



Effect Of Think-Pair-Share Cooperative Learning Strategies on Academic Performance and Attitude Towards Civic Education Among Senior Secondary School Students In Dutsin-Ma Quality Assurance, Katsina State, Nigeria

AYUBA DRIS^{1,*}, JAMILA HUSSAINI²

1,2 Department of Educational Psychology and Counselling, Federal University Dutsin-Ma, Katsina State, Nigeria.

* Corresponding Author: aidris21@fudutsinma.edu.ng

ABSTRACT

The study investigated the Effect of think-pair-share Cooperative Learning Strategies on Academic Performance and Attitude towards Civic Education among Senior Secondary School Students in Dutsin-Ma Quality Assurance, Katsina State, Nigeria. The study was guided with two research questions, hypotheses. The study employed pre-test post-test quasi-experimental research design with the population of 712 students and the sample of 20 SS 2 of GPSS Yarima Dutsin-Ma who were teacher identified with poor academic performance and negative attitude towards Civic Education were purposively selected. The instruments used for data collection at the pre-test and posttest in the study were Civic Education Performance Test and Attitude towards Civic Education Scale. The performance test has 50 questions based on the second term scheme of work while the attitude scale has 30 items measured on five point-likert scale which was validated by professionals in the department of Educational Psychology and Counselling, faculty of education Ahmadu Bello University, Zaria. The reliability coefficient of Attitude scale has .871 as established using Cronbach Alpha. Data were collected at the pre, treatment and post-test respectively. The data collected were analyzed with paired sample t-test using SPSS version 26. Findings of the study revealed that; there was significant effect of think-pair-share on academic performance of students in Civic Education($t= 17.095, p = .000$); there was significant effect of think-pair-share on attitudes of students towards Civic Education ($t= 5.228, p = .000$), Based on the finding of the study it was concluded that think- pair-share cooperative learning strategy have significant effect on academic performance and attitude towards Civic Education and that jigsaw was more effective on academic performance and attitude. It was recommended that Educational psychologists and counsellors should be encouraged to use think-pair-share cooperative learning strategy in enhancing poor academic performance and addressing negative attitude of senior secondary school students towards Civic Education.

Introduction

Academic Performance in Civic Education is concerned with student gaining knowledge; acquiring skills and competencies; securing high grades; securing a progressive career; and intention and persistence towards education, the prospects of educational institutions involved in producing the “as per demand” workforce is widely immense. As such, an extreme focus would always be there upon the academic performance of the students. Likewise, efforts to identify and utilize the factors responsible for an improved academic performance of students, has always been a major research area. Academic performance in Civic Education is a ‘net result’ of student’s cognitive and non-cognitive attributes as well as the sociocultural context in which the learning process takes place (Liem & McInerney, 2018; Liem & Tan, 2019).

It could be cognitive, non-cognitive or psychological, and contextual factors contribute to the Academic Performance of learners with various socio-demographic and sociocultural backgrounds. Higher academic performance is almost universally considered to be a good thing. In recent years, there has been a report of decline in academic performance in Civic Education which a source of concern to stake holders in education- teachers, parents school administrators and all who are concern with the education development of students. This decline in performance could be visibly observed from WAEC and NECO; According to Zonal Education Quality Assurance Dutsin-Ma Katsina State, it was 47% of both Arts and Science students passed Civic Education in WAEC examination in the year 2024, while 52% of same level passed NECO in the year 2024. The pass range indicated that, the academic performance/Performance of senior secondary students that sat for SSCE is not up to 65%, which is showing an alarm that other efforts has to be in place to burst students’ academic performance in Civic Education. Coming down to 2024 mock examination for SS2 students, across Dutsin-Ma Zonal Quality Assurance Education it was 52% passed Civic Education successfully. Considering the cumulative performances in Civic Education, there is a serious concern on the students’ academic performance in Civic Education without a good grade in Civic Education in SSCE graduates, the students was definitely experience problem in securing admission to study courses to study like; Sociology, Social Studies, Law, Accounting, Mass communication, political science, Economics and many arts and social science courses at both University, College of education and Polytechnic. This situation is alarming as it may leads to drop out, student’s inability to gain admission in to course related to Civic Education.

