

Effectiveness of Cooperative Learning on Critical Thinking Dispositions of Secondary School Students

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Abstract The objective of the present paper was to study the effectiveness of Cooperative Learning (Jigsaw strategy) on Critical thinking Dispositions of secondary school students. Total 116 students of class 9th studying in a school affiliated to P.S.E.B were taken as sample. Data was collected by using Critical Thinking in everyday Life developed by Mincemoyer, Perkins, Munyua (2001) which was revalidated on Indian population by Malhan (2011). By employing 2x2 factorial design of ANCOVA results showed that students taught through cooperative learning strategy (Jigsaw) (Mean=27.12, N=57) achieved significantly higher Critical thinking Dispositions as compared to traditional method of teaching (Mean=22.39, N=59). Critical thinking Dispositions was found to be independent of interaction between treatment and gender.

Keywords: Cooperative learning, Jigsaw, Critical thinking Dispositions

1. INTRODUCTION

As many other countries across the world, India is in a process of educational reform involving a change of paradigm of educational practices in general and school education in particular. The shift is from a teacher dominated classroom to student centred classroom and this has wide-reaching implications throughout the educational system. No doubt about that now a days it is a common belief that good learning is learner-centred. But still in our schools, education is perceived as a narrow repertoire of ritualised classroom behaviours, and only two skills are developed: memorisation and repetition. Teachers are the center of classrooms. Moreover, teachers absolutely empower the class management and usually emphasize a memorization method in teaching. This leads to restrict students

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from analytical skills, opinion sharing and self learning. NCF-SE (2005) also emphasised that knowledge should be constructed and the approach should be learner-centred. For this we have to move away from traditional teacher centred methods of teaching to student centred methods like cooperative learning. Cooperative learning is not new; it has been around since the early 1900's when it was used in one room school houses. Cooperative learning is one of the most remarkable and fertile areas of theory, research, and practice in education. Cooperative learning is the instructional use of small groups so that students work together to maximize their own and each other's learning. (Johnson, Johnson, & Holubec, 1998). Cooperative learning comprises "instructional methods in which teachers organize students into small groups, which then work together to help one another learn academic content" (Slavin, 2011). Johnson, Johnson & Stanne (2000) summarized that cooperative learning strategies are widely used because they are based on theory validated by research and almost any teacher can find a way to use cooperative learning methods that are consistent with personal philosophies. In psychology where cooperation has received much attention, it is based on following four major theoretical perspectives: Motivationalist, Social cohesion, Cognitive-developmental and Cognitive-elaboration identified by different researchers (Slavin, 1995). Cooperative learning is based on five basic elements viz: Positive interdependence, Individual accountability, Promotive interaction, Group processing and Development of small group interpersonal skills. Grouping based on the above five elements is essential for cooperative learning. The most widely used group formation comprises of heterogeneous teams, containing one high, two middle, and one low achieving student and having a mix of gender and other diversities that reflect the classroom population. The rationale for heterogeneous groups argues that these produces the greatest opportunities for peer tutoring and support as well as improve cross-race and cross-sex relations and integration. Occasionally, random or special interest teams could be formed to maximize student talents or meet a specific student need (Kagan, 1994).

Review of literature shows that large amount of research that has been conducted on Cooperative learning. Many studies on specific cooperative learning methods were found. The studies have been conducted across all the levels of education viz primary, middle, secondary and higher education (Dasan, 2007). In a Meta-analysis of 158 studies Johnson & Johnson reported that current research findings present evidence that cooperative learning methods are likely to produce positive results in achievement along with developing social and higher order thinking skills .Although a number of Cooperative learning methods are applied in classroom teaching, a well-known and highly accepted method is Jigsaw. Jigsaw method was developed by Elliot Aronson. In jigsaw, students of a normal-sized class are divided into groups of four to six

students, each of which is given a list of subtopics to study. Individual members of each group then break off to work with the “experts” from other groups, researching a part of the material being studied, after which they return to their base group in the role of instructor for their subcategory. Jigsaw strategy is a cooperative learning technique appropriate for students from 3rd to 12th grade. Jigsaw technique, which is a greatly efficient teaching method, consists of challenging problems, participating student, and sharing their own opinions and ideas (Maritland, Latourelle, Valenti and Bookman, 2001). In addition, the jigsaw technique encourages students to efficiently work in collaboration by employing higher order thinking skills. Jigsaw strategy affects students to have an attraction for learning contents and enhancing perception skills (Turk, Brineand, Kanev, 2006). Cooperative learning methods provide structure in which students have an opportunity to raise logical questions, discuss the content with his peer group, and imitate higher order thinking, critical evaluation of idea, etc. in team work.

