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Using the Jigsaw Teaching Strategy for the Advance of Economics Teachers' Acquisition of Knowledge

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ABSTRACT The Jigsaw teaching strategy is a collaborative learning approach that allows teachers to become participating "experts" during the lesson presentations. This study explores the impact of Jigsaw pedagogy as a cooperative learning approach to teachers' learning during an Economics education-training project for teachers. A quota sampling of fourteen Economics teachers were identified and selected for semi-structured focus group interviews. Findings revealed that teachers expressed positive attitudes toward Jigsaw learning and enjoyed the group spirit. Moreover, the teachers also indicated that the Jigsaw pedagogy provided opportunities to exchange and share knowledge in groups, which contributed to their learning. Lastly, they indicated that the Jigsaw strategy promotes mutual concern among Economics teachers.

INTRODUCTION

The introduction of a new national curriculum in 2010, the Curriculum and Assessment Policy Statement (CAPS) for South African schools, which replaced the National Curriculum Statement (NCS), requires teachers to make a praxis paradigm shift. This also applies to teachers of Economics. As stipulated in the new education policy framework for teacher development (Department of Education (DoE) 2009), the new curriculum requires teachers to make a shift from a traditional teacher-centered approach to a dynamic and active learner-centered approach. The CAPS Economics curriculum establishes that it is important that learners learn how to gather relevant information and to transform this information into marketable knowledge. Again, this also applies to the Economics curriculum policy. In outline, the new approach requires that learners be enabled to identify problems and find solutions to these challenges by means of creative and innovative thinking in real-life situations (Van Wyk 2012b, 2007). Economics education focuses on the teaching and learning of Economics as a subject. It encompasses the content to be taught (what), the methods of teaching (how), the evaluation of those methods (why), and information of general interest in teachers of Economics from elementary to graduate school level (van Wyk 2012a; Walstad and Rebeck 2001). It can be argued that a widespread understanding of Economics is vital to the future health of the nation's economy, because effective Economics education in schools has an important role to play in providing future citizens with the knowledge and tools necessary to make responsible and effective decisions in creating sustainable communities (Van Wyk 2012a, 2015). A range of teaching strategies, methods and techniques is available. However, this study focuses on the Jigsaw cooperative learning teaching method, which can be utilized to benefit the teaching and learning situation (Killen 2007).

This paper discusses the Jigsaw cooperative learning method, as well as the implementation of the Training of Teachers (ToT) project as an in-service teacher (INSET) training initiative.

Literature Review

Jigsaw as a Cooperative Learning Method

Elliot Aronson, a social psychologist, first outlined the Jigsaw technique in 1971. It was originally designed to break down stereotypes and prejudice among classmates. The Jigsaw strategy was developed for students to study learning material in groups to achieve specific objectives overtime. The objective of this strategy is to enhance the listening, engagement, and empathy skills of all students. The Jigsaw strategy organizes the classroom activities to assist students in supporting and creating interdependence on each other so as to succeed in their assigned tasks. It divides classes into

groups and breaks down assignments into manageable chunks that the group reassembles in order to complete the assignment successfully. The educational value of this strategy is to reduce racial conflict among school learners. It further promotes better learning in individual and group setups. It improves learner motivation to study the content, and increases the enjoyment of the learning experience. Since 1996 hundreds of classrooms have used the Jigsaw classroom strategy with great success (Aronson and Patnoe 1997). The ultimate objective of the researcher is to empower Economics teachers in using this strategy through a teacher development project. Contemporary research provides examples that show how a particular subject or theme can be broken into parts during a Jigsaw project. The advantages and disadvantages of this technique can be seen over time. The social context that brought about the need for the Jigsaw method helps the researchers see simple ideas can have great effects. Aronson developed and applied the Jigsaw technique to promote the concept of cooperative learning. Aronson (2005) suggested detailed steps for the implementation of this technique, which he further outlined on his Jigsaw Classroom website (Aronson 2005). Engaged teachers participating in a collaborative process learned that a new depth of understanding is possible when using a Jigsaw teaching strategy, slide 1 of 3.