Cooperative learning made the process of learning student-centered and this instructional strategy can be achieved by dividing the students into small groups (Machado & Coimbra, 2015). In cooperative learning each group is responsible for its own learning as well as the learning of all the members of the group in the sense that pupils can share knowledge with each other and every student can explain what s/he has gained to the other students. Thus, students in each group make discussions with each other in order to complete a task, solve a problem or achieve a specific goal given to them by the instructor. Cooperative learning does not cancel the role of the teacher because the teacher should be available in order to design the activities, monitor the students and divide them into small groups. Leaving the students alone without guidance might not help them to achieve the desired goals of learning (Kagan, 2018). The main goal of cooperative learning is to increase the level of benefit among all the students through cooperation between the students as those whose level is better than the other students can help their classmates by guiding them to understand the lesson or fulfil the given task (Johnson. 2016). Millis (2002) states that cooperative learning enhances critical thinking, promoting deep learning, encouraging self-esteem and acceptance of others, and improving interpersonal skills are the most challenging educational goals. Cooperative learning which is an instructional approach developed to enhance the challenging educational goals such as critical thinking

skills, deep learning, encourage self-esteem and acceptance of others, and improve interpersonal effectiveness.

Think-Pair-Share is a cooperative discussion strategy that was first developed by Professor Frank Lyman and his colleagues at the University of Maryland in 1981. It has been adopted by many writers in the field of cooperative learning since then. It gets its name from the three stages of student action, with an emphasis on what students are to be doing at each of those stages (Marzano & Pickering, 2005). This teaching-learning strategy works in three phases:

(1) Think. The teacher provokes students' thinking with a question, prompt, or observation. The students should take a few minutes just to THINK about the question;

(2) Pair. Using a partner or a desk-mate, students PAIR up to talk about the answer each came up with. They compare their mental or written notes and identify the answers they think are best, most convincing, or most unique;

(3) Share. After students talk in pairs for a few minutes, the teacher calls for pairs to SHARE their thinking with the rest of the class (Robertson, 2006). Think-Pair-Share is a cooperative discussion that has 3 parts to the process – student think about a question or an issue, they talk with a partner about their thoughts, then some student's share their discussion and thinking with the class. Ledlow (2001) states Think Pair Share is a low-risk strategy to get many students actively involved in classes of any size. The procedure is simple: after asking question, the teacher tells students to think silently about their answer. As a variation, you might have them write their individual answer. Then the teacher asks them to work in pair to compare or discuss their responses. The teacher call randomly on a few students to summarize their discussion or give their answer. The random calls are important to ensure that students are individually accountable for participating. Use of this strategy was help students to; draw on background knowledge to understand ideas, gives students time to think, generate and analyze ideas, maintain a high level of engagement, participate in small-group interactions, synthesize information, develop and practice reading skills. Use of this strategy also helps teachers increase their wait time, thus increasing student think time, as well. Wait / think time has been demonstrated to be a powerful factor in improving student responses to prompts and questions.

Robertson (2006) asserted that in Think-Pair-Share (TPS), students are given time to think through their own responses to question(s) before the questions are answered by other peers and the discussion moves on. Students also have the opportunity to think aloud with other student about their responses before being asked to share their ideas publicly to the entire class. As a cooperative learning strategy, Think-Pair-Share benefits students in the areas of peer acceptance, peer support, Academic Performance, self-esteem, and increased interest in learning and students (Robertson, 2006). By using TPS as a cooperative learning approach, instructors provide students with activities that promote interaction and require accountability (Kagan, 2001). To increase individual accountability in TPS, students are asked to jot down their ideas before turning to a partner to discuss them. The teacher can walk around the room and look at what students are writing to see who understands the concept. This keeps students from adopting the attitude that they was just sit back and let their classmates do all the thinking (Kagan, 2001). According to Lyman (2017), Think-Pair-Share technique as one of the cooperative language learning models has some advantages.

