

IMPACT OF COGNITIVE APPRENTICESHIP MODEL ON ACHIEVEMENT UNDER THE SELECTED CATEGORIES OF INSTRUCTIONAL OBJECTIVES – KNOWLEDGE, UNDERSTANDING, APPLICATION AND SKILL IN SOCIAL SCIENCE AMONG SECONDARY SCHOOL STUDENTS

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Abstract

Social Science is a core subject up to secondary stage of ones' education. Socialization process of an Individual is mostly taken through teaching Social Science. Social life demands a number of life skills. Inculcation of life skills essential for an effective community life demands an effective method of teaching. Thus in the present scenario, the investigator intends to study the impact of cognitive apprenticeship model on achievement under the selected categories of instructional Objectives – knowledge, understanding, Application and skill in social science Among secondary school students. For the present study investigator adopted quasi experimental method and selected two intact classrooms consisting of 60 students, in experimental group 30 and in control group 30. Mean, Standard Deviation, t test, ANOVA and ANCOVA were the statistical techniques used for the study. The study resulted in concluding that Cognitive Apprenticeship Model of teaching is the best method for teaching Social Science among Secondary School Students.

Keywords: Social Science, Life Skills, Cognitive Apprenticeship model, Knowledge, Understanding, Application, Skill.

Introduction

Social Science is a core subject of study up to Secondary School Level. It is a study of social life which is again focused in individual life. It is a science of study that deals with how to lead an effective societal life. Social Science has a pivotal role in educating a child. The aim of education is being actualized by teaching Social Science. But there is an aversion towards Social Science among the learners. Traditional method of teaching creates an aversion towards the subject itself. The teaching method of Social Science should be changed so that the learners should be attracted to it. The investigator finds Cognitive

Apprenticeship Model of teaching as a solution for it.

Cognitive Apprenticeship Model of teaching is rooted in Social Learning Theories. Learning occurs through guided experience on cognitive and metacognitive process. Educator should guide the students by expert demonstration and expert coaching. Students are challenged with tasks that are more difficult than they can accomplish on their own. Thus they are motivated to get assistance from others to achieve this task. Learners should work with experienced teacher, parent or elders.

Need and Significance of Study

Since Social Science in education plays an important role in an individual's life. It should be taught effectively. Present situation adversely affect the learner by deteriorating interest to study the Social Science. Learning task in Cognitive Apprenticeship Model of teaching is holistic in nature. In teaching Social Science the nature of learning task should be holistic. Hence it is the best suited method of teaching for Social Science. Investigator wants to find out the truth behind this.

By passing of time the learner becomes more experienced in societal life, then the nature of learning task should be increased in complexity and diversity. Cognitive Apprenticeship Model of teaching will be efficient to provide this kind of learning tasks. While teaching Social Science students should be provided with the opportunity to see the subtle, tacit elements of expert practice in societal life. It may not be explicated in a lecture method. The opportunity to see the subtle, tacit elements of expert practice is the one of the meritorious factor in Cognitive Apprenticeship Model of teaching.

Statement of the Problem

“Impact of Cognitive Apprenticeship Model on Achievement under the selected categories of instructional objectives – Knowledge, Understanding, Application and Skill In Social Science Among Secondary School Students”

Operational Definitions of key terms

Impact

Oxford Dictionary (2008) defines impact as ‘the strong effect that something has on something or somebody’. It refers to the marked effect or influence of presentation of ideas or activities involved in a teaching Social Science that produces a favorable learning outcome. In the present study, the marked effect of Cognitive Apprenticeship Model on teaching Social Science is assessed.

Cognitive Apprenticeship Model

Cognitive apprenticeship is a theory of Understanding. The master of a skill teaches that skill to an apprentice. Brown, Collins, and

Dugid (1989) have developed Cognitive Apprenticeship Model based on the Situated Cognition Theory.

Achievement under the selected categories of instructional objectives – Knowledge, Understanding, Application and Skill in Social Science

It refers to the behavioral outcomes under the selected categories of instructional objectives – Knowledge, Understanding, Application and Skill in the discipline of Social Science. It is measured by scores obtained on the Achievement Test under the selected categories of instructional objectives – Knowledge, Understanding, Application and Skill in Social Science constructed by the investigator.

Secondary School Students

The students at Secondary level refer to students who are studying in VIII, IX and X classes in Kerala State. In this study, the investigator considers only the students of standard IX.

Objectives of the Study

1. To find out the Impact of Cognitive Apprenticeship Model on Achievement under the selected categories of instructional objectives – Knowledge, Understanding, Application and Skill in Social Science of Secondary School Students.

1.a. To find out the impact of Cognitive Apprenticeship Model in the Mean Scores on Achievement under the selected categories of instructional objectives – Knowledge, Understanding, Application and Skill in Social Science for the Pretest between Experimental Group and Control Group.

1.b. To find out the Impact of Cognitive Apprenticeship Model in the

Mean Scores on Achievement under the selected categories of instructional objectives – Knowledge, Understanding, Application and Skill in Social Science Posttest between Experimental Group and Control Group.

1.c.To find out the Impact of Cognitive Apprenticeship Model in the

Gain Mean Scores on Achievement under the selected categories of instructional objectives – Knowledge, Understanding, Application and Skill in Social Science Posttest between Experimental Group and Control Group.

1.d. To find out the Impact of Cognitive Apprenticeship Model in the

Adjusted Y Means on Achievement under the selected categories of instructional objectives – Knowledge, Understanding, Application and Skill in Social Science between Experimental Group and Control Group.

