



Effectiveness of Jigsaw-II Method of Teaching on Accomplishing Instructional Objectives of Social Sciences in Cognitive Domain

Savitha Khan¹ & Lissy Koshi²

¹ Research & Development Centre, Bharathiar University, Tamil Nadu, India, PIN-641046, E-mail: savithakhan@gmail.com

² Asst. Professor, Mount Carmel College of Teacher Education, Kottayam, PIN-686002, E-mail: lissykoshi@gmail.com

Abstract: The study aims to compare the effectiveness of jigsaw-ii method of teaching and the prevailing activity method of teaching in accomplishing different instructional objectives of social sciences in cognitive domain. The study employed a pre-test post-test control group design wherein one intact class each of eighth grade students was taken as control group (n = 3) and experimental group (n = 39). Pre-intervention and post-intervention accomplishment of instructional objectives in six different levels (knowledge, comprehension, application, analysis, synthesis and evaluation) of cognitive domain was assessed with the help of an achievement in social sciences developed by the researchers. Three units from the prescribed textbook were taught in 27 classes by employing activity method of teaching for the control group and by using jigsaw-ii method with the help of lesson transcripts developed by the investigators. Independent sample t-test and paired sample t-test were employed for inferential analysis of data. The results showed that both activity method and jigsaw-ii method are effective methods for accomplishing instructional objectives of different levels in the cognitive domain. While no significant difference was observed between the activity method of teaching and jigsaw-ii method of teaching with respect to the accomplishment of knowledge level and application level instructional objectives, jigsaw-ii method was found to be more effective in achieving comprehension level, analysis level, synthesis level, and evaluation level instructional objectives of teaching social sciences.

Key words: Jigsaw-ii method, Activity method of teaching, Instructional objectives, Cognitive domain, Social sciences.

1. INTRODUCTION

Social science is a core subject in the secondary schools of India, with the objectives of inculcating in the learner in integrated forms, basic skills, values, and attitudes for useful living. Students, parents and even teachers consider social sciences as an easy subject having not much utilitarian values. Its learning is often restricted to enhance the total score grade in the school final examination. It is, therefore, one of the neglected school subjects where learner motivation and teacher involvement are comparatively less (Chandran, 2011). It has been reported that attaining higher instructional objectives in social sciences are much more difficult than attaining those in other school subjects (Joxy, 2013). Studies have revealed that in traditional classrooms the higher instructional objectives are not accomplished in most of the students (Scheurman, 2010), which require more socializable, dynamic learner centred approaches in classroom.

Learner-centered instruction is first and foremost based on constructivist epistemology which posits that knowledge is temporary, non-objective, internally constructed, and socio-culturally mediated (Karim & Bronwyn, 2016). Social constructivism, one of the variants of constructivism, makes learners active and interactive in the classroom situation, resulting in internalization of co-constructed knowledge through diverse learning process such as cooperative learning, role playing, reciprocal teaching and the like (Russell, 2008). The jigsaw-ii technique is a social constructivist method of organizing classroom activity that makes students dependent on each other to succeed. It improves peer cooperation and create team solidarity among students through division of tasks (Sharan & Hertz-Lazarowitz, 1980), involves each student in a group to assume learning responsibility. Jigsaw-ii method of teaching instill in each student a sense of responsibility for their group's performances (Lucas, 2000). The success of cooperative groups depends on positive independence and supportive interaction. It helps learners to gain self-confidence, develop their communicative skills, strengthen their problem solving and critical thinking abilities, and participate in teaching-learning process actively (Gillies, 2006; Prichard, Bizo & Stratford, 2006). Though researchers have suggested different learner-centred methods to teach social sciences, the success of a selected strategy depends not only on the nature of the content but also on the instructional objectives to be accomplished. There is not much research evidence to support the efficacy of an available constructivist strategies to accomplish the instructional objectives of social sciences. In this context, this study is an attempt to examine the efficacy of jigsaw-ii method of teaching in accomplishing the instructional objectives of social sciences in eighth grade learners.

2. OBJECTIVE OF THE STUDY

The main objective of the study is to find out the effectiveness of jigsaw-ii method of teaching on accomplishing instructional objectives of social sciences in cognitive domain.

3. HYPOTHESIS OF THE STUDY

The null hypothesis formulated for the study is stated as follows: “There is no significant difference between jigsaw-ii method of teaching and activity method of teaching in accomplishing instructional objectives of social sciences in cognitive domain”.

4. METHODOLOGY

4.1 Method

The study adopted a quasi-experimental (non-equivalent pre-test post-test control group) design.

