Chapter 6

SUMMARY, CONCLUSIONS AND SUGGESTIONS

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Summary, Conclusions and Suggestions

This chapter presents the summary of the study. It briefly outlines the various aspects of the study conducted, arrives at conclusions based on the findings, tests the tenability of the hypotheses formulated, gives the implications of the study, and presents suggestions for further research.

6.1 THE STUDY IN RETROSPECT

The study was an attempt to determine the effectiveness of certain Embedded Strategies on variables like Metacognitive Awareness, Approaches to Studying, Achievement in Economics, and Retention Capacity of Higher Secondary School Students. **Four hypotheses** were formulated for the study that are presented in the introductory chapter *(Chapter 1, pp. 13 to 14).* Effort was taken to realise **eight objectives** that are also detailed in *Chapter 1 (pp. 14 to 15).*

**METHODOLOGY IN BRIEF**

The **Quasi-Experimental Method** with the **Pretest–Posttest Non-Equivalent Group Design** was adopted to compare the effectiveness of Certain Embedded Strategies of Teaching with that of the Strategies of Teaching based on Constructivism. Instructional Plans based on the Embedded Strategies as well as on Constructivism were prepared in Economics for Standard XI. Twenty topic areas were selected for the Experiment from the
Purposive Sampling Technique was employed and the sample comprised of 432 XIth standard students from four Locales of Kozhikode and Waynad districts, viz. Urban, Rural, Coastal, and Tribal Locales.

A Metacognitive Awareness Inventory, an Inventory on Approaches to Studying, an Academic Performance Test in Economics, and a Delayed Memory Achievement Test in Economics were the tools used to test the effectiveness of the Embedded Strategies of instruction. The data gathered was tabulated and statistically treated using techniques like Arithmetic Mean, Standard Deviation, Test of Significance (t-test), Analysis of Variance (ANOVA), Analysis of Covariance (ANCOVA), and Karl Pearson’s Product-Moment Coefficient of Correlation. The results of statistical computations enabled the investigator to arrive at the following findings and conclusions.
6.2 CONCLUSIONS BASED ON THE FINDINGS

The major conclusions of the study are given below.

**Conclusion 1:** The Embedded Strategies are more effective than the Strategies based on Constructivism in improving the Metacognitive Awareness of Higher Secondary School Students for their Total sample and Sub samples based on Gender and Locale of School.

This conclusion is arrived at based on the following findings.

I. **Total Sample**

6.2.1 The Means of the Post-Test scores of students in the Experimental and Control groups differ significantly (CR = 8.66, p < 0.01). The Experimental group is superior to the Control group ($M_E = 241.3$, $M_C = 188.5$).

6.2.2 The Mean Gain scores of the Experimental and Control groups differ significantly (CR = 13.60, p < 0.01). The Experimental group is superior to the Control group ($M_E = 61.9$; $M_C = 14.7$).

6.2.3 The Analysis of Variance of the Pre-Test and Post-Test scores of students in the Experimental and Control groups are $F_x = 1.72$, $p > 0.05$ and $F_y = 621.91$, $p < 0.01$ respectively. This shows that the Post-Test scores of the Experimental and Control groups differ significantly.

6.2.4 The Analysis of Covariance of the Pre-Test and Post-Test scores of students in the Experimental and Control groups ($F = 908.98$; $p < 0.01$) shows that there is significant difference between the Means of the Post-Test scores of the two groups.
6.2.5 The Adjusted Y Means of the Post-Test scores of students in the Experimental and Control groups differ significantly \((t = 13.88, p < 0.01)\). The Experimental group is superior to the Control group \((M_{YXE} = 238.71, M_{YXC} = 191.15)\).

II. Gender Sub Samples

A. Boys

6.2.6 The Means of the Post-Test scores of students in the Experimental and Control groups differ significantly \((CR = 6.28, p < 0.01)\). The Experimental group is superior to the Control group \((M_{E} = 250.1, M_{C} = 199.8)\).

6.2.7 The Mean Gain scores of the Experimental and Control groups differ significantly \((CR = 11.32, p < 0.01)\). The Experimental group is superior to the Control group \((M_{E} = 60.6; M_{C} = 11.7)\).

6.2.8 The Analysis of Variance of the Pre-Test and Post-Test scores of students in the Experimental and Control groups are \(F_{x} = 0.04, p > 0.05\) and \(F_{Y} = 39.50, p < 0.01\) respectively. This shows that the Post-Test scores of the Experimental and Control groups differ significantly.

6.2.9 The Analysis of Covariance of the Pre-Test and Post-Test scores of students in the Experimental and Control groups \((F = 521.35; p < 0.01)\) shows that there is significant difference between the Means of the Post Test scores of the two groups.

6.2.10 The Adjusted Y Means of the Post-Test scores of students in the Experimental and Control groups differ significantly \((t = 16.12, p < 0.01)\). The Experimental group is superior to the Control group \((M_{YXE} = 249.4, M_{YXC} = 200.4)\).
Summary, Conclusions and Suggestions

B. Girls

6.2.11 The Means of the Post-Test scores of students in the Experimental and Control groups differ significantly (CR = 6.05, p < 0.01). The Experimental group is superior to the Control group ($M_E = 232.4$, $M_C = 177.9$).

6.2.12 The Mean Gain scores of the Experimental and Control groups differ significantly (CR = 8.44, p < 0.01). The Experimental group is superior to the Control group ($M_E = 63.1$, $M_C = 17.4$).