Hypotheses of the Study

The following hypotheses were formulated for the present study.

1) There exists a significant difference in the impact of Cognitive Apprenticeship Model on Achievement under the selected categories of instructional objectives – Knowledge, Understanding, Application and Skill in Social Science than that of the pretest prevailing Activity Oriented Approach in Secondary School Students.

a) There exists significant difference in the Mean Scores of Achievement under the selected categories of instructional objectives – Knowledge, Understanding, Application and Skill in Social Science Pretest between Experimental Group and Control Group.

b) There exists significant difference in the Mean Scores of Achievement under the selected categories of instructional objectives – Knowledge, Understanding, Application and Skill in Social Science Posttest between Experimental Group and Control Group.

c) There exists significant difference in the Gain Mean Scores of Achievement under the selected categories of instructional objectives – Knowledge, Understanding, Application and Skill in Social Science for the Posttest between Experimental Group and Control Group.

d) There exist significant difference in the Adjusted Y Means of Posttest scores on Achievement under the selected categories of instructional objectives – Knowledge, Understanding, Application and Skill in Social

Science between Experimental Group and Control Group.

Methodology

The investigator aimed to find out the impact of Cognitive Apprenticeship Model on achievement under the selected categories of instructional objectives – Knowledge, Understanding, Application and Skill in Social Science at secondary school level.

□ Method adopted for the study

The experimental method is found to be the most appropriate for the present study.

□ Design of the study

The design selected was pretest-posttest-non-equivalent group design.

□ Sample selected for the study

For the collection of data, the present study made use of two intact classroom groups - One Experimental group and one Control group. Each group consists of 30 students. The study was conducted in two divisions of standard IX of ST.Theresa's Bethenay Convent Higher Secondary School, Mallappally, Pathanamthitta District.

Variables used for the Study

Independent variable: Cognitive Apprenticeship Model

Dependent variable: Achievement under the selected categories of instructional objectives – Knowledge, Understanding, Application and Skill in Social Science.

Tools used for the Study

The following tools are used for the present study;

□ Lesson transcript according to Cognitive Apprenticeship Model of instructional design.

□ Lesson transcript according to activity oriented method.

□ Standardized Achievement Test under the selected categories of instructional objectives – Knowledge, Understanding, Application and Skill in Social Science is

developed by the investigator with the help of research supervisor.

Statistical techniques used

The investigator made use of the following statistical techniques:

- ☐ ♦♦♦ Mean
- ☐ ♦♦♦ Standard deviation
- ☐ ♦♦♦ ANOVA
- ☐ ♦♦♦ Analysis of co-variance (ANCOVA)

Analysis and Interpretation

Comparison of Experimental group and Control group on Achievement under the selected categories of instructional objectives – Knowledge, Understanding, Application and Skill in Social Science.

Objective 1. To study the Impact of Cognitive Apprenticeship Model on Achievement under the selected categories of instructional objectives – Knowledge, Understanding, Application and Skill in Social Science among Secondary School Students.

Objective 1.a. To study the Mean scores on Achievement under the selected categories of instructional objectives – Knowledge, Understanding, Application and Skill in Social Science for the Pretest among students in Control group and in Experimental group.

For finding out the above objectives of study, Comparison of Experimental group and Control group based on Pretest scores on Achievement in Social Science under the selected categories of instructional objectives – Knowledge, Understanding, Application and Skill were done. The data and results of the test of significance are given in the following tables.

PRETEST ON KNOWLEDGE

Table 1 The data and results of the test of significance of Experimental and Control groups based on pretest scores on Achievement under the selected categories of instructional objectives – Knowledge in Social Science

Groups	<i>N</i>	<i>M</i>	<i>SD</i>	<i>CR</i>	<i>LS</i>
Experimental	30	0.3	0.595	0	$P > .05$
Control	30	0.3	0.595		

The Mean value of Pretest scores of Experimental and Control group on Achievement under the selected categories of instructional objectives – Knowledge, Understanding, Application and Skill in Social Science is 0.595 and 0.595 respectively. The critical ratio of the Pretest scores is 0 and is less

than the table value 2 at .05 level. So the obtained value is not significant even at .05 level. From this it is clear that two groups are equal before the Experiment on Achievement under the selected categories of instructional objectives – Knowledge in Social Science.

PRETEST ON UNDERSTANDING

Table 2 The data and results of the test of significance of Experimental and Control groups based on Pretest scores on Achievement under the selected categories of instructional objectives – Understanding in Social Science

Groups	<i>N</i>	<i>M</i>	<i>SD</i>	<i>CR</i>	<i>LS</i>
Experimental	30	0.77	0.626	-0.94	$P > .05$
Control	30	0.93	0.691		

The Mean value of Pretest scores of Experimental and Control group on Achievement under the selected categories of instructional objectives – Understanding in Social Science is 0.626 and 0.691 respectively. The critical ratio of the Pretest scores is -0.94 and is less than the table value 2 at .05 level. So

Table 3 The data and results of the test of significance of Experimental and Control groups based on pretest scores on Achievement under the selected categories of instructional objectives – Application in Social Science

Groups	<i>N</i>	<i>M</i>	<i>SD</i>	<i>CR</i>	<i>LS</i>
Experimental	30	1.9	1.056	-0.424	P > .05
Control	30	2	0.743		

