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USING JIGSAW TECHNIQUE AS AN EFFECTIVE WAY OF PROMOTING CO-OPERATIVE LEARNING AMONG PRIMARY SIX PUPILS IN FIJAI

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ABSTRACT

The focus of the study was to improve upon cooperative learning with the use of Jigsaw technique in Basic six of Holy Child Practice Primary School. Action research design was used in addition to a Case study design to conduct the study. The research instruments were observation and questionnaire. The researcher employed the Jigsaw technique as the intervention. The sample size used was 40, made up of 30 pupils and 10 teachers from the same institution. Responses gathered from both the observation and the administration of the instruments indicate that some of the causes of pupils poor performance in school were poor teaching methods during lessons and the inability of teachers to vary teaching techniques. It was observed during the research period that pupils had problems in actively participating in lessons. More so pupils did not know how to learn in groups. It also came to light that lack of understanding of collaborative and cooperative learning was the pupils' deficiency. The study therefore empowered both teachers and pupils to resort to the use of collaborative learning due to its immense benefits.

Keywords: Co-operative learning, Jigsaw, Collaborative learning.

1. INTRODUCTION

Cooperative learning, which is the primary focus of this study, is a specific kind of collaborative learning. In cooperative learning, students work together in small groups on a structured activity. They are individually accountable for their work and the work of the group as a whole is also assessed. Cooperative groups work face-to-face and learn to work as a team. Cooperative learning is defined as students working together to attain group goals that cannot be obtained by working alone or competitively (Johnson *et al.*, 1986). It is a process which requires knowledge to be discovered by students and transformed into concept to which the students can relate. Cooperative learning is a methodology that employs a variety of learning activities to improve students' understanding of a subject by using a structured approach, which involves a series of steps, requiring students to create, analyze and apply concepts (Kagan, 1990). Cooperative learning utilizes ideas 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 toward 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 a common goal. Each individual team member 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, 1996). In education, jigsaw is a teaching technique invented by social Psychologist Elliot Aronson in 1971. Students of an average sized class (26 to 33 students) are divided into competency groups of four to six students to research. 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 starting group in the role of instructor for their sub-category. The jigsaw technique was invented and named in 1971 in Austin, Texas by a graduate Professor named Elliot Aronson. Recent desegregation had forced a racial mix on the students of Austin, and many teachers were unable to cope with the turmoil and hostility of the situation. The researcher decided that inter-school competition was leading students to study too much on their own and was interfering with the idea of a cooperative classroom. By arranging the students in culturally and racially diverse groups, the researcher and her team of graduate students were able to reduce the divisions between students.

The Jigsaw technique was randomly introduced into some classrooms and not introduced into other classrooms. This allowed for comparisons between students in jigsaw classes and those not in jigsaw classes. Students in the jigsaw classes expressed significantly, more self-confident and liked school better when tested objectively. Behavioral data supported these self-report measures. Students in jigsaw classes were absent less frequently, intermingled more in the cafeteria and in the school yard and performed better in exams.

The jigsaw strategy is a cooperative learning technique appropriate for students from 3rd to 12th grade. There are several benefits of jigsaw technique in teaching. Teacher is not the sole provider of knowledge because most of the work is done by the students themselves which makes it an efficient way to learn. Students take ownership in the work and achievement and therefore students are held accountable among their peers. Jigsaw technique is beneficial in teaching because learning revolves around interaction with peers, students are active participants in the learning process and thereby help to build inter-personal and interactive skills among students. The use of this technique also makes teachers find it easy to learn, enjoy working with it, it can be used in conjunction with other teaching strategies and it can be effective even if it is used for just an hour per day. There can be some obstacles when using the jigsaw technique. One common problem is a dominant student. In order to reduce this problem, each jigsaw group has an appointed leader. Students realize that the group is more effective if each student is allowed to present his or her own material before questions and comments are made. Dominance is eventually reduced because students realize it is not in the best interest of the group. Another problem is a slow student in the group. It is important that each member presents the best possible report to the group, as it is important that individuals with poor study skills do not present

inferior reports to their jigsaw group. In order to reduce this problem, the jigsaw technique relies on "expert" groups. Students work with other individuals from other groups working on the same segment of the report. In this "expert" group they are given a chance to discuss their reports and gather suggestions from other students to modify their reports as needed. Another issue is that of bright students becoming bored. Research suggests that there is less boredom of bright students in the jigsaw classroom than in the traditional classroom. Bright students should be encouraged to develop the mindset of a teacher. By being a teacher a boring task can be changed into an exciting challenge. Dealing with students that have been trained to compete can also cause difficulties. A goal of a jigsaw classroom is to decrease competition and increase cooperation and so competitive students can create difficulties.

