

Efficacy of Concept Mapping in Accomplishing Instructional Objectives in the Cognitive Domain of Social Studies Teaching

Savitha Khan^{1*}, Lissy Koshi²

ABSTRACT

The present study aimed to investigate the efficacy of concept mapping over the traditional method in accomplishing different objectives of social studies instruction in the cognitive domain. The experimental study followed a pretest-posttest control group design. Eighty students, separated into a control group and an experimental group of 40 students each, were exposed to 20 sessions of 40-minutes long teaching interventions in the normal classroom setup. Three selected units of social studies curriculum were taught to the control group and experimental group by adopting the traditional method and concept mapping method respectively. Pre-test and post-test scores were gathered with the help of a standardized achievement test that measured the accomplishment of instructional objectives in six domains viz., knowledge, understanding, application, analysis, synthesis, and evaluation, apart from the total achievement. The post-test scores of the control group and experimental group, based on instructional objectives, were compared by applying one way ANCOVA. The result exposed the superiority of concept mapping over the traditional method of teaching in accomplishing instructional objectives in four levels of the cognitive domain, viz., knowledge, understanding, application, and analysis, apart from total achievement. The concept mapping, however, was found no way superior to the traditional method in accomplishing the remaining two instructional objectives, viz., synthesis and evaluation.

Keywords: *Concept Mapping, Cognitive Domain, Knowledge, Understanding, Application, Analysis, Synthesis, Evaluation, Social Studies.*

Academic achievement is the prime concern of psychologists, educators, learners as well as parents. Achievement in Social Studies is of key importance at all levels, especially at secondary level, as it provides base for the learning of many subjects including science (eg. Geography, Meteorology, Oceanography, Archeology, Paleontology, Geology, Environmental Studies, etc.), Arts (Literature) and Humanities (eg. Sociology, Anthropology, etc.), at higher levels. Social Studies continued as a comparatively easy subject for secondary school students at all levels for last many decades (Akhila, 2014); its average achievement being often raised above that in English, Mathematics, Physics, Chemistry, and Biology (Sujatha, 2012). School-based studies conducted in recent years, in Kerala contest, have

¹ Research Scholar, Research & Development Centre, Bharathiar University, Coimbatore, Tamil Nadu, India

² Assistant Professor, Mount Carmel College of Teacher Education, Kottayam, Kerala, India

*Responding Author

Received: May 12, 2019; Revision Received: June 24, 2019; Accepted: June 30, 2019

Efficacy of Concept Mapping in Accomplishing Instructional Objectives in the Cognitive Domain of Social Studies Teaching

shown increasingly lower grades for Social Studies when there is a hike in Mathematics and Science subjects (Akhila, 2014). The reasons for this scholastic recession are multiple and varied, however, there is justifiable reasons to attribute some to the pedagogic strategies that the teachers adopt in the classroom.

The recent paradigm shift in the pedagogic approach from behaviourism to constructivism has brought radical changes in the teaching-learning process, making it an interactive and dynamic process where learners construct knowledge and interpret reality (Alam, 2017; Gaur & Surana, 2016). Constructivism has contributed a handful of active instructional methods centered on the needs, interest, and ability of the learners. In spite of the availability of numerous innovative methods for classroom instruction, teachers prefer conventional methods as they require lesser planning and preparation from the parts of the teachers, and its easiness to complete the required content area within the timeframe. The dearth of conceptual clarity and lack of meaningfulness have been identified as the major reasons for the poor quality of social studies learning in our schools (Hourani, 2011). Improving the quality of social studies learning, therefore, require the adoption of strategies that will enable the learner to integrate new knowledge into their existing networks of concepts and propositions in their cognitive structures. In this context, concept mapping has been identified as a strategy to help learners organise their cognitive frameworks into more meaningful patterns by integrating ideas, concepts, and information (Gaur & Surana, 2016; Parikh, 2015; Otor, 2011). The present study investigates the effectiveness of Concept Mapping strategy in accomplishing instructional objectives in the cognitive domain by taking selected topics from the social studies curriculum meant for 8th graders.

Objectives Of The Study

The following are the objectives of the study.

1. To compare the efficacy of concept mapping over the conventional method of teaching on accomplishing instructional objectives in different levels of cognitive domains.
2. To compare the efficacy of concept mapping over the conventional method of teaching on social science achievement of eighth graders.