Critical thinking dispositions involve seeking information, precision, and being open-minded. Critical thinking is a kind of “reasonable reflective thinking that is focused on deciding what to believe or do” (Ennis, 1987). The definition of American Philosophical Association developed through a Delphi panel of 46 theoreticians from several academic fields is the widely used: Delphi report says that the ideal critical thinker is habitually inquisitive, well-informed, trustful of reason, open-minded, flexible, fair-minded in evaluation, honest in facing personal biases, prudent in making judgments, willing to reconsider, clear about issues, orderly in complex matters, diligent in seeking relevant information, reasonable in the selection of criteria, focused in inquiry, and persistent in seeking results which are as precise as the subject and the circumstances of inquiry permit (Facione, 1990). Review of Literatures showed that no study is undertaken to see the effect of jigsaw method of cooperative learning on Critical thinking of school students in India or abroad. So, to fill these gaps investigator selected Jigsaw method of cooperative learning as an independent variable and critical thinking as a dependent variable in the present study.

1.1 Objective

- To study the effect of cooperative learning (strategy), gender and their interaction on Critical thinking Dispositions by taking Critical thinking Dispositions as covariate.

1.2 Hypotheses

- There is no significant difference in the adjusted mean scores of Critical thinking Dispositions of experimental (Jigsaw strategy) and control

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groups (lecture/discussion method) when pre scores of Critical thinking Dispositions are taken as covariate.

- There is no significant difference in the adjusted mean scores of Critical thinking Dispositions of boys and girls when pre scores of Critical thinking Dispositions are taken as covariate.
 - There is no significant effect of interaction between treatment and gender on the adjusted mean scores of Critical thinking Dispositions when pre scores of Critical thinking Dispositions are taken as covariate.
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2. METHOD

2.1 Sample

Random sampling technique was used to select the sample. The present study was conducted on 116 students of 9th class of Govt. high School Khasi Kalan, Ludhiana, affiliated to P.S.E.B Mohali. Both boys and girls were included in the sample for study.

2.2 Measure

Critical Thinking in everyday Life developed by Mincemoyer, Perkins, Munyua (2001) and revalidated on Indian population by Malhan, A. (2011) was used to assess Critical Thinking Disposition. Cooperative learning Modules based on Jigsaw strategy were also prepared by the investigator.

2.3 Experimental Design

The present study was experimental in nature. It was based on the lines of non equivalent Control group pre test-post test design.

2.4 Procedure

The study was designed to find the effectiveness of Cooperative learning (Jigsaw strategy) on Critical Thinking Disposition. Permission was taken from principal of the school for conducting the experiment. In the first step Critical Thinking in everyday Life scale was administered to 116 students as pre test. Two intact section of 9th class were taken and randomly one was selected as experimental group and another as control group. One group was assigned randomly to the treatment. This was termed as experimental group and the other was termed as control group. The experimental group was taught social science subject through jigsaw strategy (with modules prepared by investigator) for a period of Forty days at the rate of 60 min. per day. On the other hand control group was taught social science with the help of

conventional (lecture/discussion) method for a period of Forty days at the rate of 60 min. per day. After completion of the treatment Critical Thinking Disposition scale was administered to both the groups. The extraneous variables like influence and motivation of the teacher was controlled by teaching both groups by the investigator himself.

3. RESULTS

Table (a): DESCRIPTIVE ANALYSIS ON SCORES OF CRITICAL THINKING DISPOSITIONS

The Mean and S.D. were calculated for post test scores and have been placed in table 1. The means have also been depicted through bar graph.

From the table 1 and bar graph of the data, it was observed that mean score of the students of experimental group (N=57) was 77.60 with standard deviation 10.38 and mean score of the students of control group (N=59) was 74.78 with standard deviation 9.86. These values show that mean scores of students in experimental group were higher than that of students in control group. It may be noted from the table 1 that Mean score of Girls was 77.07, also higher than mean score of Boys 75.57.