Research on the jigsaw classroom suggests that it has its strongest effect when introduced in elementary school. If there is exposure to the jigsaw classroom at an early age, only an hour per a day is needed to maintain the impact of cooperative learning in later schooling. If jigsaw is first introduced in the later years of schooling, it can often be an uphill battle. Old habits can be hard to break but overtime students participating in the jigsaw classroom in high school can benefit from the cooperative structure.

2.   STATEMENT OF THE PROBLEM

There are many methods, techniques and strategies in impacting knowledge to pupils but there is no denying the fact that not all the methods of teaching adequately promotes pupils' understanding. Due to individual differences, teachers owe it as a duty to employ varieties of techniques in teaching and learning in order to offset the problem of boredom and more importantly enhance pupils' understanding of what is taught. Unfortunately, some teachers do not want any change in their mode of delivery. They stick to the lecture method and most of the times dictate notes for students to copy. In a teaching practice supervision visit made to some Basic schools around Takoradi, it was observed that most of the teachers use methods such as lecturing, notes-copying, and sometimes questions and answers techniques in teaching. The questions and answers technique is quite good but they were not used properly. The worse of it all was the note copying and the lecture techniques. It was observed that Pupils hardly get the opportunity to do collaborative learning. They are therefore denied the golden opportunity of learning in groups and all its associated benefits.

Some of the pupils clearly demonstrated lack of understanding of what were taught because the teacher most often does the talking. Students who do not get the opportunity to learn in groups tend to become antisocial and would always like to do things in isolation. Based on this background, the researcher decided to undertake a study on the use of jigsaw technique in teaching as a way of bringing about variety in teaching and learning at Holy Child Practice Primary school.

3.   RESEARCH QUESTIONS

1.   What are the steps involved in using jigsaw technique in teaching?
2.   To what extent can the use of jigsaw technique promote cooperative learning?
3.   What is the relationship between the use of jigsaw technique and pupils academic work?

4.   What are the challenges involved in the use of jigsaw technique in teaching?

4.   REVIEW OF RELATED LITERATURE

4.1. Theoretical Perspectives of Cooperative Learning

There are two major theoretical perspective associated with cooperative learning: Motivational and Cognitive (Swortzel, 1997). First, because students perceive that their success or failure is dependent upon their ability to work together as a group, students are likely to encourage each other to do whatever helps the group succeed. They are also more likely to help each other with the task(s) at hand. Therefore, cooperative learning increases students motivation to do academic work. (Johnson et al., 1986).The other theory is that cooperative learning helps students acquire critical thinking skills because cooperative learning creates a situation in which students must explain and discuss various perspectives, a greater understanding of the material is obtained. Elaborative thinking is promoted because students give and receive explanations more often   (Johnson et al., 1986). The use of cooperative learning (CL) also helps students clarify concepts and ideas through discussion and debate. Because the level of discussion within groups is significantly greater than in instructor led discussions, students receive immediate feedback, thus advancing the level of discussions. It is through the process of interacting with students of differing view points that cognitive growth is stimulated. Emphasis is placed on learning how to cooperate in order to find the best possible solution to a problem. According to the constructivist approach, when students formulate their own solutions in this manner, they are truly thinking critically, (Davis et al., 1990).

4.2. Elements of Cooperative Learning

It is only under certain condition that cooperative efforts may be expected to be more productive than competitive and individualistic efforts. These conditions are; Positive interdependence (Sink or swim together). Each group member's efforts are required and indispensable for group success. Again each member has a unique contribution to make to the joint effort because of his or her resources and or role and task responsibilities. Face-to-face Interaction (Promote each other's success) Kagan (2001). This element of cooperative learning is orally explaining how to solve problems, teaching one's knowledge to others, checking for understanding, discussing concepts being learned and connecting present with past learning is done during face-to-face interaction. Another element of cooperative learning according to Kagan (2001) is individual and group accountability. This element is keeping the size of the group small. The smaller the size of the group, the greater the individual accountability may be. Again, given an individual test to each student, also, randomly examining students orally by calling on one student to present his or her groups work to the teacher (in the presence of the group) or the entire class. Observing each group and recording the frequency with which each member contributes to the group's work. Kagan (2001) explains that the fourth element of cooperative learning is the interpersonal and small-group skills. Social skills must be taught to promote leadership skills, making decision, trust-building, communication and conflict management skills.The last element of cooperative learning according to Kagan's view is grouping processing. In this element, group members discuss how well they are achieving their goals and maintaining effective working