Hypotheses Of The Study

The following hypotheses were tested in the study:

1. Concept mapping will be more effective than the conventional method of teaching in accomplishing instructional objectives at the *knowledge* level.
2. Concept mapping will be more effective than the conventional method of teaching in accomplishing instructional objectives at the *understanding* level.
3. Concept mapping will be more effective than the conventional method of teaching in accomplishing instructional objectives at the *application* level.
4. Concept mapping will be more effective than the conventional method of teaching in accomplishing instructional objectives at the *analysis* level.
5. Concept mapping will be more effective than the conventional method of teaching in accomplishing instructional objectives at the *synthesis* level.
6. Concept mapping will be more effective than the conventional method of teaching in accomplishing instructional objectives at the *evaluation* level.
7. Concept mapping will be more effective than the conventional method of teaching on social science achievement of the students.

Efficacy of Concept Mapping in Accomplishing Instructional Objectives in the Cognitive Domain of Social Studies Teaching

METHODOLOGY

A pre-test post-test, control grouped quasi-experimental design was adopted in the study. Two intact divisions, each comprising 40 students, of 8th graders were selected from Govt. Model Higher Secondary School, Cheruvattoor (Ernakulam district, Kerala), for the study. The two divisions selected were compared on the basis of their previous achievement in social science, and one division was considered as an experimental group and other as a control group. Lesson transcripts following the conventional method of teaching, lesson plans following Concept Mapping, and a standardized achievement test in social science were used as tools for intervention and data collection. The content covered under three units (Harappa Civilisation, In Search of Earth's Truth, and Our Government) in the Social Studies Text Book (Std. VIII, SCERT, Govt. of Kerala), were taught to the control group and experimental group with the help of fifteen 40-minutes lesson plans, the control group with traditional lesson plans and the experimental group with lesson plans based on concept map. The achievement test was administered on both the control group and experimental group one week before and one week after the teaching to get pre-test and post-test scores, which are analysed statistically to test the hypotheses.

ANALYSIS AND INTERPRETATION

The pre-test and post-test scores pertained to knowledge (ke) level achievement of the experimental and control groups were subjected to one way ANCOVA to find out the effect of concept mapping on social studies achievement in knowledge level. The result of the analysis is given in Table 1.

Table 1: Tests of between-subjects effects for post-test knowledge level achievement scores of experimental and control groups

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Squared	Eta
Corrected	21.267 ^a	2	10.633	6.899	.002	.152	
Intercept	654.186	1	654.186	424.426	.000	.846	
Pre-test (ke)	3.217	1	3.217	2.087	.153	.026	
Group	20.324	1	20.324	13.186	.001	.146	
Error	118.683	77	1.541				
Total	1778.000	80					
Corrected Total	139.950	79					

^a. R Squared = .152 (Adjusted R Squared = .130)

The F-value obtained on comparing the post-test knowledge level achievement scores for the control group and experimental group, after adjusting for the pre-teaching knowledge level achievement scores as a covariate, is significant ($F = 13.186$; $P < .001$). The estimated mean for the post-test knowledge level score for the control group is 4.012, and that for the experimental group is 5.038 showing that the concept mapping is more effective than the traditional method of teaching in attaining knowledge level instructional objectives of teaching social studies.

The mean post-test scores of achievement at understanding (ug) level of the experimental and control groups were subjected to one way ANCOVA to find out the effect of concept

Efficacy of Concept Mapping in Accomplishing Instructional Objectives in the Cognitive Domain of Social Studies Teaching

mapping on understanding level achievement in social studies. The result of the analysis is given in Table 2.

Table 2: Tests of between-subjects effects for post-test understanding level achievement scores of experimental and control groups

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected	73.194 ^a	2	36.597	7.664	.001	.166
Intercept	1137.794	1	1137.794	238.270	.000	.756
Pre-test (ug)	35.382	1	35.382	7.409	.008	.088
Group	32.215	1	32.215	6.746	.011	.081
Error	367.693	77	4.775			
Total	4545.000	80				
Corrected Total	440.888	79				

^a. R Squared = .166 (Adjusted R Squared = .144)

The F-value estimated comparing the mean post-test scores of understanding level achievement of the experimental and control group is significant at 99% confidence interval (F = 6.746; p<.01). A true difference exists between the control group and experimental group with regard to the post-test scores of understanding level achievement in social studies. The mean post-test score of understanding level achievement of the control group is 6.526; and that for the experimental group is 7.799. It shows that concept mapping is more effective than the traditional teaching strategies in accomplishing understanding level instructional objectives teaching social studies for eighth graders.