The Jigsaw teaching strategy is a collaborative learning approach that allows teachers to become "experts" in one component of a lesson's content and then to share it with a "home" group. At the same time, he or she learns the rest of the content from the other home group members, who have become experts in their own component of the lesson (Aronson and Patnoe 1997). An assignment topic is given to the class as a whole, and the class is then split into groups of three to six members each. Each teacher is assigned an aspect of the topic within each group. Each teacher then creates a specific report about his or her topic, which is to be presented to the group. As a refinement of this process, each teacher is then required to convene a group that covers their specific topic, which allows each individual to collaborate with others when finalizing his or her report topic. The original groups then reconvene to hear presentations by each group member about his or her respective component. In doing so, each individual learns about another aspect of the overall topic. After the final product presentations have been given, the participants write a test that evaluates how much they have learned about the topic. Participants are required to write a test about each assigned topic. This will be particularly helpful in creating collaborative and cooperative learning among the individual teachers, as well as among the groups.

Context and Implementation of the ToT Project

The Director of Strategic Planning, Policy and Research, in the Free State Department of Basic Education approved the project, entitled *The advancement of Economics education in South African FET schools through the ToT initiative as a driver for teacher empowerment.* The primary aim of the project is to investigate the Economics teachers' perceptions of the ToT initiative as a driver for professional empowerment in FET schools of the Free State. With this research project it is envisaged that Economics teachers will be empowered with subject content knowledge and pedagogical content knowledge so as to be effective change agents in their classrooms.

The project implemented five phases of the Jigsaw method as an in-service training (INSET) initiative.

(1) Selection of Participants: The ToT workshops were hosted at the following district centers of the Free State Department of Education (FSDoE): Bloemfontein, Kroonstad, Welkom, Sasolburg and Harrismith. These regions represent the current geographic distribution of active economic education centers in the Free State. Each of the five centers administered a six-day workshop for 200 subject teachers, which were conducted by researchers and a team of facilitators during the June and September school holidays of 2010-2011. Eligibility was limited to secondary school teachers who would be teaching an Economics class during the following academic years (2011–12). Contrary to normal practice, however, the centers oversubscribed eligible applicants in order to secure enough teachers to populate the workshops. The ToT workshops were organized and delivered at each of the five sites immediately prior to and during the school holidays of a normal academic year.

(2) Economics Topics Manual and Assignments: Each workshop consisted of fourteen

days of training and lesson demonstrations using an Economics curriculum manual. Each local workshop followed a common agenda and timetable developed by the team for implementation. The workshop topics included standard treatments of introductory market economics, microeconomics, macroeconomics, international trade (globalization) and contemporary Economics issues (DoE 2009). During this phase, teachers studied their assigned topic individually and then drew a concept map to represent the main ideas of the topic. Teachers were expected to have participated in an in-depth study of the topic before joining the expert group discussion that followed. A debriefing session was held at the beginning and end of each day. A 30-minute Economics test was written at the end of each day session on each facilitated topic. The individual scores were posted on the Economics quiz table.

(3) Expert Group Meeting: Teachers working on the same topic formed expert groups consisting of four to five teachers per group. During this phase, teachers shared their concept maps and discussed the main ideas of the topic with other "experts", and then refined their own concept maps. The purpose of this phase was to facilitate the teachers' development of "expert knowledge" before proceeding to the next phase of the experiment, the Jigsaw group meeting.

(4) Jigsaw Group Meeting: Each teacher presented her/his topic to their Jigsaw group, while other members of the group were encouraged to ask questions for clarification. At the end of this phase, each Jigsaw group was required to submit a concept map that included all the key ideas of the lesson unit. Groups could complete the concept map either by combining the four concept maps produced by the team members or by redrawing a completely new one.

