

EFFECTS OF JIGSAW TEACHING METHOD ON SENIOR SECONDARY SCHOOL STUDENTS' PERFORMANCE IN ECONOMICS

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Introduction

Economics is one of the subjects that are taken very seriously in the school system, irrespective of level of education. It has been described as a model of thinking which encourages learners to observe, reflect and reason logically about a problem and in communicating ideas, making it the central intellectual discipline and a vital tool in social science and technology (Okereke & Onyekperem, 2004). Economics is the foundation for any meaningful scientific endeavor and any nation that must develop in science and technology must have a strong Economics foundation for its youths.

In terms of curriculum relevance, Economics is a compulsory subject at the secondary school level. Students feel anxiety toward economics, and this anxiety affects their performance in economics. Students who lack confidence in Economics are less successful, despite being in secondary schools for a long period of time. Over the years, students' performances in ordinary level examinations in economics have been poor. According to Ogunu as cited in Ogomaka, Ukozor and Oguguo (2016) poor performance of students especially in the public secondary schools have been attributed to many factors, among which are: teaching method, lack of test construction skills by teachers, inadequate instructional facilities and equipment necessary for the teaching of economics. It has already been pointed out that poorly designed tests could make the students lose interest. Furthermore, low proficiency students in economics performed below average on the internal and external tests. Based on observations of economics students, the information shows that students are not actively involved in developing knowledge, they receive information passively and are less motivated. This passivity has caused much concern among educators because knowledge of economics plays a significant role in enhancing the country's social economic development. These could be as a result of the widely used conventional

method by most of the economics' teachers teaching economics in the senior secondary schools.

Many researchers like Okafor, Nwike and Chukwudum (2009) agree that the conventional method does not help students to construct their own understanding and opined that the uninspiring teaching methods adopted by economics teachers lead not only to low performance but also incapacitates students from developing required skills necessary for creative thinking. The conventional method is a teaching method in which the teacher presents a verbal discourse on a particular subject, theme or concept to the learners, the teacher deliver preplanned lessons to the students with little or no instructional ideas. It is very common in education especially at senior secondary school level. Most of the time, during teaching-learning process, instruction remained unilateral which is considered to be orthodox activity.

The disheartening high failure rate in economics at senior secondary schools level had bothered the minds of many researchers, authors and economics educators and attempts are being made to proffer some solutions. In considering ways and means of ensuring effective teaching and learning of Economics in school that can enhance students' performance, various teaching methods have been adopted by economics educators and researchers. Choosing the correct teaching method and how this method is utilized is very essential in teaching economics to attain good performance. This can be attained if secondary school teachers adopt Jigsaw method of teaching and learning.

Jigsaw method was developed by Aronson (1978) and is based on the concept of division of labour among the individual group members. Here each student is responsible for completing a task and teaching the task to the rest of the group. An intermediate step in jigsaw method would be such that of one group discusses and compare the results with the students from other groups. Jigsaw method is generally defined as a teaching arrangement in which heterogeneous groups of students work together to achieve a common goal (Slavin, 2011). Jigsaw teaching method (Cooperative learning) is one of the various teaching method that have been adopted by economics teachers and researchers. It is characterized by students working together in small groups to reach a common goal. Jigsaw teaching method is one of the widest spread areas of research and practice in education.

Economics students in senior secondary school encourage and support each other, assume responsibility for their own and each other's learning, employ group related social skills, and evaluate the group's progress. Jigsaw method is an educational approach which aims to organize classroom activities into academic and social learning experiences. There is much more to Jigsaw

method than merely arranging students into groups, and it has been described as “Structuring positive interdependence. Students must work in groups to complete tasks collectively toward academic goals. Unlike individual learning, which can be competitive in nature, students learning cooperatively can capitalize on one another’s resources and skills (asking one another for information, evaluating one another’s ideas, monitoring one another’s work, etc) Furthermore, the teacher’s role changes from giving information to facilitating students’ learning. Everyone succeeds when the group succeeds. Ross and Smyth (1995), describe successful Jigsaw method tasks as intellectually demanding, creative, open-ended, and involve higher order thinking tasks. Jigsaw method is cooperative in nature, hence it tolls the line of cooperative learning.

