the difference separately by ‘t’ test.

The difference in adjusted means for post-test scores of the experimental and control groups tested for significance for df 1/323. It is significant at 0.01 level (t= 25.16) since ‘t’ value from table D is 1.97 and 2.59 at 0.05 and 0.01 levels respectively. It shows that in case of developing mathematics interest, Kolb’s Experiential Learning Model (KEM) is better than Activity Oriented Method (AOM) in secondary schools.

6.2.16 From Table No: 5.55, the ‘t’ value obtained reveals that the experimental and control groups differ significantly at 0.01 level in their mathematics interest in all the sub sample categories. This shows that Kolb’s Experiential Learning Model is superior to that of Activity Oriented Method in developing mathematics interest among Boys & Girls and students in Government and Aided schools.

6.2.17 It is evident from Table No: 5.56, that the experimental and control group differ significantly in their gain mathematics
interest with respect to four learning style categories namely Assimilating, Accommodating, Converging, and Diverging styles. Therefore Kolb’s Experiential Learning Model has an advantage over Activity Oriented Method in developing Mathematics interest among students having the four learning styles.

6.2.18 When compared the post-test scores of the experimental and control groups with respect to gain Mathematics Attitude, it was revealed that the experimental and control group differ significantly at 0.01 level (t=10.36). The 't' value and the mean difference revealed that the experimental group (KEM) is more effective than the control group (AOM) with respect to mathematics attitude.

It is evident that the experimental and control group differ significantly at 0.01 level with respect to mathematics attitude (t=19.03). Hence it can be concluded that the experimental group taught using KEM gained more than the control group taught using AOM with respect to mathematics attitude. Thus it can be stated that the Kolb’s Experiential Learning Model (KEM) is more effective than the existing Activity Oriented Method (AOM).

The obtained value of Fx is 2.188, which is not significant (Table F for df 1/ 325 is 3.86 at 0.05 level and 6.70 at 0.01 level). It shows that there is no significant difference between pre-test scores of KEM and AOM with respect to their mathematics attitude.
The obtained Fy value is 107.39, which is significant at 0.01 level. This shows that the groups differ significantly on mathematics attitude in the post-test scores.

By comparing using ANCOIVA, the Fyx ratio is greater than the Table value, it is significant (Fyx=365.43, p < 0.01). The significant ratio for the adjusted post-test scores show that the final mean scores of students in the experimental group and in the control group differ significantly after they were adjusted for the difference in the pre-test scores. The significant F-ratio necessitates proceeding to test the difference separately by ‘t’ test.

The difference in adjusted means for post-test scores of the experimental and control groups tested for significance for df 1/323. It is significant at 0.01 level (t=17.42) since ‘t’ value from table D is 1.97 and 2.59 at 0.05 and 0.01 levels respectively. It shows that in case of developing mathematics attitude, Kolb’s Experiential Learning Model (KEM) is better than Activity Oriented Method (AOM) in secondary schools.

**6.2.19** From Table No: 5.63, the ‘t’ value obtained reveals that the experimental and control group differ significantly at 0.01 level in their mathematics attitude in all the sub sample categories. This shows that Kolb’s Experiential Learning Model is superior to that of Activity Oriented Method in developing mathematics
attitude among Boys & Girls and students in Government and Aided schools.

6.2.20 It is evident from Table No: 5.64, that the experimental and control group differ significantly at 0.01 level in their gain mathematics attitude with respect to four learning style categories namely Assimilating, Accommodating, Converging, and Diverging styles. Therefore Kolb’s Experiential Learning Model has an advantage over Activity Oriented Method in developing mathematics attitude among students of different learning styles.