(5) Class Presentation and Observations: In order to allow teachers to demonstrate their understanding of the unit, as well as to offer the class opportunities to classify/clarify their ideas, some Jigsaw groups were randomly selected to report their Economics concept maps to the class as a whole. Groups were encouraged to provide feedback on the presentation and provide additional questions for teachers to discuss their concept maps in their groups. Contrary to the 'traditional' Jigsaw method, the learning materials provided for teachers in this study were not limited to paper-based materials. During the third unit (contemporary economics issues, such as unemployment), for example, the researchers used an instructional video to present the concepts included in the second phase (individual study), and a role-playing video with a worksheet in the fourth phase (Jigsaw group meeting) to enhance group discussion. The researchers also provided teachers with worksheets to guide their work and to record their results.

This study investigates the teachers' experiences with and the use of the Jigsaw pedagogy as a cooperative learning technique through a ToT project. This aim of the ToT was to empower Economics teachers to plan and implement the Jigsaw technique in the Economics classrooms in Free State secondary schools. To achieve this aim, the following research question is formulated: *"To what extent does the cooperative learning approach of the Jigsaw pedagogy enhance the economics teachers' learning through the ToT project?"*

RESEARCH METHODOLOGY

Research Design

An exploratory, descriptive, contextual qualitative research design was selected for the purpose of conducting this study.

Sampling

Some 200 Economics teachers were selected to participate in the research study in the FSDoE. The Economics teachers were all from educational districts of FSDoE. This sample represents sixty-four percent of the Economics teacher population within the five districts of the FSDoE. A quota sampling of fourteen Economics teachers were identified and selected for this study.

Data Collection

The purpose of Section A of the interview schedule was to collect personal data from interviewees. Fourteen Economics teachers were identified and purposively selected for the face-to-face interviews (Individual A-D) and semi-structured focus group interviews (Focus Groups 1-4). Semi-structured interviews were conducted with seven Economics teachers.

Data Analysis

Interview sessions were conducted either telephonically or face-to-face. Each interview session was recorded, transcribed, coded and thematically categorized. The responses from the interviewees were captured verbatim and no language editing was done to the recorded data, which remains exactly as they responded to the semi-structured questions.

Ethical Considerations

Consent was obtained from the FSDoE, secondary school principals and Economics teachers before the study began. An official FSDoE letter explaining the purpose of the study was attached to the questionnaire. The letter also highlighted the confidentiality of any results derived from each teacher's participation.

RESULTS AND DISCUSSION

Biographical Information of Respondents

All the teachers interviewed came from one of the five education districts of the FSDoE. The biographical data indicated that the majority (58.8%) of the Economics teachers interviewed were women, while male respondents comprised 41.2 percent of the teachers. Approximately fifty-one percent of the teachers had more than 10 years of professional teaching experience. Most of the respondents (70%) fell within the group range of 1-10 years of subject teaching experience, implying that the majority of Economics teachers had 10 years of subject teaching experience.

Only forty-seven percent of the teachers were qualified at Economics III level, while 36.7 percent were qualified at Economics II level and 26.45 percent at the Economics I level. Approximately 6.5 percent had no formal Economics education. On an average fifty-six percent of respondents had a Postgraduate Certificate in Education, while thirty percent had a Higher Education Diploma. Only fourteen percent of respondents had qualified a Bachelor of Education level with Honors. The majority of respondents indicated that they were frequently using teacher-centered approaches (79%) compared to learner-centered approaches (21%) in their teaching. The majority (76%) of the Economics teachers indicated that they were not familiar with teaching Economics through the Jigsaw approach. Some respondents also indicated that they often use Economics quiz bowls (34%), research projects (46%) and small-group work (31%) when teaching Economics.

Qualitative Data Analysis

The following themes emerged from the interview data analysis.

Theme #1: Working together and helping one another to learn collectively

The most frequent response of teachers (62.5%) highlighted that they liked working in groups and getting help from others. The majority of teachers (70.5%) expressed positive attitudes towards Jigsaw learning and enjoyed the group spirit, which they suggested helped them be more attentive to the learning process. For example, one female teacher said: *"This is the first time I had learned in such a way… It is much easier to understand learning material when studied in this way. I learned much from working with group members and from receiving help from others in the group. I found that my learning was effective and efficient... It encourages me to be an independent learner. I found that working with other teachers in groups was more effective than working individually. My learning was more effective when we worked together and helped one another learn cooperatively"* (Focus Group 1).