6.2.13 The Analysis of Variance of the Pre-Test and Post-Test scores of students in the Experimental and Control groups are $F_x = 1.36$, $p > 0.05$ and $F_y = 36.65$, $p < 0.01$ respectively. This shows that the Post-Test scores of the Experimental and Control groups differ significantly.

6.2.14 The Analysis of Covariance of the Pre-Test and Post-Test scores of students in the Experimental and Control groups ($F = 386.15$; $p < 0.01$) shows that there is significant difference between the Means of the Post-Test scores of the two groups.

6.2.15 The Adjusted Y Means of the Post-Test scores of students in the Experimental and Control groups differ significantly ($t = 8.55$, $p < 0.01$). The Experimental group is superior to the Control group ($M_{YXE} = 228.24$, $M_{YXC} = 182.17$).

III. Locale Sub Samples

A. Urban

6.2.16 The Means of the Post-Test scores of students in the Experimental and Control groups differ significantly (CR = 6.78, p < 0.01). The Experimental group is superior to the Control group ($M_E = 299.3$, $M_C = 236.5$).
6.2.17 The Mean Gain scores of the Experimental and Control groups differ significantly (CR = 9.16, p < 0.01). The Experimental group is superior to the Control group (M_E = 83.5; M_C = 6.3).

6.2.18 The Analysis of Variance of the Pre-Test and Post-Test scores of students in the Experimental and Control groups are (F_X = 3.0, p > 0.05; and F_Y = 45.79, p < 0.01) respectively. This shows that the Post-Test scores of the Experimental and Control groups differ significantly.

6.2.19 The Analysis of Covariance of the Pre-Test and Post-Test scores of students in the Experimental and Control groups (F = 43.52, p < 0.01) shows that there is significant difference between the Means of the Post-Test scores of the two groups.

6.2.20 The Adjusted Y Means of the Post-Test scores of students in the Experimental and Control groups differ significantly (t = 9.06, p < 0.01). The Experimental group is superior to the Control group (M_{YXE} = 303.7, M_{YXC} = 232.1).

6.2.21 The Means of the Post-Test scores of students in the Experimental and Control groups differ significantly (CR = 10.45, p < 0.01). The Experimental group is superior to the Control group (M_E = 261.7, M_C = 198.8).

6.2.22 The Mean Gain scores of the Experimental and Control groups differ significantly (CR = 12.81, p < 0.01). The Experimental group is superior to the Control group (M_E = 60.1; M_C = 7.1).

6.2.23 The Analysis of Variance of the Pre-Test and Post-Test scores of students in the Experimental and Control groups
are $F_x = 2.11, \ p > 0.05$ and $F_y = 109.16, \ p < 0.01$ respectively. This shows that the Post-Test scores of the Experimental and Control groups differ significantly.

6.2.24 The Analysis of Covariance of the Pre-Test and Post-Test scores of students in the Experimental and Control groups ($F = 171.72, \ p < 0.01$) shows that there is significant difference between the Means of the Post-Test scores of the two groups.

6.2.25 The Adjusted Y Means of the Post-Test scores of students in the Experimental and Control groups differ significantly ($t = 15.36, \ p < 0.01$). The Experimental group is superior to the Control group ($M_{YXE} = 258.20, M_{YXC} = 202.28$).

C. Coastal

6.2.26 The Means of the Post-Test scores of students in the Experimental and Control groups differ significantly ($CR = 3.78, \ p < 0.01$). The Experimental group is superior to the Control group ($M_E = 245.0, M_C = 214.8$).

6.2.27 The Mean Gain scores of the Experimental and Control groups differ significantly ($CR = 2.63, \ p < 0.01$). The Experimental group is superior to the Control group ($M_E = 60.9; M_C = 44.5$).

6.2.28 The Analysis of Variance of the Pre-Test and Post-Test scores of students in the Experimental and Control groups are $F_x = 2.82, \ p > 0.05$ and $F_y = 14.31, \ p < 0.01$ respectively. This shows that Post-Test scores of the Experimental and Control groups differ significantly.

6.2.29 The Analysis of the Covariance of the Pre-Test and Post-Test scores of students in the Experimental and Control groups ($F = 110.49, \ p < 0.01$) shows that there is
significant difference between the Means of the Post-Test scores of the two groups.

6.2.30 The Adjusted Y Means of the Post-Test scores of students in the Experimental and Control groups differ significantly (t = 9.84, p < 0.01). The Experimental group is superior to the Control group (M_{YXE} = 240.30, M_{YXC} = 219.58).

D. Tribal

6.2.31 The Means of the Post-Test scores of students in the Experimental and Control groups differ significantly (CR = 8.24, p < 0.01). The Experimental group is superior to the Control group (M_{E} = 159.5, M_{C} = 109.1).

6.2.32 The Mean Gain scores of the Experimental and Control groups differ significantly (CR = 8.36, p < 0.01). The Experimental group is superior to the Control group (M_{E} = 42.9; M_{C} = -0.4).

6.2.33 The Analysis of Variance of the Pre-Test and Post-Test scores of students in the Experimental and Control groups are F_x = 1.69, p > 0.05 and F_y = 67.98, p < 0.01 respectively. This shows that the Post-Test scores of the Experimental and Control groups differ significantly.