The Mean value of pretest scores of Experimental and Control group on Achievement under the selected categories of instructional objectives –Application in Social Science is 1.056 and 0.743 respectively. The critical ratio of the pretest scores is -0.424 and is less than the table value 2 at .05 level. So the

Table 4 The data and results of the test of significance of Experimental and Control groups based on pretest scores on Achievement under the selected categories of instructional objectives – Skill in Social Science

Groups	<i>N</i>	<i>M</i>	<i>SD</i>	<i>CR</i>	<i>LS</i>
Experimental	30	0.83	0.699	-0.538	P > .05
Control	30	0.93	0.739		

The Mean value of pretest scores of Experimental and Control group on Achievement under the selected categories of instructional objectives – Skill in Social Science is 0.83 and 0.93 respectively. The critical ratio of the pretest scores is -0.538 and is less than the table value 2 at .05 level. So the obtained value is not significant even at .05 level. From this it is clear that two groups are equal before the Experiment on Achievement under the selected categories of instructional objectives – Skill in Social Science.

Objective 1.b. To study the Impact of Cognitive Apprenticeship Model in the Mean Scores on

the obtained value is not significant even at .05 level. From this it is clear that two groups are equal before the Experiment on Achievement under the selected categories of instructional objectives – Understanding in Social Science.

PRETEST ON APPLICATION

obtained value is not significant even at .05 level. From this it is clear that two groups are equal before the Experiment on Achievement under the selected categories of instructional objectives –Application in Social Science.

PRETEST ON SKILL

Achievement under the selected categories of instructional objectives – Knowledge, Understanding, Application and Skill in Social Science for the posttest among students in Control group and in Experimental group.

For finding out the above objectives of study, Comparison of Experimental group and Control group based on Posttest scores on Achievement under the selected categories of instructional objectives – Knowledge, Understanding, Application and Skill in Social Science were done. The data and results of the test of significance are given in the following tables.

POSTTEST ON KNOWLEDGE

Table 5 The data and results of the test of significance of Experimental and Control groups based on posttest scores on Achievement under the selected categories of instructional objectives – Knowledge in Social Science

Groups	<i>N</i>	<i>M</i>	<i>SD</i>	<i>CR</i>	<i>LS</i>
Experimental	30	2.87	0.434	7.21	$P < .01$
Control	30	1.67	0.802		

The Mean value of posttest scores of Experimental group and Control group on Achievement under the selected categories of instructional objectives – Knowledge in Social Science is 2.87 and 1.67 respectively. The critical ratio of the posttest scores is 7.21 and is greater than the table value 2.66 at .01 level. So

the obtained value is significant at .01 level. From this it is clear that two groups are different after the Experiment on Achievement under the selected categories of instructional objectives – Knowledge in Social Science.

POSTTEST ON UNDERSTANDING

Table 6 The data and results of the test of significance of Experimental and Control groups based on posttest scores on Achievement under the selected categories of instructional objectives – Understanding in Social Science

Groups	<i>N</i>	<i>M</i>	<i>SD</i>	<i>CR</i>	<i>LS</i>
Experimental	30	7.73	0.907	2.08	$P < .05$
Control	30	7.2	1.064		

The Mean value of posttest scores of Experimental group and Control group on Achievement under the selected categories of instructional objectives – Understanding in Social Science is 7.73 and 7.2 respectively. The critical ratio of the posttest scores is 2.08 and is greater than the table value 2 at .05 level. So

the obtained value is significant at .05 level. From this it is clear that two groups are different after the Experiment on Achievement under the selected categories of instructional objectives – Understanding in Social Science.

POSTTEST ON APPLICATION

Table 7 The data and results of the test of significance of Experimental and Control groups based on posttest scores on Achievement under the selected categories of instructional objectives –Application in Social Science

Groups	<i>N</i>	<i>M</i>	<i>SD</i>	<i>CR</i>	<i>LS</i>
Experimental	30	9.73	1.143	8.15	$P < .01$
Control	30	6.17	2.102		

The Mean value of posttest scores of Experimental and Control group on Achievement under the selected categories of instructional objectives – Application in Social Science is 9.73 and 6.17 respectively. The critical ratio of the posttest scores is 8.15 and is greater than the table value 2.66 at .01 level. So

the obtained value is significant at .01 level. From this it is clear that two groups are different after the Experiment on Achievement under the selected categories of instructional objectives –Application in Social Science.

POSTTEST ON SKILL

Table 8 The data and results of the test of significance of Experimental and Control groups based on posttest scores on Achievement under the selected categories of instructional objectives – Skill in Social Science

Groups	<i>N</i>	<i>M</i>	<i>SD</i>	<i>CR</i>	<i>LS</i>
Experimental	30	4.3	1.088	4.893	$P < .01$
Control	30	2.93	1.081		

The Mean value of posttest scores of Experimental and Control group on Achievement under the selected categories of instructional objectives – Skill in Social Science is 4.3 and 2.93 respectively. The critical ratio of the posttest scores is 4.893 and is greater than the table value 2.66 at .01 level. So the obtained value is significant at .01 level. From this it is clear that two groups are different after the Experiment on Achievement under the selected categories of instructional objectives – Skill in Social Science.

Comparison of Gain Scores on Achievement under the selected categories of instructional objectives – Knowledge, Understanding, Application and Skill in Social Science among students in Experimental and in Control groups

Objective 1.c. There exists a significant difference in the Gain Mean Scores on Achievement under the selected categories of instructional objectives – Knowledge, Understanding, Application and Skill in Social Science for the posttest among students in Experimental group and in Control group.

