JLSB
Journal of
Life Science and Biomedicine

J. Life Sci. Biomed. 2(2): 21-24, 2012

Original Article

An Investigation into the Effect of Cooperative Learning with Focus on Jigsaw Technique on the Academic achievement of 2nd-Grade Middle School Students

Ali Akbar Sheikhi Fini*, Hossein Zainalipour and Mahin Jamri

[1]. *University of Hormozgan, Minab Street, Bandar Abbas, Iran*

*Corresponding author' email: ashaikhifini@yahoo.com

Abstract

This study aims to investigate and compare the effect of cooperative learning with an emphasis on Jigsaw technique on the academic achievement of 2nd-grade middle school student in district 1 of Bandar Abbas city. It is considered a semi-experimental study and the method is pre-test post-test with a control group. The sampling is multi-stage and the sample size includes 153 students. The tool used in this study is Teacher's Academic achievement. It uses the statistical method of analysis of covariance (ANCOVA). The findings of the study indicate that a cooperative learning method that focuses on Jigsaw technique has significant effect on students' academic achievement.

Keywords: Jigsaw II, cooperative learning method, traditional method, academic achievement.

INTRODUCTION

The old longing of any society is the progress and elevation of its members and to have wise and intellectual students. It is obvious that any kind of progress in different areas such as culture, economy, society, politics and the like require having sensible, creative, and critical people who can make the right decisions and can have the right planning. This depends on the existence of active and dynamic systems of education. Thus, it could be said that any kind of progress is the result of a correct and efficient system of education. This indeed depends on a variety of different factors such as changing methods and methodologies in a way so that to benefit from modern and dynamic methods of the day (Yazdianpoor, 2009).

The reality is that traditional teaching methods, due to different reasons, are not able to respond to recent changes and are not in line with goal of teaching human resources that the modern society needs. Thus, it is important to replace them with modern and revolutionary methods (Khodadadnezhad, 2009). Talmud explicitly states that any person needs a learning partner in order to be able to learn. According to Quintilian, students would benefit most from teaching to one another (Johnson and Johnson, 1987).

Jigsaw is one of the techniques used in cooperative learning (CL) that has widely been used for years (Aronson et al., 1978 and 2002; Doymus, 2007; Hedeen, 2003; Holliday, 1995; Slavin, 1986; Stahl, 1994). According to Doymus et al. (2010), there are different versions of Jigsaw technique available.

1. Jigsaw I (Aronson et al., 1978)
2. Jigsaw II (Slavin, 1986)
3. Jigsaw III (Stahl, 1994)
4. Jigsaw IV (Holliday, 1995)
5. Reverse Jigsaw (Hedeen, 2003)
6. Subject jigsaw (Doymus, 2007)

All jigsaw versions have been used in group-based learning in which students need to cooperate with their peers in order to achieve personal goals. Each student is like a piece of puzzle who needs to understand and learn the subject completely (Aronson, 2002). CL with a focus on Jigsaw is among new and important methods on which many studies have been conducted. Among such studies, one could mention the study by Behrangi and Aghayari (2004) in

Iran, Sahin (2010), Zacharias et al. (2010), Doymus (2007), Hanz and Berger (2007), Slish (2005), Ervin (2001), Perkinz and Saris (2001), Walker and Crogan (1998), Holliday (1995), Reuman and Mac Iver (1994), Lazarowitz et al. (1994), Lucker & Rosenfield & Sikes & Aronson (1977). All studies indicate that jigsaw technique will enhance academic achievement in students. The present research aims to study and investigate the effect of CL with a focus on Jigsaw technique on the academic achievement of the 2nd-grade middle school students in district 1 of Bandar Abbas City.

MATERIALS AND METHODS

This study is considered a semi-experimental one. It has a experimental group and a control group and uses pre-test post-test methodology with the control group.

The statistical population of this study includes all male and female students studying at the 2nd grade of middle schools located in district 1 of Bandar Abbas city in 2010-2011 academic years. There were 4126 students, 1961 girls and 2165 boys. In this study, two schools were randomly selected as samples among all schools in the statistical population and two 2nd-grade classes were selected in each school, one being the experimental group and one being the control group. The sample size included 153 students, 89 of which were girls and 64 were boys. This study applied the Jigsaw II technique on 76 students and the traditional method of instruction on 77 others.

RESULTS

The first hypothesis of the study is that Jigsaw technique has direct effect on academic achievement of students. The results obtained from this study indicate that after controlling the scores gained in the pre-test of academic achievement, the main effect was statistically significant ($F_{1,150}$= 12.11, P<0.05). This demonstrates that CL with an emphasis on Jigsaw II has significantly increased the scores gained by the experimental group as compared with the control group. Detailed results are presented in Table 1:

Table 1: Results of analysis of covariance between groups with regard to scores of academic achievement in the control and experimental groups of the whole sample

Source of variance	SS	df	MS	F	P
Equation's constant	683.53	1	683.53	89.08	0.001
Pre-test	607.92	1	607.92	79.23	0.001
Methodology	92.97	1	92.97	12.11	0.001
Error	1150.90	150	7.67		
Sum	43968.56	153			

The second hypothesis of the project says that there is difference between traditional instruction method and Jigsaw II technique with regard to academic achievement in female students. The results obtained from this study indicate that after controlling the scores gained in the pre-test of academic achievement, the main effect was statistically significant ($F_{1,86}$= 8.61, P<0.05). This demonstrates that CL method with an emphasis on jigsaw II has significantly increased the academic achievement scores gained by the experimental group as compared with the control group. Detailed results are presented in Table 2:

Table 2. Results of analysis of covariance between groups with regard to scores of academic achievement in the control and experimental groups of female students