Similarly, according to another male teacher, *"I like everything about Jigsaw learning. I learned more from working with and sharing information with others in my group. I found that all group members were concerned about each other. I am happy because my learning was more effective than I expected. The Jigsaw method enables me to develop a deeper understanding of the subject matter and to hear different perspectives from other teachers on the things I am learning. I gained more economic content knowledge and developed better learning skills from engaging in jigsaw activities when I offered explanations to others or received explanations from others…"* (Focus Group 3)

In this study, teachers felt that they learned and achieved more from working with others and from getting help from them. This factor encom-

passed the spirit of social support among group members, which helped them become attentive in the learning process, as proposed by Slavin (2011) and van Wyk (2012b). The results of this study showed that teachers in the different groups gave and received considerable social support, both personal and academic.

Most teachers in the treatment group believed that working with other teachers in groups was more effective and efficient than their previous experiences of working individually (van Wyk 2012a). They also perceived that they gained more knowledge from engaging in cooperative activities and helping one another learn Economics materials cooperatively in groups. The findings of the present study were consistent with the results of Johnson and Johnson (2005), which showed that cooperative learning promoted greater personal and social support than did competitive (effect size = 0.62) or individualistic (effect size = 0.72) learning.

Theme #2: Creating opportunities to exchange and share knowledge in groups

The second most frequent response (42.5%) related to discussing and sharing information with other teachers. This category encompassed the social benefits of group learning, as outlined by Johnson (2003). For example, one male teacher said: *"To be honest, my learning from this seminar was more valuable and meaningful than what I had expected because I had many opportunities to discuss and share information with the other teachers in my group… With Jigsaw learning, my teacher did not talk much during the class, He asked us to study in groups. This helped me to pay more attention to what I was studying."* (Individual A)

Another female teacher said, *"I had more opportunities to exchange and share knowledge in my group, so I think my learning was very meaningful. I obtained more knowledge because I worked with other group members and received help from others. I paid more attention to learning… I retained the knowledge and information for a long time."* (Focus Group 4)

The majority of teachers in the cooperative learning group valued the group discussion and information exchange among group members. Teachers found that their learning was more valuable and meaningful during the seminars than they had expected, because they had many opportunities to discuss and share information with the other teachers in groups. There was also a perception that when they presented ideas during the Economics lesson, the other group members listened attentively and asked questions cooperatively and respectfully.

Theme #3: Effectiveness of peer teaching during ToT project

The third most frequently occurring response (22.5%) referred to the effectiveness of teaching others. For example, one female teacher said: *"I found that teaching others helped me learn more during this workshop than I would have using other methods... This method gave me the time and opportunity to explore materials and discuss information with my group members…because the material was divided into several smaller parts. All the group members had to learn their own part and then teach these parts to other group members. It was really helpful to teach others in my group. Teaching others helped me widen my knowledge."* (Individual B)

Another teacher said, *"In this workshop, one thing I liked the most was teaching the other members in my group. I became 'an effective expert teacher' because I had to teach the part which I had learned, to the other group members. This helped me broaden my knowledge and retain this knowledge for a long time."* (Focus Group C)

As indicated above, teachers gained more knowledge than they had anticipated through teaching others in groups. The main factor here was the technique of cooperative learning (Van Wyk 2007; Kagan 1997; Kagan and Kagan 2009). Teaching others helped teachers obtain more knowledge and promoted greater long-term retention as suggested by Johnson and Johnson (2005). Teachers in the treatment group thought that teaching others helped them learn more than they would have done using other methods because this approach gave them the time and opportunity to explore materials, and discuss information with group members.