They are as follows:

1. The Think-Pair-Share technique is quick and does not take much preparation time.
2. The Think-Pair-Share technique makes classroom discussions more productive, as students have already had an opportunity to think about their ideas before sharing with the whole class.
3. Students have opportunity to learn higher-level thinking skills from their peers, and gain self-confidence when reporting ideas to the whole class.
4. The „pair“ step ensures that no student is left out of the discussion.
5. Students are able to rehearse responses mentally and verbally, and all students have an opportunity to talk.
6. Both students and teacher have increased opportunities to think and become involved in group discussion.
7. The Think-Pair-Share technique is applicable across all grade levels and class sizes.

Statement of the Problem

This problem of poor academic performance in Civic Education may also as a result of negative attitude of students towards the subject. If students lack the general knowledge of civic education was lead them to negative attitudes and behaviours in violating their rights and the rights of others in the society. Many of the SS II students perceived the subject as not core subject, thus even without passing it, one may get admission in to other courses in tertiary institution. If this problem of poor academic performance in Civic Education is not managed, it may lead to poor performance in the other subject which may in turns lead to dropout and inability to pass external examination and have the requirements for admission in to Tertiary Institution. Despite the fact that there have been concerted efforts by teachers, parents and school administrators to ameliorate the problem of academic performance in all subjects- Civic Education inclusive, the problem has continued to persist. It's against this backdrop that the researcher deems it fit to investigate on the effect of Cooperative Learning Strategies on academic performance and attitude towards Civic Education among senior secondary school students in Dutsin-Ma Zonal Quality Assurance Education Katsina state. Nigeria.

Research Questions

The following research questions were raised and answered for the study:

1. What is the effect of think-pair-share cooperative learning strategy on academic performance in Civic Education among senior secondary school students in Dutsin-Ma Zonal Quality Assurance Education, Katsina state, Nigeria?
2. What is the effect of think-pair-share cooperative learning strategy on attitude towards Civic Education among senior secondary school students in Dutsin-Ma Zonal Quality Assurance Education, Katsina state, Nigeria?

Hypotheses

The following hypotheses were formulated and tested at 0.05 level of significance:

1. There is no significant difference in the pre-test and post-test mean scores of academic performance among SS2 students of Dutsin-Ma Zonal Quality Assurance Education, exposed to think-pair-share cooperative learning strategy
2. There is no significant difference in the pre-test and post-test mean scores of attitude towards Civic Education among SS2 students of Dutsin-Ma Zonal Quality Assurance Education, exposed to think-pair-share cooperative learning strategy.

Methodology

Research Design

This study employed a pre-test and post-test quasi-experimental design to investigate the effect of cooperative learning strategies on academic performance and attitude towards Civic Education among senior secondary school students in Dutsin-Ma Zonal Quality Assurance Education, Katsina state, Nigeria. Rationale for Quasi-Experimental Design.

Population

The general population of this study consists of 712 Senior Secondary School Students in Dutsin-Ma Zonal Quality Assurance Education, Katsina state, Nigeria.

Sample and sampling

A total of forty 20 senior secondary school students with poor performance in Civic Education from Pilot Senior Secondary School (GPSS) Dutsin-Ma were purposively selected. A sample of 20 SS II each were purposively selected from the schools.

Instruments for Data Collection

Two instruments that was be used in this study are Civic Education Performance Test (CEPT) and Attitude towards Civic Education instrument (ATCEI) were used by the researcher to obtain data for this study. The (ATCEI) is a self-constructed scale by the researcher to obtain data in respect to attitude towards civic education of SS2 students that could be used in this study. The scale has 30 items, it's a likert scale: Always =4, Most of the time = 3, Sometime = 2, rarely = 1 and Not at all = 0. The minimum score of the scale is from 0-30 while the maximum is 0-120.

Validity of the instrument

Face validity of the CEPT and ATCEI was done by the experts in the Department of Educational Psychology and Counselling and Civic Education Teachers. The experts were provided with the copies of the performance test in Civic Education. Their observations comments and corrections were effected in the final draft. Thus, the instrument can elicit the desired information required for the study.

Pilot Testing

Pilot testing was conducted at Government Pilot senior secondary schools Dutsin-Ma. Thirty (30) copies of the instrument were administered to the SS II of the school.