4.2 Population

The entire students of eighth grade class (Standard-VIII), studying in schools affiliated to Kerala Board of Secondary Education (KBSE), Kerala State (India) constitute the population of the study.

4.3 Participants

Four intact classes of eighth grade students (n = 82) from Govt. Higher Secondary School, Medical College, Thiruvananthapuram (State of Kerala, India) constituted the participants of the study. The intact classes with varying strength of students were randomly decided as Control Group (n = 43), and Experimental group-2 (n = 39).

4.4 Tools Used

- Achievement Test in Social Science:** The academic achievement of the participants were assessed by administering a 50 marks achievement test in social sciences (2-hours) developed by the investigators. The 50-marks achievement test consisted of three types of questions viz., Objective type, Short answer type and Essay type for a total of 50 marks, covering six instructional objectives (Knowledge, Comprehension, Application, Analysis, Synthesis and Evaluation) in cognitive domain
- Lesson Transcripts based on Jigsaw-II Method:** The pedagogic intervention was done with the help of 27 lesson transcripts (expert sheet) developed by the investigators, after analyzing the selected content areas in respect of facts, concepts, terms, events etc. Three units were selected from the prescribed textbook for teaching, which included The River Valley Civilization (History), Our Government (Politics), and In Search of Earth's Secrets (Geography). The investigators fixed the curricular objectives, identified the instructional materials needed/useful for the class, planned the classroom activities to be given to each expert groups, and list out the outcome (product) thereof.

4.5 Pedagogic Intervention

The pedagogic intervention involved three phases. In Phase-I, the participants in the control group and experimental group were pre-tested for their achievement in social sciences with the help of the achievement test. In Phase-II, the selected topics were taught to the control group by employing Activity Method (AMT) and to the experimental group by employing Jigsaw-II Method (JMT) with the help of pre-prepared lesson transcripts. A total of 27 classes were given to both the groups by senior teachers in service. In Phase-III, the same achievement test was administered for a second time on both the groups, on the third day of the end of last class. The answer scripts of the pre-test and post-test were scored with the help of the scoring key, the scores were then consolidated separately for the control group and experimental group and subjected to statistical analysis with the help of SPSS.

5. ANALYSIS AND INTERPRETATION

The pre-test scores of achievement of different instructional objectives in cognitive domain, obtained for the control group and experimental group were compared to find out the significant difference, if any, before the pedagogic intervention. The result of the same is given in Table 1.

Table 1: Comparison of the pre-test scores of control group and experimental group with respect to the achievement test scores of different instructional objectives in cognitive domain.

Instructional objectives	Groups	Statistical Indices				t	Sig
		N	M	SD	SE _M		
Knowledge	Control	43	1.14	0.88	0.136	0.604	NS
	Experimental	39	1.03	0.81	0.130		
Comprehension	Control	43	1.23	0.92	0.141	0.527	NS
	Experimental	39	1.13	0.86	0.138		
Application	Control	43	0.72	0.85	0.130	1.263	NS
	Experimental	39	0.51	0.60	0.096		
Analysis	Control	43	0.49	0.74	0.112	0.523	NS
	Experimental	39	0.56	0.55	0.088		
Synthesis	Control	43	0.19	0.45	0.069	1.200	NS
	Experimental	39	0.31	0.47	0.075		
Evaluation	Control	43	0.19	0.39	0.060	2.768	.01
	Experimental	39	0.46	0.50	0.081		

The data and results of the independent sample t-tests given in Table 1 shows that no true difference exists between participants in the control group and experimental group with respect to their pre-test scores of achievements of different instructional objectives, except for “evaluation”. In the case of the instructional objective of ‘evaluation’, participants in the control group are significantly better than those in the experimental group ($t = 2.768$; $p < .001$).

In order to find out the effect of activity method of teaching (AMT) on the control group, the pre-test and post-test scores of achievement of different instructional objectives in the cognitive domain of social sciences were compared by independent sample t-test. The data and result of the same is given in Table 2.

Table 2: Comparison of the pre-test and post-test scores of achievements in different instructional objectives of control group taught by activity method of teaching.