Theme #4: Jigsaw method promotes collaboration and mutual concern among teachers

The fourth most frequently occurring response (22.5%) highlighted the extent and use-

fulness of mutual help among teachers. For example, one teacher said, [exact words of respondent] *"Jigsaw learning promotes mutual concern among teachers. Jigsaw learning helped me learn more by getting help from others in my group. Jigsaw learning offers more advantages than traditional teaching. Jigsaw learning helped me to be active in exploring learning materials and in constructing knowledge. It helped me to become more independent in my learning. I found that in cooperative learning group members were involved in an experiment rather than listening to the lecture of the facilitator, as in traditional learning"* (Individual C).

Another male teacher said [exact words of respondent] *"I realized that there is more mutual concern among teachers when we are in a cooperative learning group. To achieve the shared goals, we had to help one another learn. I think that all group members were responsible, not only for their learning but also for the others' learning. I liked jigsaw grouping very much"* (Focus Group 1).

The data obtained from the interviews showed that teachers in the groups felt that the Jigsaw method enabled them to get help from other group members during the learning process. This factor also encompassed the social benefits of cooperative learning identified (Johnson 2003; Slavin 2011; Van Wyk 2012a). In this study, teachers in the focus groups recognized that there was more mutual concern among fellow teachers when they worked together in a cooperative learning group. They believed that they were responsible not only for their learning but also for others' learning when working together to achieve shared goals. They also found that they gained an in-depth understanding of the learning materials because the facilitators spent more time helping the participating teachers to focus on the process of learning and how to actively engage in learning, while the facilitators of control groups spent more time discussing the learning tasks with the other members in the group. Each facilitator focused on the specific needs of each group. This showed that facilitators were able to be responsive to the specific needs of each group.

Theme #5: Improving learning skills in terms of critical thinking and oral communication

The fifth most frequently occurring response (17.5%) related to improving learning skills in terms of critical thinking and oral communication. For example, one teacher said, [exact words of respondents] *"I found that working in groups gave me more opportunities to discuss learning materials. This improved my oral communication skills and encouraged my speaking and reasoning ability. The interactions during cooperative learning helped to motivate fellow teachers and stimulate their learning, [as well as to] develop the teachers' creativity and their ability to work cooperatively.* (Focus Group 1)

Teachers in the cooperative learning group claimed that they experienced greater improvement in learning skills in terms of problem-solving, critical thinking and oral communication than would have been the case using other methods. In Johnson and Johnson (2005), most teachers believed that they were more interested in the seminars than they would otherwise have been because discussing the subject matter and exchanging information with other teachers in groups helped them improve their higher-level thinking skills (Tran and Lewis 2012; Van Wyk 2012a).

Theme #6: Building enabling and supportive learning environment

An enjoyable learning environment was another frequently endorsed benefit (15%) of cooperative learning. For example, one teacher said, *"I really enjoyed cooperative learning during the six-day workshop. I felt that I was in a comfortable and supportive learning environment. I did not sit there [merely] to receive what the teacher transferred. I was required to discuss learning tasks and share information with the group members in my group. My learning happened through reciprocal interaction with others… This learning makes the learning environment more natural and interactive"* (Focus Group 4).

Almost all teachers in the groups perceived the Jigsaw learning environment to be very cooperative and interactive. They also indicated that they enjoyed cooperative learning during the six-day workshop because they were in a comfortable and supportive learning environment in which they were expected to discuss learning tasks and share information with group members instead of passively receiving what the facilitator transferred by lecture. The findings of the present study are consistent with the results of Slavin's (2011) study, which shows that

cooperative learning makes the learning environment more natural, interactive and enjoyable.

Theme #7: Challenges faced by participants during the ToT project

Some teachers felt left behind (7.5%), as indicated in the following responses. *"I felt lonely and left behind in my group when we discussed the learning materials. Sometimes I was passive and only listened to the presentation of other group members. I found that the other members were very good at understanding the subject matter, and they solved problems quickly. I did not solve the problems as fast as they did. Thus, I felt that I was dependent on them. I was upset."* (Female teacher)

For example, one teacher said, *"Jigsaw learning is great. One thing I did not like is that some group members did not really cooperate with us in all group activities in relation to the subject matter. This affected the results of the discussions. We prepared information carefully for discussions, while some members were very careless in their preparation. We focused on discussing and exploring materials, while some members did their own work. They did not accept others' ideas nor did they support each other*" (Male teacher).