6.2.21 While comparing the post-test scores and delayed memory achievement test scores in mathematics of students of experimental group (KEM), the ‘t’ value obtained is 1.24 which is not significant. This shows that the achievement in mathematics can be retained even after one month to those students who are taught through Kolb’s Experiential Learning Model

6.2.22 While comparing the post-test scores and delayed memory achievement test scores in mathematics of students in control group (AOM) using paired ‘t’. The ‘t’ value obtained is 9.93 which is significant at 0.01 level. This shows that those students who are taught through Activity Oriented Method could not retain their achievement in mathematics after one month from the date of administration of the achievement test as post test.
6.3 Tenability of the Hypotheses

The tenability of the hypotheses are stated below

**Hypothesis I**

The students at secondary level belong to different learning style categories.

The finding 6.2.1 shows that the students at secondary level belongs to the four learning style categories namely Assimilating, Accommodating, Converging, Diverging proposed by David A. Kolb. Hence the above hypothesis is substantiated.

**Hypothesis II**

The achievement in mathematics of students taught using Kolb’s Experiential learning Model is significantly higher than that of those taught using Activity Oriented Method.

Finding numbers 6.2.2, 6.2.3, 6.2.4, 6.2.5, 6.2.6, 6.2.7, 6.2.8, and 6.2.9 indicate that the achievement in mathematics of students taught using Kolb’s Experiential Learning Model is significantly higher than that of those taught using Activity Oriented Method. Hence the above hypothesis is substantiated.
Hypothesis III

The achievement in mathematics of students taught using Kolb’s Experiential learning Model is significantly higher than that of those taught using Activity Oriented Method with respect to different learning styles.

Finding numbers 6.2.10, 6.2.11, 6.2.12, 6.2.13, and 6.2.14 indicate that the achievement in mathematics of students taught using Kolb’s Experiential Learning Model is significantly higher than that of those taught using Activity Oriented Method with respect to their learning styles namely Assimilating, Accommodating, Converging and Diverging. Hence the above hypothesis is substantiated.

Hypothesis IV

The mathematics interest of students taught using Kolb’s Experiential learning Model is significantly higher than that of those taught using Activity Oriented Method.

Finding numbers 6.2.15, and 6.2.16 indicate that the mathematics interest of students taught using Kolb’s Experiential Learning Model is significantly higher than that of those taught using Activity Oriented Method. Hence the above hypothesis is substantiated.
Hypothesis V

The mathematics interest of students taught using Kolb’s Experiential learning Model is significantly higher than that of those taught using Activity Oriented Method with respect to different learning styles.

Finding number 6.2.17 indicate that the mathematics interest of students taught using Kolb’s Experiential Learning Model is significantly higher than that of those taught using Activity Oriented Method with respect to their learning styles namely Assimilating, Accommodating, Converging and Diverging. Hence the above hypothesis is substantiated.

Hypothesis VI

The mathematics attitude of students taught using Kolb’s Experiential learning Model is significantly higher than that of those taught using Activity Oriented Method.

Finding numbers 6.2.18 and 6.2.19 indicate that the mathematics attitude of students taught using Kolb’s Experiential Learning Model is significantly higher than that of those taught using Activity Oriented Method. Hence the above hypothesis is substantiated.
Hypothesis VII

The mathematics attitude of students taught using Kolb’s Experiential learning Model is significantly higher than that of those taught using Activity Oriented Method with respect to different learning styles.

Finding number 6.2.20 indicate that the mathematics attitude of students taught using Kolb’s Experiential Learning Model is significantly higher than that of those taught using Activity Oriented Method with respect to their learning styles namely Assimilating, Accommodating, Converging and Diverging. Hence the above hypothesis is substantiated.

Hypothesis VIII

The students taught using Kolb’s Experiential Learning Model have better retention of achievement in mathematics than that of those taught using Activity Oriented Method.

Finding numbers 6.2.21, and 6.2.22 indicate that the students taught using Kolb’s Experiential Learning Model have better retention of achievement in mathematics than that of those taught using Activity Oriented Method. Hence the above hypothesis is substantiated.
6.4 Conclusions of the Study

The major conclusions that emerged from the study are given below.