Instructional objectives	Groups	Statistical Indices				t	Sig
		N	M	SD	SE _M		
Knowledge	Pre-test	43	1.14	0.89	0.136	13.869	.001
	Post-test		4.09	1.30	0.199		
Comprehension	Pre-test	43	1.23	0.92	0.141	14.550	.001
	Post-test		6.65	2.53	0.386		
Application	Pre-test	43	0.72	0.85	0.130	16.358	.001
	Post-test		3.91	1.13	0.172		
Analysis	Pre-test	43	0.49	0.74	0.112	13.809	.001
	Post-test		6.58	3.03	0.461		
Synthesis	Pre-test	43	0.19	0.45	0.069	12.491	.001
	Post-test		1.98	0.91	0.139		
Evaluation	Pre-test	43	0.19	0.39	0.060	9.251	.001
	Post-test		1.60	0.85	0.129		

As evident from Table 2, all the t-values obtained on comparing the pre-test and post-test scores of achievement in different levels of instructional objectives for the control group are significant, revealing that the activity method of teaching has resulted in significant changes in all the levels of instructional objectives in cognitive domain.

In order to find out the effect of jigsaw-ii method of teaching on the experimental group, the pre-test and post-test scores of achievement of different instructional objectives in the cognitive domain of social sciences were compared by independent sample t-test. The data and result of the same is given in Table 3.

Table 3: Comparison of the pre-test and post-test scores of achievements in different instructional objectives of experimental group taught by jigsaw-ii method.

Instructional objectives	Groups	Statistical Indices				t	Sig
		N	M	SD	SE _M		
Knowledge	Pre-test	39	1.03	0.81	0.130	17.466	.001
	Post-test		3.64	1.27	0.203		
Comprehension	Pre-test	39	1.13	.864	0.138	28.011	.001
	Post-test		7.13	1.689	0.270		
Application	Pre-test	39	0.51	0.60	0.096	27.713	.001
	Post-test		4.21	1.13	0.181		
Analysis	Pre-test	39	0.56	0.55	0.088	26.949	.001
	Post-test		7.44	1.60	0.257		
Synthesis	Pre-test	39	0.31	0.47	0.075	17.544	.001
	Post-test		3.08	0.81	0.129		
Evaluation	Pre-test	39	0.46	0.51	0.081	19.513	.001
	Post-test		3.03	0.74	0.119		

The result of the paired sample t-test given in Table 3 shows that all the t-values estimated are significant at 99.9% confidence interval. It exposes that jigsaw-ii method of teaching was effective in causing significant change in achievement in all levels of instructional objectives in cognitive domain.

In order to find out whether the Jigsaw-II Method of Teaching (JMT) is more effective than the prevalent Activity Method of Teaching (AMT) in accomplishing the instructional objectives of social science teaching in cognitive domain, the control group

and experimental group were compared in terms of the gain scores (score obtained by subtracting pre-test scores from post-test scores). Table 4 presents the data and rest of the independent sample t-test carried out in this regard.

Table 4: Comparison of activity method and jigsaw-ii method with respect to the gain scores of different instructional objectives

Instructional objectives	Groups	Statistical Indices				t	Sig
		N	M	SD	SE _M		
Knowledge	AMT	43	1.53	0.98	0.150	0.968	NS
	JMT	39	1.74	0.97	0.155		
Comprehension	AMT	43	3.37	2.09	0.319	4.381	.001
	JMT	39	5.21	1.64	0.263		
Application	AMT	43	2.30	1.25	0.190	1.003	NS
	JMT	39	2.54	0.82	0.132		
Analysis	AMT	43	4.12	2.34	0.357	3.575	.001
	JMT	39	5.72	1.61	0.257		
Synthesis	AMT	43	0.86	0.99	0.151	5.974	.001
	JMT	39	2.23	1.09	0.174		
Evaluation	AMT	43	0.70	1.08	0.165	4.763	.001
	JMT	39	1.87	1.15	0.184		

The results of the t-tests performed to compare the Control Group (Activity Method of Teaching) and Experimental Group (Jigsaw-II Method of Teaching) with regard to the gain scores of achievement in different instructional objectives at cognitive domain reveals that: (i) the activity method of teaching and jigsaw-ii method are alike with respect to their efficacy in accomplishing knowledge level and application level instructional objectives of social sciences., and (ii) the jigsaw-ii method is significantly more effective than the prevailing activity method of teaching in accomplishing comprehension level, analysis level, synthesis level and evaluation level instructional objectives of social sciences.

6. CONCLUSIONS

The study brought that both activity method and jigsaw-ii method are effective instructional strategies in accomplishing all the instructional objectives in cognitive domain of social sciences. While the activity method of teaching and jigsaw-ii method are almost alike in their efficacy in accomplishing the knowledge level and application level instructional objectives of social sciences, significant difference exists between the two instructional strategies with respect to the remaining four levels of instructional objectives. The jigsaw-ii method of teaching was found to be more effective than the prevailing activity method of teaching in accomplishing comprehension level, analysis level, synthesis level, and evaluation level instructional objectives.

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