6.2.34 The Analysis of Covariance of the Pre-Test and Post-Test scores of students in the Experimental and Control groups (F = 60.70, p < 0.01) shows that there is significant difference between the Means of the Post-Test scores of the two groups.

6.2.35 The Adjusted Y Means of the Post-Test scores of students in the Experimental and Control groups differ significantly (t = 9.69, p < 0.01). The Experimental group is superior to the Control group (M_{YXE} = 157.18, M_{YXC} = 111.50).
Conclusion II: The Embedded Strategies are more effective than the Strategies based on Constructivism in improving the Approaches to Studying of Higher Secondary School Students for their Total sample and Sub samples based on Gender and Locale of School.

This conclusion is arrived at based on the following findings.

I. Total Sample

6.2.36 The Means of the Post-Test scores of students in the Experimental and Control groups differ significantly (CR = 12.39, p < 0.01). The Experimental group is superior to the Control group ($M_E = 63.9, M_C = 50.2$).

6.2.37 The Mean Gain scores of the Experimental and Control groups differ significantly (CR = 17.91, p < 0.01). The Experimental group is superior to the Control group ($M_E = 13.1; M_C = 0.1$).

6.2.38 The Analysis of Variance of the Pre-Test and Post-Test scores of students in the Experimental and Control groups are $F_\text{x} = 0.5, p > 0.05$ and $F_\text{y} = 153.6, p < 0.01$ respectively. This shows that the Post-Test scores of the Experimental and Control groups differ significantly.

6.2.39 The Analysis of Covariance of the Pre-Test and Post-Test scores of students in the Experimental and Control groups ($F = 623.1; p < 0.01$) shows that there is significant difference between the Means of the Post-Test scores of the two groups.

6.2.40 The Adjusted Y Means of the Post-Test scores of students in the Experimental and Control groups differ significantly
(t = 18.63, p < 0.01). The Experimental group is superior to the Control group (M_{YXE} = 63.66, M_{YXC} = 50.54).

II. Gender Sub Samples

A. Boys

6.2.41 The Means of the Post-Test scores of students in the Experimental and Control groups differ significantly (CR = 7.77, p < 0.01). The Experimental group is superior to the Control group (M_{E} = 66.1, M_{C} = 54.6).

6.2.42 The Mean Gain scores of the Experimental and Control groups differ significantly (CR = 11.93, p < 0.01). The Experimental group is superior to the Control group (M_{E} = 13.0; M_{C} = 1.0).

6.2.43 The Analysis of Variance the of the Pre-Test and Post-Test scores of students in the Experimental and Control groups are F_{X} = 0.13, p > 0.05 and F_{Y} = 60.39, p < 0.01 respectively. This shows that the Post-Test scores of the Experimental and Control groups differ significantly.

6.2.44 The Analysis of Covariance of the Pre-Test and Post-Test scores of students in the Experimental and Control groups (F = 269.84; p < 0.01) shows that there is significant difference between the Means of the Post-Test scores of the two groups.

6.2.45 The Adjusted Y Means of the Post-Test scores of students in the Experimental and Control groups differ significantly (t = 23.35, p < 0.01). The Experimental group is superior to the Control group (M_{YXE} = 66.29, M_{YXC} = 54.38).
Summary, Conclusions and Suggestions

B. Girls

6.2.46 The Means of the Post-Test scores of students in the Experimental and Control groups differ significantly (CR = 10.28, p < 0.01). The Experimental group is superior to the Control group (M_E = 61.8, M_C = 46.1).

6.2.47 The Mean Gain scores of the Experimental and Control groups differ significantly (CR = 13.4, p < 0.01). The Experimental group is superior to the Control group (M_E = 13.1; M_C = -0.8).

6.2.48 The Analysis of Variance of the Pre-Test and Post-Test scores of students in the Experimental and Control groups are F_x = 1.47, p > 0.05 and F_Y = 105.83, p < 0.01 respectively. This shows that the Post-Test scores of the Experimental and Control groups differ significantly.

6.2.49 The Analysis of Covariance of the Pre-Test and Post-Test scores of students in the Experimental and Control groups (F = 281.9; p < 0.01) shows that there is significant difference between the Means of the Post-Test scores of the two groups.

6.2.50 The Adjusted Y Means of the Post-Test scores of students in the Experimental and Control groups differ significantly (t = 14.22, p < 0.01). The Experimental group is superior to the Control group (M_YXE = 61.14, M_YXC = 46.84).

III. Locale Sub Samples

A. Urban

6.2.51 The Means of the Post-Test scores of students in the Experimental and Control groups differ significantly (CR = 12.27, p < 0.01). The Experimental group is superior to the Control group (M_E = 78.2, M_C = 55.1).
6.2.52 The Mean Gain scores of the Experimental and Control groups differ significantly (CR = 16.95, p < 0.01). The Experimental group is superior to the Control group (\(M_E = 19.3; M_C = -2.2\)).

6.2.53 The Analysis of Variance of the Pre-Test and Post-Test scores of students in the Experimental and Control groups are \(F_X = 0.84, p > 0.05\) and \(F_Y = 44.77, p < 0.01\) respectively. This shows that the Post-Test scores of the Experimental and Control groups differ significantly.

6.2.54 The Analysis of Covariance of the Pre-Test and Post-Test scores of students in the Experimental and Control groups (\(F = 139.1, p < 0.01\)) shows that there is significant difference between the Means of the Post-Test scores of the two groups.