Findings of the study indicate that the students of secondary school belong to the four learning style categories proposed by David A. Kolb namely Assimilating, Accommodating, Converging, and Diverging. Comparatively majority of students belong to Accommodating and Diverging learning styles.

The achievement in mathematics of students taught using Kolb’s Experiential Learning Model is significantly higher than that of those taught using Activity Oriented Method. The objective-wise (Computation, Comprehension, Application, and Analysis) achievement in mathematics of students taught using Kolb’s Experiential Learning Model is significantly higher than that of those taught using Activity Oriented Method. The Kolb’s Experiential Learning Model is found better than the existing Activity Oriented Method among Boys & Girls and students in Government and Aided schools with respect to total achievement and objective-wise achievement.

In all the different learning style categories namely Assimilating, Accommodating, Converging, and Diverging, the achievement in mathematics of students taught using Kolb’s Experiential Learning Model is significantly higher than that of
those taught using Activity Oriented Method. In majority of cases, the objective-wise achievement in mathematics with respect to the learning style categories of students taught using Kolb’s Experiential Learning Model is significantly higher than that of those taught using Activity Oriented Method.

The mathematics interest of students taught using Kolb’s Experiential Learning Model is significantly higher than that of those taught using Activity Oriented Method. The Kolb’s Experiential Learning Model is found better than the existing Activity Oriented Method among Boys & Girls and students in Government and Aided schools with respect to mathematics interest.

The mathematics interest of students taught using Kolb’s Experiential Learning Model is significantly higher than that of those taught using Activity Oriented Method with respect to their learning styles namely Assimilating, Accommodating, Converging and Diverging.

The mathematics attitude of students taught using Kolb’s Experiential Learning Model is significantly higher than that of those taught using Activity Oriented Method. The Kolb’s Experiential Learning Model is found better than the existing Activity Oriented Method among Boys & Girls and students in
Government and Aided schools with respect to mathematics attitude.

The mathematics attitude of students taught using Kolb’s Experiential Learning Model is significantly higher than that of those taught using Activity Oriented Method with respect to their learning styles namely Assimilating, Accommodating, Converging and Diverging.

Kolb’s Experiential Learning Model is found to have more effect on the retention of achievement in mathematics than the existing Activity Oriented Method.

### 6.5 Suggestions of the Study

It was categorically proved that the application of Kolb’s Experiential Learning Model was far superior to the Activity Oriented Method in teaching Mathematics. The following suggestions are arrived at based on the findings of the study.

1. It was found that the Kolb’s Experiential Learning Model is more effective than the existing Activity Oriented Method in teaching mathematics. Therefore Kolb’s Experiential Learning Model should be introduced at secondary level for the attainment of mathematics achievement and for the development of mathematical interest and mathematical attitude.
2. The students at secondary level belong to different learning style categories. The learning style of students should be borne in mind while teaching mathematics. While we are implementing new strategies it should be looked from the point of view of their learning styles. The students belong to different learning styles learn different concepts of mathematics differently.

3. The learning style wise grouping while instruction will help for obtaining maximum output with respect to mathematics achievement. Therefore provisions should be made to identify the learning style of students at school level. So standard Learning Style Inventories like the Kolb Learning Style Inventory should be made available in schools and insist the teachers to use it and teach accordingly.

4. It was found that the Kolb’s Experiential Learning Model is more effective than the existing Activity Oriented Method in teaching mathematics. So faculty improvement programmes namely, Orientation Classes, Refresher Courses, Seminars and Workshops should be organized for the teachers to familiarize with various instructional strategies such as Kolb’s Experiential Learning Model. The concept of models of teaching and the syntax of different models must be made familiar to secondary school teachers. Therefore teachers can experiment with novel
strategies like Kolb’s Experiential Learning Model while teaching mathematics.