The performances of students in both groups were compared by testing the significance of the difference between the Mean of Gain Scores on Achievement under the selected categories of instructional objectives – Knowledge, Understanding, Application and Skill in Social Science of the two groups. For this the critical ratio is found out and tested for significance. The data and results of the test of significance are given in the following tables.

GAIN ON KNOWLEDGE

Table 9 Data and Results of Test of Significance of Gain Scores on Achievement under the selected categories of instructional objectives – Knowledge in Social Science among Students in Experimental and in Control groups

Groups	<i>N</i>	<i>M</i>	<i>SD</i>	<i>CR</i>	<i>LS</i>
Experimental	30	2.57	0.73	5.45	$P < 01$
Control	30	1.37	0.96		

The Gain Mean scores of the Experimental group (2.57) is greater than that of the Control group (1.37). The obtained critical ratio is 5.45 which is significant at .01 level. Since the Gain Mean of Experimental group is greater than that of the Control group and the obtained critical ratio is significant at .01 level, it is

inferred that Experimental group is better in performance than that of the Control group with regard to achievement under the selected categories of instructional objectives – Knowledge in Social Science.

GAIN ON UNDERSTANDING

Table 10 Data and Results of Test of Significance of Gain Scores on Achievement under the selected categories of instructional objectives – Understanding in Social Science among Students in Experimental and in Control groups

Groups	<i>N</i>	<i>M</i>	<i>SD</i>	<i>CR</i>	<i>LS</i>
Experimental	30	6.97	1.16		
Control	30	6.27	1.28	2.22	$P < .05$

The Gain Mean scores of the Experimental group (6.97) is greater than that of the Control group (6.27). The obtained critical ratio is 2.22 which is significant at .05 level. Since the Gain Mean of Experimental group is greater than that of the Control group and the obtained critical ratio is significant at .05 level, it is

inferred that Experimental group is better in performance than that of the Control group with regard to achievement under the selected categories of instructional objectives – Understanding in Social Science.

GAIN ON APPLICATION

Table 11 Data and Results of Test of Significance of Gain Scores on Achievement under the selected categories of instructional objectives – Application in Social Science among Students in Experimental and in Control groups

Groups	<i>N</i>	<i>M</i>	<i>SD</i>	<i>CR</i>	<i>LS</i>
Experimental	30	7.83	1.26		
Control	30	4.17	2	8.54	$P < .01$

The Gain Mean scores of the Experimental group (7.83) is greater than that of the Control group (4.17). The obtained critical ratio is 8.54 which is significant at .01 level. Since the Gain Mean of Experimental group is greater than that of the Control group and the obtained critical ratio is significant at .01 level, it is

inferred that Experimental group is better in performance than that of the Control group with regard to achievement under the selected categories of instructional objectives – Application in Social Science.

GAIN ON SKILL

Table 12 Data and Results of Test of Significance of Gain Scores on Achievement under the selected categories of instructional objectives – Skill in Social Science among Students in Experimental and in Control groups

Groups	<i>N</i>	<i>M</i>	<i>SD</i>	<i>CR</i>	<i>LS</i>
Experimental	30	3.47	1.19		
Control	30	2	1.20	4.76	$P < .01$

The Gain Mean scores of the Experimental group (3.47) is greater than that of the Control group (2). The obtained critical ratio is 4.76 which is significant at .01 level. Since the Gain Mean of Experimental group is greater than that of the Control group and the obtained critical ratio is significant at .01 level, it is inferred that Experimental group is better in performance than that of the Control group with regard to achievement under the selected

categories of instructional objectives – Skill in Social Science.

The Pretest scores, Posttest scores, Gain scores were analyzed and found out critical ratio. Based on this, it is unable to reach to a conclusion about the two groups. That is, after the conduction of the Experiment, the two groups may or may not differ significantly in their performance. The investigator selected

two intact class room groups. There is no concern for any variables like sex, age, socio economic status etc. Therefore in order to achieve accurate result, the data should be summited to the statistical technique 'Analysis of covariance' (ANCOVA).

Comparison of impact of Cognitive Apprenticeship Model on Achievement under the selected categories of instructional objectives – Knowledge, Understanding, Application and Skill in Social Science with that of Activity Oriented Approach.

Objective 1.d. To study the Impact of Cognitive Apprenticeship Model in the Adjusted Y Means Scores on Achievement under the selected categories of instructional objectives – Knowledge, Understanding, Application and Skill in Social Science among students in Control group and in Experimental group.

Computation of Analysis of Variance (ANOVA)

Table 13 Summary of ANOVA of pretest and posttest scores of Experimental and Control groups on Achievement under the selected categories of instructional objectives – Knowledge in Social Science.

Source of Variation	<i>df</i>	<i>SSx</i>	<i>Ssy</i>	<i>MSx</i>	<i>Msy</i>
Among Mean	1	0	21.6	0	21.6
Within Group	58	20.6	24.13	0.36	0.42
Total	59	20.6	45.73	0.36	22.02

From table F for degrees of freedom (1/58)

F at .05 level = 4.00

F at .01 level = 7.08

F_x = 0

F_y = 51.91

The obtained F_x and F_y ratios are tested for significance. The calculated value of F_x is 0. It is not significant even at .05 level. It shows that the Mean of pretest scores do not differ

Table 14 Summary of ANOVA of pretest and posttest scores of Experimental and Control groups on Achievement under the selected categories of instructional objectives – Understanding in Social Science.