Cooperative learning involves all group members who share in process, content, and accountability (cooperative learning). There are different forms of cooperative learning, there are as follows: Students-Team-Achievement Division, Team Game Tournament, Group investigation, learning together and Jigsaw teaching method. Apart from all the groups involved in cooperative learning methods, the researcher decides to utilize the Jigsaw teaching method in education. Jigsaw is the one part of cooperative learning technique that was created with the goals of reducing conflict and enhancing positive educational outcomes. According to Arends (2001), it was developed and tested by Elliot Aronson and his colleagues at the university of Texas and then adapted by Slavin and his colleagues. The jigsaw technique helps students realize they are essential components of a whole and encourages cooperation in a learning environment.

In education, Jigsaw method is a teaching method invented by social psychologist Elliot Aronson in 1971 in Austin Texas. The Jigsaw strategy is a group-work method for Learning and participating in group learning activities. It is a cooperative learning strategy that enables each student of a group to specialize in one aspect of a learning unit to resolve a task or class project (Aronson, 2008). Jigsaw method, one kind of students-centered learning approach, has been documented throughout the literature, as effective in helping students to obtain practical learning skills, abilities for effective communication and proficiency in term of understanding knowledge and it promotes positive students attitudes towards their own learning (Johnson & Johnson, 2008; Slavin, 2011). Is also a teaching strategy that employs a variety of teaching and learning activities to improve students’ understanding of a subject like (Economics) using a structured approach which involves a series of steps, requiring students to create, analyze and apply concepts (Kegan,1990).

Jigsaw cooperative learning strategy is a structure of interaction designed to facilitate the accomplishment of a specific end product or goal through students working together in groups. Each member of a team is responsible not only for learning what is taught but also for helping team mates learn. It also utilizes of Vygotsky, Piaget and Kohlberg in that, both the individual and the social setting are active dynamics in the learning process as students' attempts to imitate real-life learning. By combining teamwork, and individual accountability, students work towards acquiring both knowledge and social skills. It is a teaching strategy which allows students to work together in small groups with individuals of various talents, abilities and backgrounds to accomplish common goals. Each individual team members is responsible for learning the material and also for helping the other members of the team learn. Students work until each group member successfully understands and completes the assignment, thus creating an atmosphere of achievement (Panitz 2000).

Using the Jigsaw method, students were assigned to five or six members of the study team heterogeneous, academic material presented to the students. Each student is responsible for learning some of the material. After that, the expert group was formed, students with the same topic and then meet to learn and help each other to learn the topic. Then the students back to the group. If any group is having trouble, make an appropriate intervention, at the end of the session, give a quiz on the material so that students quickly come to realize that these sessions are not just fun and games but really count. Aronson (2008) compared classes that used the cooperative jigsaw approach with students worked in competitive groups. He found that students in Jigsaw classroom out performed students in competitive classroom in terms of mastery of classroom material. The teacher's role in the Jigsaw technique is to facilitate learning. When students are in expert groups, the teacher can support students by encouraging them to find ways to put information they learned into their own words, to relate the material to their own lives, and to give examples that help them explain the material to their groups. Students should be encouraged to help each other and to make sure everyone in their group understands the material and will be confident presenting it to his/her group. If student find it difficult to explain his/her topic to the jigsaw group, a teacher first might pair that students with a partner who will help research and present the information to the jigsaw group and then have the pair travel together to the expert group. This will help both students develop interpersonal skills, and cooperating. To facilitate this partner coaching, have both students to make suggestion that would help them learn the material. Encourage both

students to make suggestion that would help them learn more efficiently. In implementing of Jigsaw method, certainly requires several strategy.

Holubac (2003, p. 123) tell us that the five principles for jigsaw strategy are:

- Positive interdependence
- Face-to-Face
- Individual and group Accountability
- Interpersonal skills
- Social skills.

Gender has been identified as one of the factors influencing students' performance in economics at senior secondary school level. Olson as cited in Madu, & Ukah (2015) reported that male performed better than female students in economics using conventional teaching method while gender had no effect on academic performance of students in Jigsaw teaching method. These contradictory findings have caused for inclusion of gender as one of the moderating variable of this study. Based on this background, the researcher decided to undertake a study on the effects of Jigsaw teaching method on senior school students' performance in Economics in Owerri Education Zone 1 Imo State.