5. Model lesson transcripts based on different models of teaching like Kolb’s Experiential Learning Model on selected units in mathematics may be developed by a team comprises of educationists.

6. Usually the teacher trainees are not getting proper exposure to innovative approaches to teaching. Hence provisions should be made in teacher education programmes to explore the possibilities of practicing innovative models like Kolb’s Experiential Learning Model based on established theories.

7. Every school should provide ample library facilities with internet connectivity for the teachers and students to get acquaintance with latest theory and practices that are experimenting across the globe. At the same time, it should be monitored properly that all are utilizing the facilities to produce maximum output.

8. Since overcrowded class rooms and difficulty in maintaining discipline are two practical difficulties likely to be encountered by teachers while practicing the Kolb’s Experiential Learning Model, steps must be taken to revise the teacher-pupil ratio by reducing the number of students in the class.
9. The implementation of Activity Oriented Method is only in theory in most of the schools. The classes using Activity Oriented Method can also be improved if the activities in it are restructured, adopting an essence of different models of teaching wherever possible.

10. The incorporation of latest theory based models of teaching in the present day Activity Oriented Method is best suited to get optimum results particularly in mathematics in Indian context.

11. The achievement in mathematics of students will depend upon their mathematics interest and mathematics attitude. Therefore teachers should take substantial efforts to develop the interest and attitude of students towards mathematics. The teachers should make use of standard mathematics interest inventory and mathematics attitude scale.

12. Most of the teachers are very reluctant to change their method of teaching as they studied or following. So they have a negative attitude towards implementing any type of new instructional strategy. But without a positives attitude on the part of the teachers, new instructional strategies cannot be adopted. Hence some measures may be taken to develop positive attitude for adopting effective and interesting instructional strategies.
13. Teaching at secondary level should be experience based. Therefore games, activities based on experience and based on their learning styles, brainstorming etc are more appreciable at secondary level for teaching mathematics.

14. The infrastructural facilities and ‘math lab’ facilities in schools are not sufficient for implementing new methods and strategies. Therefore more facilities should be provided in all secondary schools for effective mathematics teaching.

15. Research should be conducted to develop effective and feasible instructional strategies for teaching mathematics and for developing more valuable tools for identifying the learning styles of students.

6.6 Suggestions for Further Research

The investigator is of the view that the present study opens up many new avenues for conducting more studies in future in the field of education. Some suggestions for the possible lines in which further research can be carried out are given below.

1. The present study is conducted at secondary level to find the effectiveness of Kolb’s Experiential Learning Model. This study needs to be repeated for different educational levels such as primary and higher secondary to find out the effect of this model. This study can also be repeated to other school subjects.
2. This study can be repeated for a large sample for longer
duration representing all districts in the state to ensure the
validity of the results.

3. This study carried out to find the effectiveness of the Kolb's
Experiential Learning Model with respect to achievement in
mathematics, mathematics interest and mathematics attitude.
This study can be extended to find the effect of this model on
mathematics anxiety, spatial ability and perceptual speed in
mathematics.

4. Similar studies can be conducted to find out the effectiveness of
Kolb’s Experiential Learning Model on fast learners, under
achievers, slow learners, gifted children, sensitive learners,
learners of short concentration span, and learners with learning
difficulty.

5. Similar studies can be carried out with other learning style
categories proposed by other theorists.

6. Similar studies can be conducted on academically
disadvantaged students.

7. A survey can be done to find out the problems behind
implementing the novel methods of teaching in schools.
8. A study on developing leaning materials for transacting mathematics curriculum by adapting this technique of teaching can be conducted.

9. A survey may be conducted to find the attitude of teachers towards adopting new instructional strategies especially based on learning styles.

10. Similar studies can be conducted using different combination of models from different families of models.

11. Experimental studies can be conducted to find out the effectiveness of Kolb’s Experiential Learning Model with other innovative teaching models, mastery learning, small group technique etc.