Source of Variation	<i>df</i>	<i>SSx</i>	<i>Ssy</i>	<i>MSx</i>	<i>Msy</i>
Among Mean	1	0.42	4.27	0.42	4.27
Within Group	58	25.23	56.67	0.44	0.98
Total	59	25.65	60.93	0.85	5.24

To determine the Impact of Cognitive Apprenticeship Model on Achievement under the selected categories of instructional objectives – Knowledge, Understanding, Application and Skill in Social Science, the scores obtained on Achievement Test under the selected categories of instructional objectives – Knowledge, Understanding, Application and Skill in Social Science both in Experimental group and in Control group were subjected to statistical technique of ANCOVA. The calculation of ANOVA was done first and thereafter proceeds to ANCOVA. The summary of ANOVA calculation under the selected categories of instructional objectives – Knowledge, Understanding, Application and Skill in Social Science of pretest (x) and posttest (y) scores was given in the following tables.

ANOVA ON KNOWLEDGE

significantly on Achievement under the selected categories of instructional objectives – Knowledge in Social Science. The obtained value of F_y is 51.91. It is significant at .01 level. This indicates that there is significant difference for the posttest on Achievement under the selected categories of instructional objectives – Knowledge in Social Science between the performance of pupils in Experimental and in Control group.

ANOVA ON UNDERSTANDING

$$F_x = 0.957$$

$$F_y = 4.37$$

The obtained F_x and F_y ratios are tested for significance. The calculated value of F_x is 0.957. It is not significant even at .05 level. It shows that the Mean of pretest scores do not differ significantly on Achievement under the selected categories of instructional objectives –

Understanding in Social Science. The obtained value of F_y is 4.37. It is significant at .05 level. This indicates that there is significant difference for the posttest on Achievement under the selected categories of instructional objectives – Understanding in Social Science between the performance of pupils in Experimental and in Control group.

ANOVA ON APPLICATION

Table 15 Summary of ANOVA of pretest and posttest scores of Experimental and Control groups on Achievement under the selected categories of instructional objectives – Application in Social Science.

Source of Variation	<i>df</i>	<i>SS_x</i>	<i>S_{sy}</i>	<i>MS_x</i>	<i>MS_y</i>
Among Mean	1	0.15	190.82	0.15	190.82
Within Group	58	34.7	166.03	0.60	2.86
Total	59	34.85	356.85	0.75	193.68

$$F_x = 0.251$$

$$F_y = 66.66$$

The obtained F_x and F_y ratios are tested for significance. The calculated value of F_x is 0.251. It is not significant even at .05 level. It shows that the Mean of pretest scores do not differ significantly on Achievement under the selected categories of instructional objectives –

Application in Social Science. The obtained value of F_y is 66.66. It is significant even at .01 level. This indicates that there is significant difference for the posttest on Achievement under the selected categories of instructional objectives – Understanding in Social Science between the performance of pupils in Experimental and in Control group.

ANOVA ON SKILL

Table 16 Summary of ANOVA of pretest and posttest scores of Experimental and Control groups on Achievement under the selected categories of instructional objectives – Skill in Social Science.

Source of Variation	<i>df</i>	<i>SS_x</i>	<i>S_{sy}</i>	<i>MS_x</i>	<i>MS_y</i>
Among Mean	1	0.15	28.02	0.15	28.02
Within Group	58	30.03	68.17	0.52	1.18
Total	59	30.18	96.18	0.67	29.19

$$F_x = 0.289$$

$$F_y = 23.838$$

The obtained F_x and F_y ratios are tested for significance. The calculated value of F_x is 0.289. It is not significant even at .05 level. It shows that the Mean of pretest scores do not differ significantly on Achievement under the selected categories of instructional objectives – Skill in Social Science. The obtained value of F_y is 23.838. It is significant at .01 level. This indicates that there is significant difference for the posttest on Achievement under the selected

categories of instructional objectives – Skill in Social Science between the performance of pupils in Experimental and in Control group.

Computation of ANCOVA

The summary of analysis of co-variance of pretest and posttest scores of pupils in Experimental group and in Control group on Achievement under the selected categories of instructional objectives – Knowledge, Understanding, Application and Skill in Social Science were given in tables.

ANCOVA ON KNOWLEDGE

Table 17 Summary of ANCOVA of pretest and posttest scores of students in Experimental and in Control groups on Achievement under the selected categories of instructional objectives – Knowledge in Social Science

Source of Variations	<i>df</i>	<i>SS_x</i>	<i>Ssy</i>	<i>Ssxy</i>	<i>Ssy.x</i>	<i>Msy.x</i>	<i>SDy.x</i>
Among Mean	1	0	21.6	0	21.6	21.6	
Within Group	58	20.6	24.13	1.2	24.06	0.41	0.644
Total	59	20.6	45.73	1.2	45.66	22.01	

From table F for degrees of freedom (1/58)

F at .05 level = 4.00

F at .01 level = 7.08

Fy.x = 52.06

The obtained Fy.x was tested for significance. The table value of F ratio for df 1/58 is 4.00 at .05 level and 7.08 at .01 level. The obtained value of Fy.x is 52.06 and it is significant at .01

level. From this, it is clear that the posttest Mean scores on Achievement under the selected categories of instructional objectives – Knowledge in Social Science between Experimental group and Control group differ significantly after they have adjusted for differences in the pretest scores on Achievement under the selected categories of instructional objectives – Knowledge in Social Science.