6.2.55 The Adjusted Y Means of the Post-Test scores of students in the Experimental and Control groups differ significantly (\(t = 25.42, p < 0.01\)). The Experimental group is superior to the Control group (\(M_{YXE} = 77.57, M_{YXC} = 55.71\)).

**B. Rural**

6.2.56 The Means of the Post-Test scores of students in the Experimental and Control groups differ significantly (CR = 6.07, p < 0.01). The Experimental group is superior to the Control group (\(M_E = 63.6, M_C = 51.7\)).

6.2.57 The Mean Gain scores of the Experimental and Control groups differ significantly (CR = 7.19, p < 0.01). The Experimental group is superior to the Control group (\(M_E = 9.1; M_C = -1.1\)).

6.2.58 The Analysis of Variance of the Pre-Test and Post-Test scores of students in the Experimental and Control groups
are $F_x = 0.72$, $p > 0.05$ and $F_Y = 36.94$, $p < 0.01$ respectively. This shows that the Post-Test scores of the Experimental and Control groups differ significantly.

6.2.59 The Analysis of Covariance of the Pre-Test and Post-Test scores of students in the Experimental and Control groups ($F = 106.9$, $p < 0.01$) shows that there is significant difference between the Means of the Post-Test scores of the two groups.

6.2.60 The Adjusted Y Means of the Post-Test scores of students in the Experimental and Control groups differ significantly ($t = 7.92$, $p < 0.01$). The Experimental group is superior to the Control group ($M_{YXE} = 63.0$, $M_{YXC} = 52.3$).

C. Coastal

6.2.61 The Means of the Post-Test scores of students in the Experimental and Control groups differ significantly ($CR = 5.80$, $p < 0.01$). The Experimental group is superior to the Control group ($M_E = 62.1$, $M_C = 52.9$).

6.2.62 The Mean Gain scores of the Experimental and Control groups differ significantly ($CR = 7.32$, $p < 0.01$). The Experimental group is superior to the Control group ($M_E = 13.6$; $M_C = 3.4$).

6.2.63 The Analysis of Variance of the Pre-Test and Post-Test scores of students in the Experimental and Control groups are $F_x = 0.29$, $p > 0.05$ and $F_Y = 33.69$, $p < 0.01$ respectively. This shows that the Post-Test scores of the Experimental and Control groups differ significantly.

6.2.64 The Analysis of Covariance of the Pre-Test and Post-Test scores of students in the Experimental and Control groups ($F = 72.1$, $p < 0.01$) shows that there is significant difference
between the Means of the Post-Test scores of the two groups.

6.2.65 The Adjusted Y Means of the Post-Test scores of the students in the Experimental and Control groups differ significantly (t = 75.15, p < 0.01). The Experimental group is superior to the Control group (M_{YXE} = 62.40, M_{YXC} = 52.63).

D. Tribal

6.2.66 The Means of the Post-Test scores of students in the Experimental and Control groups differ significantly (CR = 7.48, p < 0.01). The Experimental group is superior to the Control group (M_E = 52.2, M_C = 41.8).

6.2.67 The Mean Gain scores of the Experimental and Control groups differ significantly (CR = 8.31, p < 0.01). The Experimental group is superior to the Control group (M_E = 7.9; M_C = 4.6).

6.2.68 The Analysis of Variance of the Pre-Test and Post-Test scores of students in the Experimental and Control groups are F_x = 0.014, p > 0.05 and F_y = 56.16, p < 0.01 respectively. This shows that the Post-Test scores of the Experimental and Control groups differ significantly.

6.2.69 The Analysis of Covariance of the Pre-Test and Post-Test scores of students in the Experimental and Control groups (F = 79.1; p < 0.01) shows that there is significant difference between the Means of the Post-Test scores of the two groups.

6.2.70 The Adjusted Y Means of the Post-Test scores of students in the Experimental and Control groups differ significantly (t = 10.19 p < 0.01). The Experimental group is superior to the Control group (M_{YXE} = 52.1, M_{YXC} = 41.8).
Conclusion III: The Embedded Strategies are more effective than the Strategies based on Constructivism in improving Academic Performance in Economics of Higher Secondary School Students for their Total sample and Sub samples based on Gender and Locale of School.

This conclusion is arrived at based on the following findings.

I. Total Sample

6.2.71 The Means of the Post-Test scores of students in the Experimental and Control groups differ significantly (CR = 24.94, p < 0.01). The Experimental group is superior to the Control group ($M_E = 25.5$, $M_C = 13.9$).

6.2.72 The Mean Gain scores of the Experimental and Control groups differ significantly (CR = 35.11, p < 0.01). The Experimental group is superior to the Control group ($M_E = 13.0; M_C = 0.9$).

6.2.73 The Analysis of Variance of the Pre-Test and Post-Test scores of students in the Experimental and Control groups are $F_x = 1.72$, $p > 0.05$ and $F_Y = 621.9$, $p < 0.01$ respectively. This shows that the Post-Test scores of the Experimental and Control groups differ significantly.

6.2.74 The Analysis of Covariance of the Pre-Test and Post-Test scores of students in the Experimental and Control groups ($F = 367.65; p < 0.01$) shows that there is significant difference between the Means of the Post-Test scores of the two groups.

6.2.75 The Adjusted Y Means of the Post-Test scores of students in the Experimental and Control groups differ significantly ($t =$
18.75, \( p < 0.01 \)). The Experimental group is superior to the Control group \((M_{YX_E} = 25.70, M_{YX_C} = 13.67)\).