Source of variance	SS	df	MS	F	P
Equation's constant	606.30	1	606.30	89.71	0.001
Pre-test	13.12	1	13.12	6.94	0.001
Methodology	58.21	1	58.21	8.61	0.001
Error	581.21	86	6.75		0.004
Sum	28.06	89			

The third hypotheses of this study states that there is difference between traditional instruction method and Jigsaw II technique, with regard to academic achievement in male students. The results obtained from this study indicate that after controlling the scores gained in the pre-test of academic achievement, the main effect was statistically significant ($F_{1,61}$= 5.59, P<0.05). This demonstrates that CL method with an emphasis on jigsaw II has significantly increased the academic achievement scores gained by the experimental group as compared with the control group. Detailed results are presented in Table 3:

Table 3. Results of analysis of covariance between groups with regard to scores of academic achievement in the control and experimental groups of male students

Source of variance	SS	df	MS	F	P
Equation's constant	220.57	1	220.57	33.13	0.001
Pre-test	492.34	1	492.34	73.96	0.001
Methodology	37.87	1	37.87	5.69	0.001
Error	406.02	61	6.65		
Sum	15307.50	64			

Discussion and Conclusion

After administration of the Jigsaw II technique, a significant difference was observed between the mean scores of academic achievement in the pre-test and post-test for the experimental group and the control group. Since the mean scores of the pre-test was almost the same for the experimental group and the control group, and there was no significant difference between the mean scores, it could be concluded that Jigsaw II has been effective on the academic achievement of the students. This is indeed consistent with the studies conducted by Behrangi and Aghayari (2004), Sahin (2010), Zacharias et al. (2010), Doymus (2007), Hanz and Berger (2007), Slish (2005), Harman (2002), Perkinz and Saris (2001), Walker and Crogan (1998), Holliday (1995), Reuman and Mac Iver (1994), Lazarowitz et al. (1994), Aronson et al. (1978), and Lucker & Rosenfield & Sikes & Aronson (1977). Therefore, it could be said that the result obtained in this study with regard to the effect of the proposed teaching method on the academic achievement of students has been confirmed by different other studies. The reason behind consistency of the results could be attributed to the fact that the proposed teaching method was properly and accurately implemented. Based on the findings of this study, schools could use CL method with an emphasis on Jigsaw II technique in order to enhance students' academic achievement.

Based on the results gained in this study and their consistency with other studies conducted previously, the adoption of jigsaw technique in classroom should be emphasized or probably should become a necessity for other subjects. The main issue is the quality of implementing this method. In other words, it could be said that inaccurate or missing implementation of this method could lead to negative effects (cited in Jamri, 2011). Based on the researcher's observation of classroom lessons, students in the study group showed more attempts and care. On the other hand, most students in the study group expressed their satisfaction of the method and recommended it to be used in all classes as well.

REFERENCES

Behrangi, K. and Aghayari, T. (2004.) Changes resulting from cooperative learning of jigsaw in the traditional instruction system for 5th grade students. Educational Innovations Journal (10): 35.

Jamri, M. (2011). An investigation into the effect of Jigsaw method and the traditional teaching method on the academic achievement of 2nd grade middle school student in geography in district 1 of Bandar Abbas City. MA thesis in educational research at the University of Hormozgan.

Khodadadnezhad, A. (2009). The effect of cooperative learning on the attitude and academic achievement in mathematics in 5th grade elementary students in Gachsaran city. New Ideas in Educational Sciences Quarterly. 5th year. Issue 1.

Yazdanpoor, N. and Yousofi, A. (2009). The effect of teaching through projects and cooperation on the academic achievement of 3rd grade high school female students of experimental sciences in Fooladshahr city in the subjects of statistics and modeling. Science and Research in Educational Sciences-Educational planning. Islamic Azad University-Khorasgan branch. Issue 22.

Aronson, E. (2002). Building empathy, compassion, and achievement in the jigsaw classroom. In J. Aronson (Ed.), Improving academic achievement . Impact of psychological factors on education (pp. 209-225). San Diego, CA: Academic Press.

Dymus, K. (2007). Teaching Chemical Equilibrium with the Jigsaw Techniqe. Res Sci Edu. 38:249-260.

Doymus. K., Karacop. A. & Simsek. U. (2010). Effects of jigsaw and animation techniques on students understanding of concepts and subjects in electrochemistry. Education Tech Research.

Hanze, M., & Berger, R. (2007). Cooperative learning, motivational effects, and student characteristics: An experimental study comparing cooperative learning and direct instruction in 12th grade physics classes. Learning & Instruction, 17, 29–41.

Holliday, D. C. (1995). The effects of the cooperative learning strategy jigsaw II on academic achievement and cross-race relationship in a secondary social studies classroom, unpublished doctorial dissertation, The university of southern Mississippi.

Johnson R. T. & Johnson D. W. (1987). Action, research. Cooperative learning in the science classroom. Science and Children .

Lazarowitz, R. (1994). Setting academic achievement and affective outcomes. Journal of Research in Science Teaching, 31(10), 1121-31.
Lucker, G. W., Rosenfield, D., Sikes, J., & Aronson, E. (1977). Performance in the interdependent classroom: A field study. American Educational Research Journal, 13,115,123.
Reuman, D. A. & Mac Iver, D. J. (1994). Effects of instructional grouping on seventh grades academic motivation and achievement. John Hopkins university center. (Nov),N.50,134-158
Stahl. G. (1994). Grouping cognition: Computer for building collaborative knowledge. Cambridge, MA: MIT.
Zacharia, C. Z. Xenofonos, N. A. Manoli, C. C. (2011). The effects of two different cooperative approaches on students learning and practices within the context of a webquest science investigation. Education Tech Research. 59:399-424.