Poor students' performance in Economics is alarming in spite of the fact that many researchers like Okafor, Nwike, Chukwudume (2009), have been carried out to ameliorate the bad situation. Many instructional approaches or teaching methods have been proffered by psychologists like Brunner, Peaget, Gagne, for improved performance in Economics and other social sciences. Amaefula (2009) and Njoku (2010) strongly believed that the teaching method adopted by Economics teachers in teaching Economics is to a large extent responsible for the observed consistent poor performance in Economics. The conventional teaching methods lack students' cooperation and interaction required for effective learning of the difficult Economics concepts. Adequate students' cooperation and interactions are required for over learning and transfer of learning economics concepts, which are mainly difficult, and abstract (Nzewi, 2010). Such cooperation and interaction are found in Jigsaw teaching method. The problem of this study is to find an effective teaching method that can improve students' performance in Economics. This work therefore intended to examine the effects of Jigsaw teaching method in senior secondary school students' performance in economics in Owerri Education Zone 1 of Imo State.

The purpose of this study is to investigate the effects of Jigsaw method on senior school students' performance in Economics in Owerri Education Zone 1. Specifically, the study sought to determine the:

- i. the mean pre-test and post-test performance scores of students taught with Jigsaw and conventional teaching methods,
- ii. the mean pre-test and post-test performance scores of male and female students taught with Jigsaw teaching method
- iii. the interaction effect of gender and teaching methods on students' performance scores in economics.

In order to achieve the objectives of this study, the following research questions are posed:

- i. What are the mean pre-test and post-test performance scores of students taught with Jigsaw and conventional teaching methods?
- ii. What are the mean pre-test and post-test performance scores of male and female students taught with Jigsaw teaching method?

The following null hypotheses tested at 0.05 level of significance.

1. There is no significant difference in the mean performance scores of students taught with Jigsaw and conventional teaching methods.
2. There is no significant difference in the mean performance scores of male and female students taught with Jigsaw teaching method.
3. There is no significant interaction of gender and teaching methods on students' performance scores in economics.

Method

The study adopted quasi-experimental design. The study adopted pre-test posttest control group design. The population of this study comprises of 1010 SS2 senior secondary school students offering Economics 68 public secondary schools in Owerri Education Zone 1 of Imo State. The sample of the study consisted of 67 SS2 students from two secondary schools who were randomly drawn from the entire population. The drawn students were also randomly assigned to two groups, experimental and control.

The instrument used for data collection was Economics Achievement Test (EAT) developed by the researchers. The instrument was developed to measure the cognitive performance of the students before and after treatment. The EAT consisted of 50 multiple choice items drawn from the scheme of work. The instrument was administered to both the control and experimental groups (pre-tested). The experimental group was then exposed to teaching and carryout evaluation for 4 weeks, and was evaluated during the teaching and learning. The control group was also taught the same thing for the same period

without carrying out evaluation. The researchers developed a test blue-print used in constructing the instrument. The instrument was validated by three experts, two from Measurement and Evaluation unit and one from Business education unit, all from University of Nigeria, Nsukka. The reliability coefficient of the instrument was determined using Kuder-Richardson formula ($K-R_{20}$) and reliability index of 0.81 was obtained for the instrument. The Statistical Package for Social (SPSS) was used to perform the analysis. Mean and standard deviation of the test scores were used to answer the research questions while Analysis of Covariance (ANCOVA) was used to test the null hypotheses at 0.05 level of significance.

Results

Table 1; Mean pre-test and post-test performance scores of students taught with Jigsaw and conventional teaching methods

| Test: Performance | | Pre-test | | Post-test | |
|-------------------|----|-----------|------|-----------|------|
| Group | n | \bar{X} | S | \bar{X} | S |
| Jigsaw | 32 | 23.91 | 3.28 | 40.34 | 3.45 |
| Conventional | 35 | 24.46 | 2.62 | 24.14 | 3.26 |

Table 1, shows the mean performance scores of students taught with Jigsaw and conventional teaching methods at pre-test and post-test. The table shows that students under the Jigsaw teaching method had a pre test mean score of 23.91 while at post test their score increased to 40.34. Also students under the conventional method had a pre test mean score of 24.46 but their scores at post test was still minimal at 24.14. This led to the conclusion that Jigsaw teaching method is more effective on the academic performance of Economics students than the conventional teaching method. This implies that Jigsaw teaching method is effective in teaching and learning of Economics.