The mean post-test scores of social studies achievement at application (ap) level for the experimental and control groups, having adjusted for pre-test scores as a covariate, were subjected to one way ANCOVA to find out the effect of concept mapping on social studies achievement in the application level. The result of the analysis is given in Table 3.

Table 3: Tests of between-subjects effects for post-test application level achievement scores of experimental and control groups

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected	20.651 ^a	2	10.325	8.762	.000	.185
Intercept	678.804	1	678.804	576.040	.000	.882
Pre-test (ap)	11.538	1	11.538	9.792	.002	.113
Group	7.655	1	7.655	6.496	.013	.078
Error	90.737	77	1.178			
Total	1531.000	80				
Corrected Total	111.387	79				

^a. R Squared = .185 (Adjusted R Squared = .164)

Efficacy of Concept Mapping in Accomplishing Instructional Objectives in the Cognitive Domain of Social Studies Teaching

The results of the analysis presented in Table 3 shows that comparison of the post-test scores of the control group and the experimental group produced an F-value which is significant at 99% confidence interval ($F = 6.496$; $P < .01$). Put another way, the control and experimental interventions have a statistically significant differential effect on the application level achievement in social studies of the eighth graders. The mean achievement score (application level) estimated for the control group is 3.902, and that for the experimental group is 4.523. It exposes that the concept mapping strategy is significantly better than the traditional method for attaining application level instructional objectives of teaching social studies to eighth grade students.

The mean post-test scores of social studies achievement at analysis (ay) level for the experimental and control groups, having adjusted for pre-test scores as a covariate, were subjected to one way ANCOVA to find out the effect of concept mapping on social studies achievement in analysis level. The result of the analysis is given in Table 4.

Table 4: Tests of between-subjects effects for post-test analysis level achievement scores of experimental and control groups

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	126.652 ^a	2	63.326	9.353	.000	.195
Intercept	2864.326	1	2864.326	423.054	.000	.846
Pre-test (ay)	32.039	1	32.039	4.732	.033	.058
Group	94.612	1	94.612	13.974	.000	.154
Error	521.336	77	6.771			
Total	5163.000	80				
Corrected Total	647.987	79				

^a. R Squared = .195 (Adjusted R Squared = .175)

The F-value obtained on comparing the control group and experimental group with regard to the post-test scores of social studies achievement at analysis level is significant beyond 99% confidence interval ($F = 13.974$; $p < .001$). The mean post-test scores, after being adjusted for the covariate, estimated for the control group is 6.425, and that for the experimental group is 8.600 revealing that the experimental treatment is superior to the control treatment in accomplishing instructional objectives at the analysis level.

The experimental and control groups were compared by taking the mean post-test scores (adjusted for covariate) of social studies achievement at synthesis (say) level by applying ANCOVA to find out the effect of differential treatment of the groups. The result of the analysis is given in Table 5.

Efficacy of Concept Mapping in Accomplishing Instructional Objectives in the Cognitive Domain of Social Studies Teaching

Table 5: Tests of between-subjects effects for post-test synthesis level achievement scores of experimental and control groups

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected	.347 ^a	2	.173	.210	.811	.005
Intercept	263.376	1	263.376	318.851	.000	.805
Pre-test (sy)	.147	1	.147	.178	.674	.002
Group	.211	1	.211	.255	.615	.003
Error	63.603	77	.826			
Total	376.000	80				
Corrected Total	63.950	79				

^a. R Squared = .005 (Adjusted R Squared = -.020)

The result of the analysis given in Table 5 shows that the F-value obtained on comparing the post-test scores of synthesis level achievement in social studies is not significant ($F = 0.255$; $p > .05$). To put differently, the concept mapping teaching strategy is not superior to the traditional method in realising the instructional objectives at the synthesis level,

Comparison of the experimental and control group was done with regard to the mean post-test scores of achievement at evaluation (iv) level, after being adjusted for pre-test scores as covariate. The result of the analysis is given in Table 6.