Reliability of the of the instrument

The data collected from the pilot testing was analyzed using Cronbach alpha, the internal consistency of the instrument is .871.

Procedure for Data Collection

Treatment Procedures

Treatment Sessions

Treatment 1: Think-fair-share Cooperative Learning Strategy.

Week One: Introduction

Introduction and allocation of the participants into groups there is going to be five groups and each group contains 4 participants making the total number of 20 participants: explaining the main focus and details explanation on think-pair-share and basic elements of cooperative learning: Face-to-face introduction, in concern basically with; positive independence, equal participation, group interaction and working together. Establishing cordial relationship with the participants surrounding the challenges and problems associated with poor performance in Civic Education and after that the researcher administer the CEPT and ATCEI instruments as posttest.

Week Two: Understanding the process

Week Three: Thinking and idea generation

Week Four: Fair Sharing Round 1

Week Five: Group Discussion and Clarification

Week Six: Fair sharing Round 2

Week Seven: Synthesizing ideas

Week Eight: Task Assignment and responsibility

Week Nine: Collaboration and support

Week Ten: Reflection and Evaluation (Individual)

Week Eleven: Reflection and Evaluation (Group)

Week Twelve: Wrap-up and Application

The Researcher **welcomes** the participants to the last session of the think-pair-share strategy group lesson. The researcher and the participants summarize key takeaways and discuss how to apply think-fair-share in the real life learning of Civic Education and ask the participants sit according to the groups and each group contains 4 participants, the total number of 4 groups that's is $4 \times 5 = 20$ participants. The researcher re-administer the CEPT and ATCEI instrument as a posttest to the participants.

Procedure for Data Analysis

The data collect in the study was be subjected to statistical analyses using descriptive and inferential statistics. Paired sample t-test was be used to test hypotheses 1-4 while ANCOVA was be used to analyze hypothesis 5 and 6 of the study to determine and accept the result at 0.05 Alpha level of level of significance. The analyses were conducted using Statistical Package for Social Science (SPSS version 26).

Results

Hypothesis 1: There is no significant difference in the pre-test and post-test mean scores of academic performance among SS2 students of Dutsin-Ma Zonal Quality Assurance Education, exposed to think-pair-share cooperative learning strategy.

Table 3 Paired Sample t-test on the Think-pair-share on Academic Performance of Students in Civic Education.

Groups	N	Mean	SD	t	df	p
Pre-test	20	16.95	3.748	17.095	19	.000
Post-test	20	33.00	1.864			

Table 3 reveals that there is significant effect of think-pair-share on academic performance of students in Civic Education in Dutsin-Ma Zonal Quality Assurance Education as shown by the mean of 16.95, SD = 3.748 for pre-test, mean = 33.00, SD = 1.864 for post-test, t = 17.095, df = 19 and p = .000 which is lower than .05 level of significance. Thus, the null hypothesis which states that there is no significant difference in the pre-test and post-test mean scores of academic performance among SS2 students of Dutsin-Ma Zonal Quality Assurance Education, exposed to think-pair-share cooperative learning strategy is hereby rejected.

Hypothesis 2: There is no significant difference in the pre-test and post-test mean scores of attitude towards Civic Education among SS2 students of Dutsin-Ma Zonal Quality Assurance Education, exposed to think-pair-share cooperative learning strategy.

Table 4 Paired Sample t-test on the Think-pair-share on Attitude of Students towards Civic Education.

Groups	N	Mean	SD	t	df	p
Pre-test	20	100.600	19.316	5.228	19	.000
Post-test	20	125.400	10.615			

Table 4 reveals that there is significant effect of think-pair-share on attitudes of students towards Civic Education in Dutsin-Ma Zonal Quality Assurance Education as indicated by the mean of 100.600, SD = 19.316 for pre-test, mean = 125.400, SD = 10.615 for post-test, t = 5.228, df= 19 and p = .000 which is lower than .05 level of significance. Thus, the null hypothesis which states that there is no significant difference in the pre-test and post-test mean scores of attitude towards Civic Education among SS2 students of Dutsin-Ma Zonal Quality Assurance Education, exposed to think-pair-share cooperative learning strategy, is hereby rejected.