Table 2; Mean pre-test and post-test performance scores of male and female students taught with Jigsaw teaching method

| Test: Performance | Pre-test | | | Post-test | |
|-------------------|----------|-----------|------|-----------|------|
| | n | \bar{X} | S | \bar{X} | S |
| Jigsaw | | | | | |
| Gender | | | | | |
| Male | 18 | 24.07 | 3.67 | 42.17 | 2.18 |
| Female | 14 | 23.78 | 3.04 | 38.00 | 3.42 |

Table 2, shows the mean performance scores of male and female students taught with Jigsaw teaching method at pre-test and post-test. The above analysis shows that Jigsaw teaching method is more effective on

improving the academic performance of male students than the female students. That is to say that the male students performed higher compared with their female counterpart.

Table 3; One Way Analysis of Covariance (ANCOVA) for mean performance scores of students taught with Jigsaw and Conventional teaching methods.

Tests of Between-Subjects Effects

Dependent Variable: Post-Test

| Source | Type III Sum of Squares | df | Mean Square | F | Sig. |
|-----------------|-------------------------|----|-------------|----------------|-------------|
| Corrected Model | 4399.359 ^a | 2 | 2199.679 | 195.612 | .000 |
| Intercept | 787.662 | 1 | 787.662 | 70.045 | .000 |
| PreTest | 11.819 | 1 | 11.819 | 1.051 | .309 |
| TeachingMethods | 4391.385 | 1 | 4391.385 | 390.516 | .000 |
| Error | 719.686 | 64 | 11.245 | | |
| Total | 73216.000 | 67 | | | |
| Corrected Total | 5119.045 | 66 | | | |

a. R Squared = .859 (Adjusted R Squared = .855)

From Table 3, the fourth row revealed that the F-calculated value for post test effect is 390.516 with significance probability value of 0.000 which is less than 0.05 alpha level. This led to the conclusion that there is significant difference in the mean performance scores of students taught with Jigsaw and conventional teaching methods. This implies that Jigsaw teaching method is significantly effective on Economics students' academic performance.

Table 4; One Way Analysis of Covariance (ANCOVA) mean performance scores of male and female students taught with Jigsaw teaching method

Tests of Between-Subjects Effects

Dependent Variable: Post-Test

| Source | Type III Sum of Squares | df | Mean Square | F | Sig. |
|-----------------|-------------------------|----|-------------|---------|------|
| Corrected Model | 4539.156 ^a | 4 | 1134.789 | 121.328 | .000 |
| Intercept | 749.175 | 1 | 749.175 | 80.100 | .000 |
| PreTest | 14.895 | 1 | 14.895 | 1.592 | .212 |
| TeachingMethods | 4185.089 | 1 | 4185.089 | 447.457 | .000 |

| | | | | | |
|------------------|-----------|----|--------|--------------|-------------|
| Gender | 76.227 | 1 | 76.227 | 8.150 | .006 |
| Teaching Methods | 68.886 | 1 | 68.886 | 7.365 | .009 |
| * Gender | | | | | |
| Error | 579.889 | 62 | 9.353 | | |
| Total | 73216.000 | 67 | | | |
| Corrected Total | 5119.045 | 66 | | | |

a. R Squared = .887 (Adjusted R Squared = .879)

From table 4, the fifth row revealed that the F-calculated value for post test effect is 8.150 with significance probability value of 0.006 which is less than 0.05 alpha level. This led to the conclusion that there is significant difference in the mean performance scores of male and female students taught with Jigsaw teaching method.