II Gender Sub Samples

A. Boys

6.2.76 The Means of the Post-Test scores of students in the Experimental and Control groups differ significantly \((CR = 17.15, p < 0.01)\). The Experimental group is superior to the Control group \((M_E = 25.6, M_C = 13.9)\).

6.2.77 The Mean Gain scores of the Experimental and Control groups differ significantly \((CR = 23.28, p < 0.01)\). The Experimental group is superior to the Control group \((M_E = 12.9; M_C = 1.0)\).

6.2.78 The Analysis of Variance of the Pre-Test and Post-Test scores of students in the Experimental and Control groups are \(F_X = 0.11, p > 0.05\) and \(F_Y = 294.2, p < 0.01\) respectively. This shows that the Post-Test scores of the Experimental and Control groups differ significantly.

6.2.79 The Analysis of Covariance of the Pre-Test and Post-Test scores of students in the Experimental and Control groups \((F = 169.52; p < 0.01)\) shows that there is significant difference between the Means of the Post-Test scores of the two groups.

6.2.80 The Adjusted Y Means of the Post-Test scores of students in the Experimental and Control groups differ significantly \((t = 11.67, p < 0.01)\). The Experimental group is superior to the Control group \((M_{YX_E} = 15.87, M_{YX_C} = 9.92)\).
Summary, Conclusions and Suggestions

B. Girls

6.2.81 The Means of the Post-Test scores of students in the Experimental and Control groups differ significantly (CR = 18.05, p < 0.01). The Experimental group is superior to the Control group (M_E = 25.2, M_C = 13.8).

6.2.82 The Mean Gain scores of the Experimental and Control groups differ significantly (CR = 26.41, p < 0.01). The Experimental group is superior to the Control group (M_E = 13.1; M_C = 0.9).

6.2.83 The Analysis of Variance of the Pre-Test and Post-Test scores of students in the Experimental and Control groups are F_x = 2.35, p > 0.05 and F_y = 325.97, p < 0.01 respectively. This shows that the Post-Test scores of the Experimental and Control groups differ significantly.

6.2.84 The Analysis of Covariance of the Pre-Test and Post-Test scores of students in the Experimental and Control groups (F = 197.36; p < 0.01) shows that there is significant difference between the Means of the Post-Test scores of the two groups.

6.2.85 The Adjusted Y Means of the Post-Test scores of students in the Experimental and Control groups differ significantly (t = 26.43, p < 0.01). The Experimental group is superior to the Control group (M_{YXE} = 25.63, M_{YXC} = 13.47).

II. Locale Sub Samples

A. Urban

6.2.86 The Means of the Post-Test scores of students in the Experimental and Control groups differ significantly (CR =
26.89, p < 0.01). The Experimental group is superior to the Control group (\(M_E = 32.2, M_C = 16.2\)).

6.2.87 The Mean Gain scores of the Experimental and Control groups differ significantly (\(CR = 32.62, p < 0.01\)). The Experimental group is superior to the Control group (\(M_E = 17.0; M_C = 0.1\)).

6.2.88 The Analysis of Variance of the Pre-Test and Post-Test scores of students in the Experimental and Control groups are \(F_x = 2.65, p > 0.05\) and \(F_Y = 722.95, p < 0.01\) respectively. This shows that the Post-Test scores of the Experimental and Control groups differ significantly.

6.2.89 The Analysis of Covariance of the Pre-Test and Post-Test scores of students in the Experimental and Control groups (\(F = 53.85, p < 0.01\)) shows that there is significant difference between the Means of the Post-Test scores of the two groups.

6.2.90 The Adjusted Y Means of the Post-Test scores of students in the Experimental and Control groups differ significantly (\(t = 34.68, p < 0.01\)). The Experimental group is superior to the Control group (\(M_{YXE} = 32.57, M_{YXC} = 15.92\)).

B. Rural

6.2.91 The Means of the Post-Test scores of students in the Experimental and Control groups differ significantly (\(CR = 12.67, p < 0.01\)). The Experimental group is superior to the Control group (\(M_E = 26.3, M_C = 14.7\)).

6.2.92 The Mean Gain scores of the Experimental and Control groups differ significantly (\(CR = 14.47, p < 0.01\)). The Experimental group is superior to the Control group (\(M_E = 13.4; M_C = 1.5\)).
6.2.93 The Analysis of Variance of the Pre-Test and Post-Test scores of students in the Experimental and Control groups are $F_X = 0.15$, $p > 0.05$ and $F_Y = 160.72$, $p < 0.01$ respectively. This shows that the Post-Test scores of the Experimental and Control groups differ significantly.

6.2.94 The Analysis of Covariance of the Pre-Test and Post-Test scores of students in the Experimental and Control groups ($F = 37.48$, $p < 0.01$) shows that there is significant difference between the Means of the Post-Test scores of the two groups.

6.2.95 The Adjusted $Y$ Means of the Post-Test scores of students in the Experimental and Control groups differ significantly ($t = 150.63$, $p < 0.01$). The Experimental group is superior to the Control group ($M_{YXE} = 26.43$, $M_{YXC} = 14.65$).

C. Coastal

6.2.96 The Means of the Post-Test scores of students in the Experimental and Control groups differ significantly ($CR = 18.25$, $p < 0.01$). The Experimental group is superior to the Control group ($M_E = 22.9$, $M_C = 12.2$).