Discussion of Findings

This study examined the Effect Of think-pair-share Cooperative Learning Strategies on Academic Performance and Attitude towards Civic Education among Senior Secondary School Students in Dutsin-Ma Quality Assurance, Katsina State, Nigeria.

The result of this study revealed that significant effect of think-pair-share on academic performance of students in Civic Education in Dutsin-Ma Zonal Quality Assurance Education. This finding is in line with Yusuf, Owede and Bello (2018) who carried out a research on Effect of Think-Pair-Share Instructional Strategy on Students' Performance in Civic Education in Bayelsa, Nigeria. Their research revealed among others that students taught Civic Education using Think-Pair-Share strategy outperformed those in the control group, there was a significant difference between the post-test scores of experimental and control groups on Civic Education Performance test. This shows that think-pair-share is a good psychological method

in enhancing student performance through group accountability, interaction and student independence in fostering learning activities also assume that interaction among students around appropriate tasks increases their mastery of critical concepts. When students interact with other students, they have to explain and discuss each other's perspectives, which lead to greater understanding of the material to be learned. The struggle to resolve potential conflicts during think-pair-share leaning activity results in the development of higher levels of understanding in Civic Education.

This finding is also in line with Wuryandani and Herwin. (2021) who conducted a study on the effect of the think pair share model on learning outcomes of Civics in elementary school students, Negeri Indonesia. The finding of the study indicated that there is a significant effect of the think-pair-share learning model on student learning outcomes in Civics education subject. The score of the student learning outcomes has increased significantly after implementing the think-pair-share learning model in Civics learning.

This finding is also incongruence with Kaur (2022) who studied on effect of think-pair-share strategy on Performance in mathematics in relation to mathematical creativity in India. The finding revealed that think-pair-share enhanced Performance in mathematics of high mathematical creativity experimental group was found significantly higher as compared to the control group and The Performance in mathematics of low mathematical creativity experimental group was found significantly higher as compared to the control group. This finding is also incongruence with Okolocha and Nwaukwa (2020) who conducted a study on Effect of Think-Pair-Share Instructional Strategy on Secondary School Students' Academic Performance and Retention in Financial Accounting in Abia State. The study revealed that there was a significant main effect of the treatment which accounted for 58 percent of the variance in the Performance scores of the students also, significant difference in the Performance and retention of students taught financial accounting using think-pair-share strategy and those taught with conventional method.

This finding is also in support with Abiodun, Asanre, Ogundesi, Odupe and Rasaki, (2022) who conducted a research on effect of think-pair-share strategy on student Performance in senior secondary school mathematics at Ogun state, Nigeria. The finding revealed that effect of the strategy on the student's Performance in Mathematics and also, it was established that there is no significant main effect of gender on the Performance of the students in Mathematics among students who were exposed to thinly-fair-share strategy. This finding is also in support with Abiola and Rasheed (2021) who conducted a study on effects of the think-pair-share instructional strategy on students' learning Performances in secondary school mathematics. At same account, the finding is in agreement with Okebukola, Olaniyan-Shobowale and Crownntney (2024) who conducted a study on Effectiveness of Think-Pair-Share Reading Comprehension and Attitude of Lagos State Junior Secondary School Students Lagos State, Nigeria. The finding of the study revealed that the study reveals that the performance of students is highly related to their acquisition of knowledge using the Think-Pair-Share Method. This implies that students will perform better if taught using the Think-Pair-Sharer teaching method in the classroom as an instructional method .On the basis of this, it was concluded and recommended that Think-Pair-Share is more effective in achieving instructional objectives in reading comprehension of the English language.