relationships, describe what members actions are helpful and not helpful and make decisions about what behaviours to continue or change. Compared with traditional teaching methods, the jigsaw has several benefits or advantages or importance. First and foremost, most teachers find jigsaw easy to learn because teacher is not the sole provider of knowledge which makes most teachers enjoys working with it because it can be used with other teaching strategies. It works even if only used for an hour per day. Again, it is an efficient way to learn. It enables students take ownership in the work and achievement. Students are held accountable among their peers, also learning revolves round interaction with peers and therefore students are active participants in the learning process and this helps build interpersonal and interactive skills.

5. METHODOLOGY

Action and Case study designs were used. Action research involves finding out immediate solutions to local problems. According to Burns (1990), Action research is the practical application of fact finding to practical problems solving in a social situation with a view to improving the quality of action within it, involving the collaboration and cooperation of researchers, practitioners and laymen. Action research can also be explained as a small scaled intervention in the functioning of the real world and a close examination of the effect of such intervention. The choice for action research design is to help to promote cooperative learning in the classroom and elsewhere in the world of life. This is because the Action research assists us find immediate solutions to the problems we identify in the classroom. In terms of strength, the Action research helps the teacher to find immediate solutions to classroom problems confronting both teaching and learning. The researcher again used a case study approach. Case studies are investigations of an individual, group, institution or other social unit. According to (Osuala, 1982) Case study typically involves the observation of an individual unit example a student, a delinquent clique, a family group, a class, a school, a community, an event or even an entire culture. Case studies are mostly used when the relevant behaviours cannot be manipulated of respondents' physical characteristics, social qualities or behaviours.

The Case study design was also adopted for this study because the study is concentrated on one school and more so because it is an appropriate way of getting information from a specific institution. The target population used for the study included all pupils and teachers of Holy Child College Practice Primary. The accessible population consisted of pupils in primary six, teachers who teach primary six and the headmistress. The sample size was 30 students and 10 teachers. Fifteen (15) boys and Fifteen (15) girls were selected from the students. The thirty (30) were sampled through a simple random sampling technique. The researcher used the sample frame (i.e. the class list) of pupils in class six and from it randomly picked 15 boys and 15 girls for the study. The purposive sampling technique was used in selecting 10 teachers for the study. The 10 teachers were teachers who have taught upper primary before or were currently teaching upper primary levels (p4-p6). The total sample size was therefore 40 (30 students and 10 teachers).The researcher made use of observation interviews and interventions as the major tools in doing the study. Pupils were observed by watching, listening and recording what he saw rather than asking questions. The researcher chose observation in the sense that, it could offer data when respondents are unwilling to cooperate or give information. The

researcher played the role of an observer noting down the behaviour and activities of students in class. The use of observation also offered first hand information without relying on the report of others. After the researcher had obtained the above information, he selected some questions for the pupils and teachers in the form of an interview in order to obtain relevant information pertaining to the problem.

6. INTERVENTION, RESULTS AND DISCUSSIONS

6.1. Pre-Intervention

In order to ensure of the Effective use of cooperative learning among pupils the researcher explained why he wanted to use cooperative learning and described its benefits to the students. To aid in this explanation, he distributed a handout that describes collaborative learning. The group size was ranged from two to four students, depending on the cooperative learning task. Groups were formed by putting students together to share common strengths, interests etc. Once the groups were assigned, students were given the needed time to work together for a while before moving to a different group. The researcher also optimized the space in their classroom so that students groups could interact and move about the room easily. The instructional methods and materials that the researcher chose allowed individuals to contribute to the group's success. There was some debate about whether or not the researcher should play a role in this decision. Whether or not the researcher chose to assign roles within a group, he made sure there was a distinct role for each student. Also, the researcher chose and assisted the students in choosing roles that uses their strengths, and improved their areas of weakness. The researcher also ensured that students did not choose the same role over and over again. Some of the roles that were chosen or assigned included facilitator, time keeper, recorder, checker (for understanding), summarizer, elaborator (on prior knowledge or discussion points).