6.2.97 The Mean Gain scores of the Experimental and Control groups differ significantly ($CR = 19.38$, $p < 0.01$). The Experimental group is superior to the Control group ($M_E = 12.5; M_C = 1.9$).

6.2.98 The Analysis of Variance of the Pre-Test and Post-Test scores of students in the Experimental and Control groups are $F_X = 0.082$, $p > 0.05$ and $F_Y = 333.3$, $p < 0.01$ respectively. This shows that the Post-Test scores of the Experimental and Control groups differ significantly.
6.2.99 The Analysis of Covariance of the Pre-Test and Post-Test scores of students in the Experimental and Control groups \((F = 40.67, p < 0.01)\) shows that there is significant difference between the Means of the Post-Test scores of the two groups.

6.2.100 The Adjusted \(Y\) Means of the Post-Test scores of students in the Experimental and Control groups differ significantly \((t = 21.12, p < 0.01)\). The Experimental group is superior to the Control group \((M_{XE} = 22.92, M_{XC} = 12.25)\).

D. Tribal

6.2.101 The Means of the Post-Test scores of students in the Experimental and Control groups differ significantly \((CR = 12.23, p < 0.01)\). The Experimental group is superior to the Control group \((M_E = 20.7, M_C = 12.6)\).

6.2.102 The Mean Gain scores of the Experimental and Control groups differ significantly \((CR = 27.28, p < 0.01)\). The Experimental group is superior to the Control group \((M_E = 9.1; M_C = 0.2)\).

6.2.103 The Analysis of Variance of the Pre-Test and Post-Test scores of students in the Experimental and Control groups are \(F_X = 0.082, p > 0.05\) and \(F_Y = 333.37, p < 0.01\) respectively. This shows that the Post-Test scores of the Experimental and Control groups differ significantly.

6.2.104 The Analysis of Covariance of the Pre-Test and Post-Test scores of students in the Experimental and Control groups \((F = 348.68, p < 0.01)\) shows that there is significant difference between the Means of the Post-Test scores of the two groups.
6.2.105 The Adjusted Y Means of the Post-Test scores of students in the Experimental and Control groups differ significantly \((t = 32.53, p < 0.01)\). The Experimental group is superior to the Control group \((M_{YXE} = 22.92, M_{YXC} = 12.25)\).

**CONCLUSION IV:** The Embedded Strategies are more effective than the Strategies based on Constructivism in enhancing Retention Capacity of Higher Secondary School Students for their Total sample and Sub samples based on Gender and Locale of School.

This conclusion is based on the following findings

I. **Total Sample**

6.2.106 Retention Capacity of the Experimental group is very high \((r = 0.920)\), whereas that of the Control group is low \((r = 0.445)\).

II. **Gender sub samples**

A. **Boys**

6.2.107 Retention Capacity of the Experimental group is very high \((r = 0.926)\) as compared to that of the Control group, which is low \((r = 0.365)\).

B. **Girls**

6.2.108 Retention Capacity of the Experimental group is very high \((r = 0.914)\) in comparison to that of the Control group, which is low \((r = 0.314)\).
III. Locale sub samples

A. Urban

6.2.109 Retention Capacity of the Experimental group is very high \((r = 0.779)\), whereas that of the Control group is low \((r = 0.330)\).

B. Rural

6.2.110 Retention Capacity of the Experimental group is very high \((r = 0.912)\) as compared to that of the Control group, which is low \((r = 0.345)\).

C. Coastal

6.2.111 Retention Capacity of the Experimental group is very high \((r = 0.8202)\) in comparison to that of the Control group, which is very low \((r = 0.244)\).

D. Tribal

6.2.112 Retention Capacity of the Experimental group is very high \((r = 0.867)\), whereas that of the Control group is low \((r = 0.341)\).
6.3 TENABILITY OF THE HYPOTHESES

Each of the four hypotheses that were formulated for the study was tested and their tenability are presented below.

**Hypothesis I:** The Metacognitive Awareness of Higher Secondary School Students taught using Certain Embedded Strategies will improve significantly as compared to those students taught using the Strategies based on Constructivism for their total sample and sub samples based on Gender and Locale of School.

The following findings of the study substantiate this hypothesis.

<table>
<thead>
<tr>
<th>Groups</th>
<th>Finding Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total Sample</strong></td>
<td>Nos. 6.2.1, 6.2.2, 6.2.3, 6.2.4, and 6.2.5</td>
</tr>
<tr>
<td></td>
<td>(on pages 378 to 379)</td>
</tr>
<tr>
<td><strong>Gender Sub Samples</strong></td>
<td></td>
</tr>
<tr>
<td>Boys</td>
<td>Nos. 6.2.6, 6.2.7, 6.2.8, 6.2.9, and 6.2.10</td>
</tr>
<tr>
<td></td>
<td>(on page 379)</td>
</tr>
<tr>
<td>Girls</td>
<td>Nos. 6.2.11, 6.2.12, 6.2.13, 6.2.14, and 6.2.15</td>
</tr>
<tr>
<td></td>
<td>(on page 380)</td>
</tr>
<tr>
<td><strong>Locale Sub Samples</strong></td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>Nos. 6.2.16, 6.2.17, 6.2.18, 6.2.19, and 6.2.20</td>
</tr>
<tr>
<td></td>
<td>(on pages 380 to 381)</td>
</tr>
<tr>
<td>Rural</td>
<td>Nos. 6.2.21, 6.2.22, 6.2.23, 6.2.24, and 6.2.25</td>
</tr>
<tr>
<td></td>
<td>(on pages 381 to 382)</td>
</tr>
<tr>
<td>Coastal</td>
<td>Nos. 6.2.26, 6.2.27, 6.2.28, 6.2.29, and 6.2.30</td>
</tr>
<tr>
<td></td>
<td>(on pages 382 to 383)</td>
</tr>
<tr>
<td>Tribal</td>
<td>Nos. 6.2.31, 6.2.32, 6.2.33, 6.2.34, and 6.2.35</td>
</tr>
<tr>
<td></td>
<td>(on page 383)</td>
</tr>
</tbody>
</table>