The second finding of the study revealed that, the result of the study showed significant effect of think-pair-share on attitudes of students towards Civic Education in Dutsin-Ma Zonal Quality Assurance Education. This finding corroborate with the finding of Oluwanife, Olubunmi and Olajumoke (2022) who carried out a study on the Effects of Lesson Study and Think-Pair-Share Instructional Strategies on Students' Academic Performance in Circle

Geometry. Stratified random sampling technique was used to select 184 Senior Secondary Two (SS II) students from the intact classes of three selected secondary schools from the three senatorial districts of Ekiti state, Nigeria. The result of the study revealed significant effect of teacher's lesson study and cooperative learning strategy on the performance of students in circle geometry. It also showed teacher's lesson study and cooperative learning strategy are comparatively different in their effectiveness on the performance of students in circle geometry and their attitude towards geometry. The study is congruence with Akanmu (2019) who conducted a research on the Effects of Think-pair-share on Senior School Students' Performance and attitude in Mathematics in Ilorin, Nigeria. The finding revealed that that, the use of think-pair-share improved students' performance in Mathematics, gender of a student does not affect his or her performance in Mathematics, and the use of think-pair-share improved the retention ability and attitude of the students. Also the finding of this study is congruence with Hans-Stefan and Sagheer (2024) conducted a study on the effect of think-pair-share on grade six students' mathematics achievement and attitude towards mathematics Germany. The finding revealed that Positive changes in attitudes toward mathematics were also observed in the experimental group, with some progress in the control group. Collaborative learning appears promising for enhancing mathematics achievement and nurturing positive attitudes in elementary students.

Recommendations

The following are the recommendations based on the findings and conclusions of the study:

1. Educational Psychologists, and counsellors should be encouraged to use think-pair-share cooperative learning strategy in enhancing poor academic performance and negative attitude of senior secondary school students towards Civic Education.
3. Sociologists of education and curriculum planners should put think-pair-share cooperative learning strategies in to consideration when sensitizing school teachers, when writing text books for learning and when developing a school curriculum, the two strategies are good for teaching students, as it poster learning through social interaction and group work ability through which learning becomes more easier and permanents among students.
4. Curriculum experts and educational planners should sensitize teachers on how to effectively use think-pair-share and jigsaw strategies to enhance and boost academic performance and attitude of senior secondary school students through workshops, seminars, conferences, and symposia.

References

Abiodun, A. A., Asanre, A. A., Ogundehi, M. O., Odupe, F. O., & Rasaki, O. A. (2022). Effect of think-pair-share strategy on student performance in senior secondary school mathematics. *Journal of Education and Human Development*, 11(2), 1-9.

Abiola, A. A., & Rasheed, R. A. (2021). Effects of the think-pair-share instructional strategy on students' learning performances in secondary school mathematics. *Journal of Education and Human Development*, 10(1), 1-12.

Achufusi-Aka, E. O., & Okpanachi, R. A. (2021). Effect of cooperative learning strategy on students' academic performance in chemistry in Onitsha education zone, Anambra state, Nigeria. *Journal of Education and Human Development*, 10(2), 1-12.

Adediran, A., & Ajiboye, J. (2017). Civic Education and Youth Empowerment in Nigeria. *Journal of Education and Human Development*, 6(2), 1-9.

Aiken, L. R. (2021). *Attitudes and related psychosocial constructs*: A review of the literature. *Educational Psychology Review*, 33(2), 257-276.

Ajitoni, O. O., & Salako, S. E. (2014). Effect of jigsaw technique and gender on students' attitude to ethnic integration and sustainable development in Nigeria. *Journal of Education and Human Development*, 3(1), 1-10.

Akanmu, M. A. (2019). Effects of think-pair-share on senior school students' performance in mathematics in Ilorin, Nigeria. *Journal of Education and Human Development*, 8(2), 1-10.

Akinwamide, T. C., & Oguntade, S. O. (2023). Effect of the think-pair-share strategy on facilitating collective writing skill proficiency and attitude among senior secondary school students in Ekiti, Nigeria. *Journal of Education and Human Development*, 12(1), 1-12.

Asthirningsih, Fitriani, & Budiman. (2020). The effectiveness of the jigsaw type cooperative learning methods on students' academic performance on civic education. *Journal of Education and Human Development*, 9(1), 1-12.