ANCOVA ON UNDERSTANDING

Table 18 Summary of ANCOVA of pretest and posttest scores of students in Experimental and Control groups on Achievement under the selected categories of instructional objectives – Understanding in Social Science

Source of Variations	<i>df</i>	<i>SS_x</i>	<i>Ssy</i>	<i>Ssxy</i>	<i>Ssy.x</i>	<i>Msy.x</i>	<i>SDy.x</i>
Among Mean	1	0.42	4.27	-1.33	3.94	3.94	
Within Group	58	25.23	56.67	-2.47	56.43	0.97	0.986
Total	59	25.65	60.93	-3.8	60.37	4.92	

Fy.x = 4.05

The obtained Fy.x was tested for significance. The table value of F ratio for df 1/58 is 4.00 at .05 level and 7.08 at .01 level. The obtained value of Fy.x is 4.05 and it is significant at .05 level. From this, it is clear that the posttest Mean scores on Achievement under the selected categories of instructional objectives –

Understanding in Social Science between Experimental group and Control group differ significantly after they have adjusted for differences in the pretest scores on Achievement under the selected categories of instructional objectives – Understanding in Social Science.

ANCOVA ON APPLICATION

Table 19 Summary of ANCOVA of pretest and posttest scores of students in Experimental and Control groups on Achievement under the selected categories of instructional objectives – Application in Social Science

Source of Variations	<i>df</i>	<i>SS_x</i>	<i>Ssy</i>	<i>Ssxy</i>	<i>Ssy.x</i>	<i>Msy.x</i>	<i>SDy.x</i>
Among Mean	1	0.15	190.82	-5.35	196.25	196.25	
Within Group	58	34.7	166.03	20.2	154.27	2.66	1.63
Total	59	34.85	356.85	14.85	350.52	198.91	

Fy.x = 73.78

The obtained $F_{y.x}$ was tested for significance. The table value of F ratio for df 1/58 is 4.00 at .05 level and 7.08 at .01 level. The obtained value of $F_{y.x}$ is 73.78 and it is significant at .01 level. From this, it is clear that the posttest Mean scores on Achievement under the selected categories of instructional objectives – Application in Social Science between

Experimental group and Control group differ significantly after they have adjusted for differences in the pretest scores on Achievement under the selected categories of instructional objectives – Application in Social Science.

ANCOVA ON SKILL

Table 20 Summary of ANCOVA of pretest and posttest scores of students in Experimental and Control groups on Achievement under the selected categories of instructional objectives – Skill in Social Science

Source of Variations	df	SSx	SSy	SSxy	SSy.x	MSy.x	SDy.x
Among Mean	1	0.15	28.02	-2.05	28.89	28.89	
Within Group	58	30.03	68.17	7.37	66.36	1.14	1.069
Total	59	30.18	96.18	5.32	95.25	30.03	

$F_{y.x} = 25.25$

Comparison of Adjusted Y Means

The obtained $F_{y.x}$ was tested for significance. The table value of F ratio for df 1/58 is 4.00 at .05 level and 7.08 at .01 level. The obtained value of $F_{y.x}$ is 25.25 and it is significant at .01 level. From this, it is clear that the posttest Mean scores on Achievement under the selected categories of instructional objectives – Skill in Social Science between Experimental group and Control group differ significantly after they have adjusted for differences in the pretest scores on Achievement under the selected categories of instructional objectives – Skill in Social Science.

The adjusted Means for posttest scores (Y Means) of pupils in Experimental group and in Control groups were computed by using correlation and regression. The difference between the adjusted Y Means of posttest scores of pupils in Experimental group and in Control group on Achievement under the selected categories of instructional objectives – Knowledge, Understanding, Application and Skill in Social Science were given the following tables.

ADJUSTED Y MEANS ON KNOWLEDGE

Table 21 Data for Adjusted Y Means of posttest Scores of Students in Experimental and in Control groups on Achievement under the selected categories of instructional objectives – Knowledge in Social Science.

GROUPS	N	Mx	My	Myx <i>ajstd</i>
Control	30	0.3	1.67	1.67
Experimental	30	0.3	2.87	2.87
General Mean		19.18	0.3	2.27

From table t for degrees of freedom 1/58

Calculated t value = 7

Critical value of t at .05 level = 2

Critical value of t at .01 level = 2.66

S EM between adjusted Means = 0.167

Difference between Mean = 1.2

S_{dyx} = 0.644

Adjusted Y Means for the posttest scores were tested for significance at df 1/58. The calculated t value of adjusted Y Means is 7 which is significant at .01 level. It indicates that Experimental group and Control group differ significantly on Achievement under the selected categories of instructional objectives – Knowledge in Social Science.

ADJUSTED Y MEANS ON UNDERSTANDING

Table 22 Data for Adjusted Y Means of posttest Scores of Students in Experimental and in Control groups on Achievement under the selected categories of instructional objectives – Understanding in Social Science.

GROUPS	<i>N</i>	<i>M_x</i>	<i>M_y</i>	<i>Myx adjstd</i>
Control	30	0.93	7.2	7.21
Experimental	30	0.77	7.73	7.73
General Mean		19.18	0.85	7.47

S E M between adjusted Means = 0.255

Difference between Mean = 0.517

S_{dyx} = 0.986

Calculated t value = 2

which is significant at .05 level. It indicates that Experimental group and Control group differ significantly on Achievement under the selected categories of instructional objectives – Understanding in Social Science.