*Hence, the first hypothesis is accepted.*
Hypothesis II: The Study Approaches of Higher Secondary School Students taught using Certain Embedded Strategies will improve significantly as compared to those students taught using the Strategies based on Constructivism for their total sample and sub samples based on Gender and Locale of School.

The following findings of the study substantiate this hypothesis.

<table>
<thead>
<tr>
<th>Groups</th>
<th>Finding Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Sample</td>
<td>Nos. 6.2.36, 6.2.37, 6.2.38, 6.2.39, and 6.2.40</td>
</tr>
<tr>
<td></td>
<td>(on pages 384 to 385)</td>
</tr>
<tr>
<td>Gender Sub Samples</td>
<td>Boys Nos. 6.2.41, 6.2.42, 6.2.43, 6.2.44, and 6.2.45</td>
</tr>
<tr>
<td></td>
<td>(on page 385)</td>
</tr>
<tr>
<td></td>
<td>Girls Nos. 6.2.46, 6.2.47, 6.2.48, 6.2.49, and 6.2.50</td>
</tr>
<tr>
<td></td>
<td>(on page 386)</td>
</tr>
<tr>
<td>Locale Sub Samples</td>
<td>Urban Nos. 6.2.51, 6.2.52, 6.2.53, 6.2.54, and 6.2.55</td>
</tr>
<tr>
<td></td>
<td>(on pages 386 to 387)</td>
</tr>
<tr>
<td></td>
<td>Rural Nos. 6.2.56, 6.2.57, 6.2.58, 6.2.59, and 6.2.60</td>
</tr>
<tr>
<td></td>
<td>(on pages 387 to 388)</td>
</tr>
<tr>
<td></td>
<td>Coastal Nos. 6.2.61, 6.2.62, 6.2.63, 6.2.64, and 6.2.65</td>
</tr>
<tr>
<td></td>
<td>(on pages 388 to 389)</td>
</tr>
<tr>
<td></td>
<td>Tribal Nos. 6.2.66, 6.2.67, 6.2.68, 6.2.69, and 6.2.70</td>
</tr>
<tr>
<td></td>
<td>(on page 389)</td>
</tr>
</tbody>
</table>

Hence, the second hypothesis is accepted.


**Hypothesis III:** The Academic Performance in Economics of Higher Secondary School Students taught using Certain Embedded Strategies will improve significantly as compared to those students taught using the Strategies based on Constructivism for their total sample and sub samples based on Gender and Locale of School.

The following findings of the study substantiate this hypothesis.

<table>
<thead>
<tr>
<th>Groups</th>
<th>Finding Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total Sample</strong></td>
<td>Nos. 6.2.71, 6.2.72, 6.2.73, 6.2.74, and 6.2.75</td>
</tr>
<tr>
<td></td>
<td>(on pages 390 to 391)</td>
</tr>
<tr>
<td><strong>Gender Sub Samples</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Boys</strong></td>
<td>Nos. 6.2.76, 6.2.77, 6.2.78, 6.2.79, and 6.2.80</td>
</tr>
<tr>
<td></td>
<td>(on page 391)</td>
</tr>
<tr>
<td><strong>Girls</strong></td>
<td>Nos. 6.2.81, 6.2.82, 6.2.83, 6.2.84, and 6.2.85</td>
</tr>
<tr>
<td></td>
<td>(on page 392)</td>
</tr>
<tr>
<td><strong>Locale Sub Samples</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Urban</strong></td>
<td>Nos. 6.2.86, 6.2.87, 6.2.88, 6.2.89, and 6.2.90</td>
</tr>
<tr>
<td></td>
<td>(on pages 392 to 393)</td>
</tr>
<tr>
<td><strong>Rural</strong></td>
<td>Nos. 6.2.91, 6.2.92, 6.2.93, 6.2.94, and 6.2.95</td>
</tr>
<tr>
<td></td>
<td>(on pages 393 to 394)</td>
</tr>
<tr>
<td><strong>Coastal</strong></td>
<td>Nos. 6.2.96, 6.2.97, 6.2.98, 6.2.99, and 6.2.100</td>
</tr>
<tr>
<td></td>
<td>(on pages 394 to 395)</td>
</tr>
<tr>
<td><strong>Tribal</strong></td>
<td>Nos. 6.2.101, 6.2.102, 6.2.103, 6.2.104, and 6.2.105</td>
</tr>
<tr>
<td></td>
<td>(on pages 395 to 396)</td>
</tr>
</tbody>
</table>

*Hence, the third hypothesis is accepted.*
**Hypothesis IV**: The Retention Capacity of Higher Secondary School Students taught using Certain Embedded Strategies will be enhanced significantly as compared to those students taught using the Strategies based on Constructivism for their total sample and sub samples based on Gender and Locale of School.