Table 1: Group wise Mean, S.D. and N values of boys and girls on post test scores of Critical Thinking Dispositions.

	Experimental Group	Control Group	Total
Boys	M =75.91 N =35 S.D =9.25	M =75.23 N =35 S.D =9.94	M = 75.57 N = 70 S.D = 9.54
Girls	M =80.27 N =22 S.D =11.67	M =74.12 N =24 S.D =9.90	M = 77.07 N = 46 S.D = 11.11
Total	M = 77.60 N = 57 S.D = 10.38	M = 74.78 N = 59 S.D = 9.86	

Table 2 : Levene’s Test of homogeneity of variance

F	df1	df2	Sig.
0.572	3	112	0.634

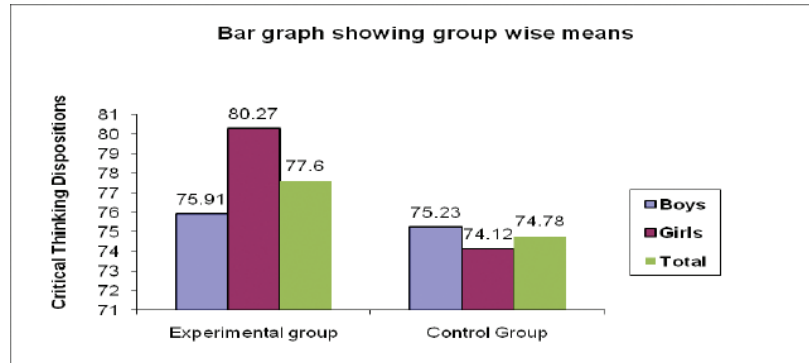


Figure 1: Bar graph showing group wise mean scores of critical thinking dispositions.

3.1 Inferential Analysis

Before applying ANCOVA, Levene's test was used to check that data meets the homogeneity of variance test.

Table 2 reveals that the value of Levene's statistic for test of homogeneity of variance is 0.572, which is not significant at .001 level with *df* 3/112. It indicates that there is no variance and groups are homogeneous.

To study whether differences among means were statistically significant or not critical thinking dispositions scores were subjected to 2 x 2 ANCOVA. The results are given in Table 2

It is evident from table 3 that reported F-value for adjusted mean scores of critical thinking dispositions is 7.845, which is significant at .01 level with **df 1/111**. It indicates that there is significant difference in adjusted mean scores of

Table 3: Summary Of 2x2 Ancova On Adjusted Mean Scores Of Critical Thinking Dispositions.

Source	Sum of Squares	Df	Mean Square	F	Sig.
Pre_CTD	6866.438	1	6866.438	168.494	.000
SSA(Group)	319.717	1	319.717	7.845**	.006
SSB(Gender)	17.447	1	17.447	0.428	.514
SS A*B	43.025	1	43.025	1.056	.306
SS Error	4523.465	111	40.752		
Total	684801.000	116			

critical thinking dispositions between experimental and control group. Further, the adjusted mean score of experimental group taught by Jigsaw ($M=77.60 \pm 10.38$) was significantly higher than control group taught by Traditional Method ($M=74.78 \pm 9.86$). It may, therefore, be concluded that Jigsaw Method was significantly superior to Traditional Method in developing Critical thinking dispositions.

It is evident from the table 3 that reported F value for adjusted mean scores of critical thinking dispositions is 0.428, which is not significant even at .05 level. It means that there is no significant difference in adjusted mean scores of critical thinking dispositions between boys and girls students.

It is evident from the table 3 that reported F value for interaction between group and gender is 1.056, which is not significant. It indicates that there is no significant difference in adjusted mean scores of critical thinking dispositions between boys and girls students belonging to experimental and control group.

CONCLUSIONS

1. Critical thinking dispositions of students taught by Jigsaw method of cooperative learning were significantly better than students taught with traditional method of teaching.
2. Gender differences were not found in Critical thinking dispositions of students.
3. Critical thinking dispositions of students were found independent of interaction between gender and group (teaching method).

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