ADJUSTED Y MEANS ON APPLICATION

Adjusted Y Means for the posttest scores were tested for significance at df 1/58. The calculated t value of adjusted Y Means is 2

Table 23 Data for Adjusted Y Means of posttest Scores of Students in Experimental and in Control groups on Achievement under the selected categories of instructional objectives – Application in Social Science

GROUPS	<i>N</i>	<i>M_x</i>	<i>M_y</i>	<i>Myx adjstd</i>
Control	30	2	6.17	6.14
Experimental	30	1.9	9.73	9.76
General Mean		19.18	1.95	7.95

S E M between adjusted Means = 0.421

Difference between Mean = 3.62

S_{dyx} = 1.63

Calculated t value = 8

which is significant at .01 level. It indicates that Experimental group and Control group differ significantly on Achievement under the selected categories of instructional objectives – Application in Social Science.

ADJUSTED Y MEANS ON SKILL

Adjusted Y Means for the posttest scores were tested for significance at df 1/58. The calculated t value of adjusted Y Means is 8

Table 24 Data for Adjusted Y Means of posttest scores of Students in Experimental and in Control groups on Achievement under the selected categories of instructional objectives – Skill in Social Science.

GROUPS	<i>N</i>	<i>M_x</i>	<i>M_y</i>	<i>Myx adjstd</i>
Control	30	4.17	17.97	17.55
Experimental	30	3.8	24.6	25.02
General Mean		19.18	3.98	21.28

S EM between adjusted Means = 0.276

Difference between Mean = 1.39

Sdyx = 1.069

Calculated t value = 5

Adjusted Y Means for the posttest scores were tested for significance at df 1/58. The calculated t value of adjusted Y Means is 5 which is significant at .01 level. It indicates that Experimental group and Control group differ significantly on Achievement under the selected categories of instructional objectives – Skill in Social Science.

Findings and Conclusions

The major conclusions obtained from the analysis of the comparison of impact of the Cognitive Apprenticeship Model over the Existing Activity Oriented Method are synthesized below.

1.To study the Impact of Cognitive Apprenticeship Model on Achievement under the selected categories of instructional objectives – Knowledge, Understanding, Application and Skill in Social Science among Secondary School Students.

1.a. To study the Mean Scores of Achievement under the selected categories of instructional objectives – Knowledge, Understanding, Application and Skill in Social Science for the pretest among students in Experimental group and in Control group.

The data was analyzed by using inferential statistics for test of significance difference between Means for a large independent sample. The t value obtained for the pretest of Achievement under the selected categories of instructional objectives – Knowledge (0), Understanding (-0.94), Application (-0.424) and Skill (-0.538) in Social Science. The t value for all categories is less than the table value of 1.96 at .05 level. It indicates that Experimental Group and Control group do not differ significantly on their achievement under the selected categories of instructional objectives – Knowledge, Understanding, Application and Skill in Social Science as a whole before the experiment.

1.b. To study the Impact of Cognitive Apprenticeship Model in the Mean Scores on Achievement under the selected categories of instructional objectives – Knowledge, Understanding, Application and Skill in Social Science for the posttest among students in Experimental group and in Control group.

The data was analyzed by using inferential statistics for test of significance difference between Means for a large independent sample. The t value obtained for the posttest of Achievement under the selected categories of instructional objectives – Knowledge (7.21, $P < .01$), Understanding (2.08, $P < .05$), Application (8.15, $P < .01$) and Skill (4.893, $P < .01$) in Social Science. The obtained t value is statistically significant. It indicates that Experimental Group is in advantageous position with respect to achievement under the selected categories of instructional objectives – Knowledge, Understanding, Application and Skill in Social Science as a whole after the experiment.

1.c. To study the Impact of Cognitive Apprenticeship Model in the posttest Gain Mean Scores on Achievement under the selected categories of instructional objectives – Knowledge, Understanding, Application and Skill in Social Science for the posttest among students in Experimental group and in Control group.

The data was analyzed by using inferential statistics for test of significance difference between Means for a large independent sample. The t value obtained for the Gain scores on Achievement under the selected categories of instructional objectives – Knowledge (5.45, $P < .01$), Understanding (2.22, $P < .05$), Application (8.54, $P < .01$) and Skill (4.76, $P < .01$) in Social Science. It indicates that Experimental Group is in advantageous position with respect to achievement under the selected categories of instructional objectives – Knowledge, Understanding, Application and Skill in Social Science as a whole.

1.d. To study the Impact of Cognitive Apprenticeship Model in the Adjusted Y Means on Achievement under the selected categories of instructional objectives – Knowledge, Understanding, Application and Skill in Social Science among students in Experimental group and in Control group.

The pretest and posttest scores on Achievement under the selected categories of instructional objectives – Knowledge, Understanding, Application and Skill in Social Science of 60 students of Experimental group and Control group were subjected to Analysis of Co-Variance to determine the impact of Cognitive Apprenticeship Model by using pretest scores of Achievement under the selected categories of instructional objectives – Knowledge, Understanding, Application and Skill in Social Science as covariate. The scores obtained in the pretest and posttest were analyzed statistically by using ANCOVA.

The analysis helped to state that pretest (Co-variate) is significantly related to posttest (Dependent Variable) since $P < .01$ and the Cognitive Apprenticeship Model has significant effect on posttest on Achievement under the selected categories of instructional objectives – Knowledge, Understanding, Application and Skill since $P < .01$.