The following findings of the study substantiate this hypothesis.

<table>
<thead>
<tr>
<th>Groups</th>
<th>Finding Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total Sample</strong></td>
<td>No. 6.2.106 (on page 396)</td>
</tr>
<tr>
<td><strong>Gender Sub Samples</strong></td>
<td></td>
</tr>
<tr>
<td>Boys</td>
<td>No. 6.2.107 (on page 396)</td>
</tr>
<tr>
<td>Girls</td>
<td>No. 6.2.108 (on page 396)</td>
</tr>
<tr>
<td><strong>Locale Sub Samples</strong></td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>No. 6.2.109 (on page 397)</td>
</tr>
<tr>
<td>Rural</td>
<td>No. 6.2.110 (on page 397)</td>
</tr>
<tr>
<td>Coastal</td>
<td>No. 6.2.111 (on page 397)</td>
</tr>
<tr>
<td>Tribal</td>
<td>No. 6.2.112 (on page 397)</td>
</tr>
</tbody>
</table>

*Hence, the fourth hypothesis is accepted.*
6.4 EDUCATIONAL IMPLICATIONS OF THE STUDY

In the present study, the Cognitive Strategy, the Metacognitive Strategy, the Social Strategy, the Macro Strategy, and the Resource Management Strategy were Embedded within the experimental instructional programme while Strategies based on Constructivism were employed for instruction in the Control group. The findings of the study throw light on the fact that the Embedded Strategies of instruction are effective in improving Metacognitive Awareness, Approaches to Studying, Academic Performance and enhances Retention Capacity of students. This effectivity is also proved for the sub samples of students based on Gender and Locale of School.

The findings of the study have profound implications for Teachers, Teacher Trainees, Students, Curriculum Constructors, Course Designers, Professional Training Institution, Research Agencies, and Research Scholars. Given below are some of the implications of the study:

- Teachers should take into consideration the results of research studies for academic planning.
- Teachers should create a synthesis between knowledge of the discipline and knowledge of how students learn. They should have a good understanding of how learning happens and be responsible for what and how their students learn.
Teachers should employ novel and interesting instructional tactics, which provide a multitude of opportunities to choose suitable activities for instruction. This is the hallmark of effective teaching. Teachers need to be conscientized regarding the effectivity and usability of Embedding strategies for effective classroom instruction. Such new strategies do not require elaborate technology, except competence and efficiency on the part of the teachers.

Teachers should lead students towards deep learning in a delightful manner. This will result in excellent performance, retention and reflective thinking in students.

Teachers should use appropriate assessment techniques as an integral component of the instructional process.

Importance should be given to Students’ views on the significant dimensions in learning and courses related to student learning approaches, whereby students gain new perspectives and insights about learning.

Student learning should involve both acquiring high-level knowledge and knowing how that knowledge becomes usable in fundamental issues. Thereby, there will be an increase in the efficiency and confidence with which the
learner approaches a learning task as well as in his ability to develop a product, retain information, or perform a skill.

Teachers and Students alike benefit from their reflection on the dynamics of teaching and learning, which is the core of education, and is a first step towards revising one’s teaching-learning approach.

Teacher Educators should disseminate the results of relevant research on teaching-learning strategies such as Cognitive, Metacognitive, Social, Macro, Resource Management, and the like, so that Teacher Educands become aware of the necessity for employing new instructional strategies.

Teachers Educators should become competent in producing auto-instructional material based on new instructional strategies both in multimedia and modular form.

Within the pre-service training, Teacher Educands should be equipped with theoretical information and practical guidelines to translate new instructional strategies into practice.

In-service courses should be periodically revised and updated. The training programmes must be geared to
enhance the professional quality, excellence and calibre of faculty members.

✓ Pre-service and In-service Teacher Training Programmes need to focus on integrating novel teaching strategies in order to make school a better learning environment in future.

✓ National level and State level Curriculum Framers must take adequate steps to incorporate innovative learning strategies that enhance deep learning among students.

✓ Professional Institution/Organizations should incorporate and disseminate the outcomes of relevant and significant research conducted in the field of education.

✓ Budget provisions for educational institutions must be increased so as to provide good institutional, educational and technological support for promoting deep learning among students.

✓ Research Agencies must take initiatives to earmark and disburse funds for research in strategies related to deep learning approach and effective teaching in higher education.
6.5 SUGGESTIONS FOR FURTHER RESEARCH

The present study is a limited one in terms of time, sample size, subject and standard. Keeping in view the limitations of this study and the constraints under which it was conducted, the findings do not claim wide generalization. It is therefore suggested that:

- Studies on large samples are needed to arrive at a more reliable and precise result.
- Similar studies may be conducted for different age groups, subjects of study and medium of instruction.
- Studies at other levels of education like lower primary, upper primary, secondary and university may be conducted.
- On-line studies and web-enhanced learning based on reflective activities have to be attempted.
- The effect of the Embedded strategies on other variables can be tested.
- Exploratory studies on the attitude of teachers towards employing new strategies for classroom instruction have to be undertaken.
- The relative effectiveness of the Embedded strategies can be explored in various other localities like slums, scheduled caste and scheduled tribe areas and even schools that follow different educational syllabi.
- The effect of other new strategies can also be tested in enhancing deep learning.
- The present research was confined to the two districts of Kozhikode and Waynad. It can be extended to other districts of Kerala.