6.2. Intervention

After all the preparations, it was time to begin working. During the intervention phase of cooperative learning, the students played the most important role, some of their tasked at this stage included;

- Working together
- Listening to one another
- Questioning one another
- Keeping records of their work and progress
- Producing the assessment task (product)
- Assuming personal responsibility being involved in the group

6.3. Steps Involved in the Intervention

The learners were divided into five groups of six with each having a letter group and a number. The researcher guided learners to select leaders for each group that is a president and a secretary for each group. After choosing the presidents and secretaries for each group, the task was given to the groups and tasks were in five different topics all related to a central topic of "Adolescence reproductive health. Below are the tasks given to the groups to work on:

1) Explain problems associated with adolescence
2) Describe how to manage the problem that occur during adolescence
3) Discuss how the health of the adolescent affect the welfare of the nation
4) Describe the physical changes that occur in adolescents
5) Describe the emotional changes that occurs in adolescents

Pupils were allowed to do the work after task was given. During the discussion the researcher went round to supervise the work to provide the needed assistance to the group. Later, after some 30 minutes they were asked to move to their letter groups to teach other group members about their areas of speciality. After they had finished teaching other members their area of speciality, each group was called to do a presentation for their group. After the presentations there was a plenary session. The researcher gave final comments on the whole activity and brought it to an end.

6.4. Post-Intervention

The post-intervention was an evaluation of the outcome of the intervention. After completing the group work and assessment tasks, the student's job was to reflect on the work that was accomplished in the group. What worked and what did not work? What would they change or keep next time they work together. The students also gave feed back to their researcher and this was a sign that showed that they were really having a cooperative learning. There were able to tell the researcher what worked or what was good about this unit and they did point out what did not work well. This information had been written down and informally discussed with them.

Research question 1: What are the steps involved in using jigsaw technique in teaching?

After the activity students were interviewed with regards to the steps involved in planning jigsaw. The Respondents came out with a number of steps to implement in the use of jigsaw. The steps identified by the respondents perfectly agrees with the ten steps of Aronson (2008). They are:

1) Students are divided into 5 or 6 people's jigsaw group. The group should be diverse in terms of ethnicity, gender, ability and race.
2) One student should be appointed as the group leader. This person should initially be the most mature student in the group.
3) The day's lesson is divided into 5-6 segments (one for each member).
4) Each student is assigned one segment to learn. Each student should only have direct access to their own segment.
5) Students should be given time to read over their segment at least twice to become familiar with it. Students do not need to memorize it.
6) Temporary experts groups should be formed in which one student from each jigsaw group joins other students assigned to the same segment. Students in this expert group should be given time to discuss the main points of their segment and rehearse the presentation they are going to make to their jigsaw group.
7) Students come back to their jigsaw group.
8) Students present their segment to the group, other members are encouraged to ask question for clarification.

9) The teacher needs to float from group to group in other to observe the process. Intervene if any group is having trouble such as member being dominating or disruptive. There will come to a point that the group leader should hand this task. Teachers can whisper to group leader as to how to intervene until the group leader can effectively do it themselves.

10) A quiz on the material should be given at the end so students realize that the sessions are not just for fun and games but they really count.

Research question 2: To what extent can the use of jigsaw promote cooperative learning?

6.5. Tutors' Responses to the Questionnaire

Respondents simply responded to the 4point likert scale to confirm the extent to which Jigsaw promote cooperative learning.

Table-1. Extent to which Jigsaw promotes Cooperative learning

Responses	Respondents	Percentage (%)
Very high extent	3	30
High extent	6	60
Low extent	1	10
Very low extent	–	–
Total	10	100%

Table 1 shows that ninety percent of the respondents overwhelmingly agreed that the use of jigsaw technique in teaching helps to promote cooperative learning to a high extent. This shows that greater percentage of the teachers know the importance of using jigsaw technique in teaching. It also implies that the respondents greatly agreed to what the psychologist (Aronson, 2008) said concerning the benefits of jigsaw technique. According to him, learning revolves around interaction with peers and therefore students are active participant in the learning process and this helps build interpersonal and interactive skills.

Research question 3: What is the relationship between the use of jigsaw technique and pupils participation in class?

In answer to the research question, the teachers rated the performance of pupils in respect to the use of Jigsaw.

Table-2. The use of Jigsaw and pupils academic work

Responses	Respondents	Percentage (%)
Promotes good Academic Performance	1	10
Promotes average Academic Performance	–	–
Promotes active Students Participation	9	90
Total	10	100

The analysis shown in Table 2 indicate that the greater respondents representing ninety percent overwhelmingly agreed that the use of jigsaw technique promote Active students participation and only one respondent representing ten percent also agreed that the use of jigsaw technique promote

Good academic performance than active students participation and this shows that there is a great relationship between a teaching technique and pupils performance. This is so because if the technique used in teaching is good it will have good effect on pupils' academic performance and vice-versa. With these reasons, the use of jigsaw technique greatly improve pupils active participation in class since most of the work is done by the students and by so doing this will help improve upon their academic performance in class. The views expressed by the respondents again agrees with what (Aronson, 2008) said concerning the significance of the use of jigsaw technique in teaching. According to him, the significance of using jigsaw technique in teaching is to promote students learning and academic achievement and this helps increase student's retention. Also, it enhances students' satisfaction with their learning experience which enables them not only to achieve which enables them not only to achieve good academic performance but also develop skills in oral communication since there is a great participation and providing of knowledge from them.