Although some teachers found that it was useful when one group had four members as opposed to a standard of three members per group, they did not like groups that were preassigned and permanent. Some teachers believed that they would have learned more if participants were rotated between groups following each teaching session. Le (2010) reports that most teachers liked the relatively frequent changing of group members. However, if the assertion is accepted that the gradual development of group cohesion enhances group productivity, then frequent changing of group members may impede this group dynamic, and ultimately their achievement (Biggs 1996; Volet and Renshaw 1996; Whicker and Nunnery 1997; Wong 2004; Le 2010).

The results of this study showed that two recommendations consistently made by some teachers were that it is important to emphasize the teaching of interpersonal and social skills, and to explain individual and group accountability clearly. This probably relates to the observation that some teachers in the treatment group did not like uncooperative or irresponsible group members. They perceived that some members of their group did not take responsibility for their assigned topics in the learning materials, and were not cooperative with others in the group as a result of a lack of individual accountability and dysfunctional interpersonal and social skills.

Some teachers claimed that they prepared information carefully for discussions, while others were seen as very careless in their preparation. Unfortunately, the ToT project involved only six training sessions. Some teachers may, therefore, not have experienced sufficient involvement in mastering skills and understanding their accountability for learning in groups. This conclusion appears consistent with the suggestions argued by Johnson and Johnson (2005), which showed that teachers usually need a longer period of time to develop their personal and social skills in groups. This helps them recognize the extent of their individual accountability in learning (Thanh-Pham 2011; Tran and Lewis 2012).

CONCLUSION

The Jigsaw teaching strategy is a collaborative learning approach that allows teachers to become "experts" on specific components of an assigned topic during lesson presentations. Teachers demonstrated positive attitudes toward the Jigsaw method as a cooperative learning approach. This resulted from the teachers achieving more from working with other teachers, retaining more knowledge from sharing and teaching others, improving learning skills, facilitating mutual help, and improving confidence and social relationships with other teachers in an enjoyable learning environment.

The results of this study show that teachers in the cooperative learning group had positive attitudes towards their learning since it enabled them to be academically, socially and psychologically more successful than they would otherwise have been. This study also supported the argument that positive attitudes in the cooperative learning context and higher achievement are strongly correlated. In this study, Economics teachers in the groups reported more effective learning in groups, more helpfulness and mutual teaching, more discussion of the learning material among participants, and a great-

er exchange of information than they had experienced in traditional teacher-centered classrooms.

Use of the Jigsaw strategy during this ToT project empowered teachers to create an enabling learning environment and to expand opportunities for knowledge exchange and sharing in groups. The ToT project enabled the participants, the Economics teachers in the Free State province, to implement the Jigsaw teaching method in their own teaching praxis. The method promotes productive improvement in teachers' Economics knowledge, skills and attitudes toward learning, which will be of benefit to the current wave of curriculum reform in South African schools.

RECOMMENDATIONS FOR FURTHER RESEARCH

The findings of the present study indicate the positive effects of cooperative learning on the attitudes of Economics teachers to their own learning, as well as to the instructional method of cooperative learning. However, it is difficult to demonstrate a generalizable effect on teacher attitudes from a single experiment of short duration, such as reported in this paper. In addition, attitudes are both abstract and subjective, and it is, therefore, difficult to measure changes in attitude over a short time.

A more prolonged and extensive treatment may be needed to confirm that using the Jigsaw method brings about radical changes in teacher attitudes. To achieve more conclusive findings, the attitudes of teachers toward cooperative learning should be studied not only by means of questionnaires but also by undertaking observations and interviews. To achieve more conclusive findings, the attitudes of teachers to cooperative learning should be studied not only by means of interviews, but also by undertaking observations and questionnaire studies.

It is, therefore, recommended that a series of further studies on cooperative learning at the secondary levels (grades 10 to 12) of Economics education should be undertaken. It is also recommended that further research studies on the effectiveness of rotating groups and changing group membership following each lesson should be conducted.

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