Table 6: Tests of between-subjects effects for post-test evaluation level achievement scores of experimental and control groups

Source	Type III Sum of	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected	2.271a	2	1.135	1.817	.169	.045
Intercept	210.934	1	210.934	337.555	.000	.814
Pre-test (ev)	.758	1	.758	1.214	.274	.016
Group	1.445	1	1.445	2.313	.132	.029
Error	48.117	77	.625			
Total	285.000	80				
Corrected Total	50.387	79				

^a. R Squared = .005 (Adjusted R Squared = -.020)

The result of the one way ANCOVA, given in Table 6, shows that the F-value obtained on comparing the post-test evaluation level achievement scores of a control group and experimental group is not significant ($F = 2.313$; $P > .05$). It shows that concept mapping is not superior to the traditional methods of teaching in realizing evaluation level instructional objectives of teaching social studies. Finally, the mean post-test scores of total achievement (tot) for the experimental and control groups were compared, after adjusting for the covariate, to find out whether the groups differ significantly with regard to the performance. The result of the analysis is given in Table 7.

Efficacy of Concept Mapping in Accomplishing Instructional Objectives in the Cognitive Domain of Social Studies Teaching

Table 7: Tests of between-subjects effects for post-test total achievement scores of experimental and control groups

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected	1508.892 ^a	2	754.446	22.601	.000	.370
Intercept	9631.890	1	9631.890	288.547	.000	.789
Pre-test (ev)	892.842	1	892.842	26.747	.000	.258
Group	648.795	1	648.795	19.436	.000	.202
Error	2570.308	77	33.381			
Total	62832.000	80				
Corrected Total	4079.200	79				

^a. R Squared = .370 (Adjusted R Squared = .354)

The F-value obtained on comparing the mean post-test scores of total achievement for the control group and experimental group is significant above .01 level (F = 19.436; p<.01). The adjusted mean score of total achievement for the control group taught with the traditional method is 24.252 and that for the experimental group taught with concept mapping method is 29.948. The estimates expose that the concept mapping is significantly better than the traditional method of teaching selected topics of social studies.

CONCLUSIONS

The analyses of data revealed that significant difference exists between the control group and experimental group with regard to the mean post-test scores of total social studies achievement apart from achieving instructional objectives in four levels, viz., knowledge, understanding, application, and analysis. The control and experimental groups were found to be alike in accomplishing instructional objectives in the levels of synthesis and evaluation. It was further revealed from the analysis that the concept mapping method is better than the traditional activity method of instruction in accomplishing most of the instructional objectives in the cognitive domain of teaching social studies.

REFERENCES

- Akhila, S. P. (2014). Social studies achievement of a secondary school student in relation to involvement in socio-political activities. Unpublished Master's Dissertation. University of Kerala: Thiruvananthapuram (India).
- Alam, M. (2017). Constructivism and the classroom curriculum. *International Journal of Indian Psychology*, 5 (1), DIP: 18.01.103/20170501, DOI: 10.25215/0501.103
- Gaur, J., & Surana, A. (2016). Concept map: A visual learning tool. *International Journal of Indian Psychology*, 4 (1/81), ISSN:2348-5396 (e), ISSN:2349-3429 (p), DIP:18.01.139/20160401, ISBN:978-1-365-59365-9
- Hourani, R. B. (2011). Constructivism and revitalizing social studies. *The History Teacher*, 44 (2), 228-249.
- Otor, E. E. (2013). Effects of concept mapping strategy on students' achievement in difficult chemistry concepts. *Educational Research*, 4 (2), 182-189. Retrieved from: <http://www.interestjournals.org/ER>

Efficacy of Concept Mapping in Accomplishing Instructional Objectives in the Cognitive Domain of Social Studies Teaching

- Parikh, N. D. (2015). Mind map and concept map as complementary tools for teaching. *International Journal of Indian Psychology*, 2 (4), 147-158. ISSN 2348-5396 (e), ISSN: 2349-3429 (p), DIP: B00314V2I42015
- Sujatha, R. (2012). Social studies achievement of secondary school students of Kerala from 2000 to 2010. Unpublished Masters Dissertation. University of Kerala: Thiruvananthapuram (India).

Acknowledgment

This paper is a part of the Ph. D research by the first author under the supervision of the second author. The authors place on record their profound and sincere gratitude to the Director, Research and Development Centre, Bharathiar University, Coimbatore, for the support extended to carry out the research activity. Heartfelt thanks are also due to the Principal, Teachers and Students of Govt. Model Higher Secondary School, Cheruvatoor, for their co-operation during the intervention phase of the study.

Conflict of Interest

The authors carefully declare this paper to bear not a conflict of interests

How to cite this article: Khan, S., & Koshi, L (2019). Efficacy of Concept Mapping in Accomplishing Instructional Objectives in the Cognitive Domain of Social Studies Teaching. *International Journal of Indian Psychology*, 7(2), 748-755. DIP:18.01.090/20190702, DOI:10.25215/0702.090