From the data of adjusted Means of total posttest Scores the calculated t value on Achievement under the selected categories of instructional objectives – Knowledge (7, $P < .01$), Understanding (2, $P < .05$), Application (8, $P < .01$) and Skill (5, $P < .01$) in Social Science of students in Experimental and in Control groups, the calculated t value are greater than the table value 2.66 at .01 levels. So it is clear that the performance of two groups differs significantly. This shows that the Cognitive Apprenticeship Model is more effective than the ordinary Activity Oriented method in teaching Social Science on Achievement under the selected categories of instructional objectives – Knowledge, Understanding, Application and Skill.

Tenability of the Hypotheses

Hypotheses 1

There exists a significant difference in the impact of Cognitive Apprenticeship Model on Achievement under the selected categories of instructional objectives – Knowledge, Understanding, Application and Skill in Social Science than that of the prevailing Activity Oriented Approach among the Secondary School Students.

Hypotheses 1.a

There exists a significant difference in the Mean Scores on Achievement under the selected categories of instructional objectives – Knowledge, Understanding, Application and Skill in Social Science for the pretest among students in Experimental group and in Control group.

Comparisons of Mean scores on Achievement under the selected categories of instructional objectives – Knowledge, Understanding, Application and Skill in Social Science for the pretest were done for total sample. The analysis of pretest scores on Achievement under the selected categories of instructional objectives – Knowledge, Understanding, Application and Skill is done by using the technique of significance of difference between students in two groups. It revealed that the t value obtained is not significant even at .05 level.

Hence Hypotheses 1.a is rejected.

Hypotheses 1.b.

There exists a significant difference in the Mean Scores on Achievement under the selected categories of instructional objectives – Knowledge, Understanding, Application and Skill in Social Science for the Posttest among students in Experimental group and in Control group.

Comparisons of Mean scores on Achievement under the selected categories of instructional objectives – Knowledge, Understanding, Application and Skill in Social Science for the Posttest were done for total sample. The analysis of Posttest scores on Achievement under the selected categories of instructional objectives – Knowledge, Understanding, Application and Skill is done by using the technique of significance of difference between students in two groups. It revealed that the t value obtained is statistically significant at .01 and .05 level.

Hence Hypotheses 1.b is fully substantiated.

Hypotheses 1.c.

There exists a significant difference in the Gain Mean Scores on Achievement under the selected categories of instructional objectives – Knowledge, Understanding, Application and Skill in Social Science for the Posttest among

students in Experimental group and in Control group.

Comparisons of Gain Mean scores on Achievement under the selected categories of instructional objectives – Knowledge, Understanding, Application and Skill in Social Science for the posttest were done for total sample. The analysis of posttest Gain scores on Achievement under the selected categories of instructional objectives – Knowledge, Understanding, Application and Skill is done by using the technique of significance of difference between students in two groups. It revealed that the t value obtained is statistically significant at .01 and .05 level.

Hence Hypotheses 1.c. is fully substantiated.

Hypotheses 1.d.

There exists a significant difference in the Adjusted Y Means on Achievement under the selected categories of instructional objectives – Knowledge, Understanding, Application and Skill in Social Science among students in Experimental group and in Control group.

The pretest of Achievement under the selected categories of instructional objectives – Knowledge, Understanding, Application and Skill is significantly related to posttest since $P < .01$ for Achievement under the selected categories of instructional objectives – Knowledge, Understanding, Application and Skill and independent variable, (Cognitive Apprenticeship Model) have significant effect on posttest for Achievement under the selected categories of instructional objectives – Knowledge, Understanding, Application and Skill in Social Science since $P < .01$.

The adjusted Means of posttest scores on Achievement under the selected categories of instructional objectives – Knowledge, Understanding, Application and Skill in Social Science of students in Experimental group and in Control groups were computed. Since the calculated t value on Achievement under the selected categories of instructional objectives – Knowledge, Understanding, Application and Skill in Social Science is greater than the table value at .01 and .05 levels. It revealed that the t value obtained is statistically significant. The investigator concluded that the performance of two groups differ significantly.

Hence the Hypotheses 1.d. is fully substantiated.

Educational implication of the study

Present study reveals that Cognitive Apprenticeship Model enhances Achievement under selected categories of instructional objectives – Knowledge, Understanding, Application and Skill in Social Science.

Instructional materials under Cognitive Apprenticeship Model evolved out of research can be utilized for Social Science instruction.

Curriculum construction committee can incorporate Cognitive Apprenticeship Model while revising the curriculum.

Scope and limitations of the Study

Scope of the Study

Present study has a wider range of application. Study reveals that Cognitive Apprenticeship Model of teaching is best suited for Social Science learning. It may true to the rest of the subject too. Teaching and learning should be effective and transforming the students. Cognitive Apprenticeship Model of teaching lies in the principle that a master teaches the apprentice. Not mere teaching but re-reflecting on the process of teaching the master teaches. Master shares the inert or tacit knowledge to the learner. Thus the whole personality of the master and apprentice are involved in the process of teaching. The effect of such kind of teaching would create efficient and excellent personalities with capacity to withstand the modern competitions.

Limitation of the Study

- The study was confined to the effect of Cognitive Apprenticeship Model of instructional design on achievement under the selected categories of instructional objectives – Knowledge, Understanding, Application and Skill of pupil of IX standard.
- The study would be confined to a single school, which would act as the sample for the entire population of the secondary schools.
- Only some topics of a single subject such as Social Science is considered.

- The study does not do comparisons between private and government schools.
- The study does not do comparison between boys and girls.

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