Table 5; One Way Analysis of Covariance (ANCOVA) interaction of gender and teaching method on students performance scores in economics

Tests of Between-Subjects Effects

Dependent Variable: Post-Test

| Source | Type III Sum of Squares | df | Mean Square | F | Sig. |
|--------------------------|-------------------------|----|-------------|--------------|-------------|
| Corrected Model | 4539.156 ^a | 4 | 1134.789 | 121.328 | .000 |
| Intercept | 749.175 | 1 | 749.175 | 80.100 | .000 |
| PreTest | 14.895 | 1 | 14.895 | 1.592 | .212 |
| TeachingMethods | 4185.089 | 1 | 4185.089 | 447.457 | .000 |
| Gender | 76.227 | 1 | 76.227 | 8.150 | .006 |
| TeachingMethods * Gender | 68.886 | 1 | 68.886 | 7.365 | .009 |
| Error | 579.889 | 62 | 9.353 | | |
| Total | 73216.000 | 67 | | | |
| Corrected Total | 5119.045 | 66 | | | |

a. R Squared = .887 (Adjusted R Squared = .879)

From table 5, the sixth row revealed that the F-calculated value for post test effect is 7.365 with significance probability value of 0.009 which is less than 0.05 alpha level. This led to the conclusion that there is significant interaction of gender and teaching methods on students' performance scores in economics.

Discussion

The study revealed that Jigsaw teaching method is more effective on the academic performance of Economics students than the conventional

teaching method. This implies that Jigsaw teaching method is effective in teaching and learning of Economics. The finding further established that there is significant difference in the mean performance scores of students taught with Jigsaw and conventional teaching methods at post-test. This implies that the effectiveness of the teaching method is significant. One can therefore say that Jigsaw can enhance students' academic achievement in Economics. This is in line with the findings of Sonam Mehta and Kulsrestha (2014) revealed that in jigsaw technique students developed the feeling of working in a group in the classroom of social science, and it also improved their performance, as the discussion always leads to a considerable degree of clarity of concepts. Okoro (2010) findings of the study showed that Jigsaw instructional strategy facilitated the academic achievement of students in biology. Similarly, Okafor, et al (2009) study showed that Jigsaw instructional strategy enhanced students' achievement and interest in geometric construction. The similarities recorded in this study may be attributed to the effectiveness of the treatment (Jigsaw teaching method). This also proves the efficacy of the teaching strategy.

The study also revealed that Jigsaw teaching method is more effective on the academic performance of Economics students than the conventional teaching method. This implies that Jigsaw teaching method is effective in teaching and learning of Economics. With the finding, the study established that there is significant difference in the mean performance scores of male and female students taught with Jigsaw teaching method at post-test. This implies that the male and female students differed significantly in their performance. In contrast to this finding, Okoro (2010) found out that gender is not a significant factor on students' achievement in biology when taught with Jigsaw instructional strategy. Okafor, et al (2009) also found out that gender is not a significant factor on students' achievement in geometric construction when taught with Jigsaw instructional strategy. The contradictions recorded above could be attributed to the fact that the studies made use of different subjects.

The study finally revealed that there is an interaction of gender and teaching methods with the performance scores of the Economics students. This implies that gender and teaching method affected the students' performance in Economics. This finding led to the inference that there is a significant interaction effect of gender and teaching methods on the performance scores of the Economics students. In contrast, Okebukola (2005) findings revealed that there was no significant effect in academic achievement of male and female students at the pretest and posttest levels respectively. Alex and Mammon (2014) asserted that there is no significant statistical difference between the performance of male and female students in

economics. The recorded contradictions in the findings may be attributed to the fact that the studies were not carried out in the same location and they used different subjects. Despite these contradictions, the present study proved that teaching method and gender is a predictor of academic achievement of the students in Economics.

Conclusion

There is significant difference in the mean performance scores of students taught with Jigsaw. Jigsaw teaching method is more effective on the academic performance of Economics students than the conventional teaching method. This implies that Jigsaw teaching method is effective in teaching and learning of Economics. This implies that Jigsaw teaching method is effective in teaching and learning of Economics. There is an interaction of gender and teaching methods with the performance scores of the Economics students.

Recommendations

Based on the findings of this study, the following recommendations were made:

1. Teacher preparation institutions should incorporate Jigsaw teaching method in the relevant areas of their curriculum units and expose both pre-service and in service teachers to the use of Jigsaw method to enhance teaching and learning.
2. Seminars and workshops should be organized at the Local Education Authorities, Education Zones, State and Federal ministry of Education where teachers, curriculum planners and textbook authorities will be taught various ways of using Jigsaw teaching method.
3. Teachers should expose students to Jigsaw method since the study revealed that Jigsaw activity is natural to students and as such, all learning activities of children involve games. This will help to eliminate gender imbalance in the classrooms, because the objective of learning is to help students to learn and acquire knowledge not in favour of male or female.

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