Research question 4: What are the challenges involved in the use of jigsaw technique in teaching?

6.6. Challenges Involved in Using Jigsaw

Respondents gave various challenges involved in using jigsaw technique in teaching. A summary of their challenges are provided below:

1) It is time consuming.
2) Some students tend to dominate during the activities.
3) Time and limited source of information for pupils.
4) The jigsaw helped most of the pupils to understand what the researcher was teaching but few of them did not get the concept.
5) Because pupils have their groups, they will not have a cordial relationship with other student in that class.
6) Number of students in that class. High number of students in the group can affect participation.
7) Not all students will have the courage to be involved.
8) The nature of the time table does not allow enough time for pupils to do their presentation. That is time constraint.
9) Students who are academically good will give problems for the weaker students.

With these challenges it implies that the use of jigsaw technique has not only benefits to the student but it has some problems as well. This view given by the respondents on the challenges in using jigsaw technique agrees with that of (Aronson, 2008). According to him, the dominant student is an obstacle to a successful Jigsaw activity. To reduce this each jigsaw group is given an appointed leader. Another obstacle in using the jigsaw technique in teaching is that of the slow student in the group as it is important that individuals with poor study skills do not present inferior reports to their group. In order to reduce this problem the technique relies on "experts" groups. Students work with other individuals from other groups working on the same segment of the report which affect the time making the time given limited.

6.7. Suggestions To Make Jigsaw More Beneficial

Respondents gave various suggestions which could make the use of jigsaw technique very effective. A summary of their suggestions are provided below:

1) Each member in the group should be given enough time to contribute his or her idea
2) Teacher should be time conscious and creative
3) Each student should be allowed to operate at his or her own pace
4) Teacher must provide pupils with more source of information
5) If the researcher continues to use the jigsaw technique day in and day out, they will also become like the others.
6) Every student is allowed to participate so, there is an active participation of every student
7) Number of students in a group must be looked at for effective participation
8) All the students must be involved
9) Each member in the group should be given the change to talk and contribute during the presentation.
10) Number in each group not be more or less, at least between four to six members in each group.

This implies that the obstacles in using the technique can be removed or reduced when the above suggestions are taken into consideration so that the use of the technique would be beneficial to both learners and teachers.

An Observation checklist used by the researcher achieved the following:

1) Each pupil was put into two groups.
2) Pupils changed over to their second groups as "experts".
3) All pupils did not take part in the exercise.
4) Shy pupils contributed to group work.
5) Leaders did notemerge from group activities
6) Learners were able to answer questions during lessons.
7) Pupils performed well after written exercise on the topic.
8) Bright students dominated group work.
9) A lot of time was involved using jigsaw technique.

Based on the observations listed above, it is quite clear that the use of jigsaw technique is beneficial to learners. This is because it engaged greater number of the learners to participate in the learning process and also enhanced better performance of learners. However, leaders did not emerge from the activity as anticipated by the researcher this may be attributed to the inadequate time allocated for the work.

7. CONCLUSIONS AND RECOMMENDATIONS

The study revealed that jigsaw is a very useful technique. Through the use of the technique, pupils naturally developed the interest of working with their colleagues and through that they learnt from each other and hence learnt better. They also cultivated good attitudes from each other. The observation conducted by the researcher after the intervention also confirmed that most of the pupils

were able to take active part in the lesson by answering questions during and after the lesson. It is recommended that teachers should avoid merely using lecture method in teaching lessons at the lower levels (Basic level) because it leads to poor participation of pupils in the lessons and poor understanding of concepts. Teachers should rather concentrate on teaching techniques or teaching methods like the activity method which will enable pupils to properly understand the concepts taught in class. The Ministry of Education should organize frequent in-service training for teachers in the various schools, particularly on the methods of teaching. The Ghana Education Service must make sure head teachers organise in-service training, at least thrice a term. Resource persons can be invited from the District Education Offices, the Colleges of Education and the Teaching Universities to help.

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