Chukwuebuka, F., Nwandikor, C. C., Beneth, O. N., & Ugochukwu, E. N. (2017). Effect of jigsaw cooperative learning strategy on senior secondary school students' interest and performance in physics. *Journal of Science Education*, 18(2), 1-10.

Damoeroem, M., & Markus, K. (2021). The effect of jigsaw strategy on senior secondary school students' knowledge retention and attitude in physics in Jos, Nigeria. *Journal of Education and Human Development*, 10(1), 1-12.

Hans-Stefan, S., & Sagheer, A. (2024). Effect of think-pair-share on grade six students' mathematics achievement and attitude towards mathematics in Germany. *International Journal of Mathematics Education*, 16(1), 1-15.

Johnson, D. W. (1970). The social psychology of education. In D. A. Goslin (Ed.), *Handbook of socialization theory and research* (pp. 357-402). Rand McNally.

Johnson, D. W. (1991). *Human relations and your career*. Prentice Hall.

Johnson, D. W. (2016). *Reaching out: Interpersonal effectiveness and self-actualization*. Allyn & Bacon.

Johnson, D. W., & Johnson, R. T. (1986). *Learning together and alone: Cooperative, competitive, and individualistic learning* (2nd ed.). Prentice Hall.

Johnson, D. W., & Johnson, R. T. (1989). Cooperation and competition: Theory and research. Interaction Book Company.

Johnson, D. W., & Johnson, R. T. (2005). *New developments in social interdependence theory*. Psychological Monographs, 131(4), 285-360.

Johnson, V. E. (2003). *Grade inflation: A crisis in college education*. Springer-Verlag New York, LLC.

Jones, B. (2006). Think-pair-share: A teaching strategy to encourage student engagement. *Journal of Education and Human Development*, 1(1), 1-8.

Juweto, A. (2024). Effects of jigsaw co-operative teaching/learning strategy and school location on student's achievement and attitude towards biology in secondary school in delta state. *Journal of Education and Human Development*, 13(1), 1-12.

Kagan, S. (2014). Cooperative learning and socio-emotional learning. *International Journal of Cooperative Studies*, 3(1), 1-11.

Karacop, A., Ataman, B., & Diken, I. (2017). The effect of jigsaw technique on students' academic achievement and attitude towards lesson. *Journal of Education and Learning*, 6(1), 137-144.

Kaur, R. (2022). Effect of think-pair-share strategy on performance in mathematics in relation to mathematical creativity. *Journal of Education and Human Development*, 11(1), 1-12.

Ksheerasagar, A., & Kavyakishore, G. (2017). Attitude of students towards mathematics. *International Journal of Science and Mathematics Education*, 15(4), 761-774.

Liem, G. A. D., & McInerney, D. M. (2018). Understanding motivation and learning: A self-determination theory perspective. *Educational Psychology Review*, 30(2), 251-274.

Mark, M.M and Gamble, C. (2020). Experiments, quasi-experiments and ethics. In D.M. mertens & Gisberg eds, *Handbook of social research ethics* (pp.198-213). Thousands Oaks, CA: Sage.

Mbacho, C. N., & Changeiywo, J. M. (2015). Effects of jigsaw cooperative learning strategy on students' performance by gender differences in secondary school mathematics in Laikipia East District, Kenya. *Journal of Gender and Education*, 27(3), 257-272.

Millis, B. J. (2002). Cooperative learning in the college classroom. National Center for Teaching and Learning.

Musa, A., & Hassan, S. (2022). Effect of think-solve-group-share differentiated strategy on motivation, attitude, and performance in mathematical concepts among senior secondary students in Katsina, Nigeria. *Journal of Education and Learning*, 11(2), 1-12.

Nadya, S., & Santoso, P. (2021). The influence of the jigsaw learning model on mutual respect attitudes for grade VIII junior high school students. *Journal of Education and Human Development*, 10(1), 1-12.

Narad, B. K., & Abdullah, A. G. K. (2016). Factors influencing students' academic performance in Nigerian universities. *Journal of Educational Research and Practice*, 5(1), 1-9.

Ogbaga, C. C., & Osuafor, G. N. (2022). Effects of think-pair-share instructional strategies on secondary school students' achievement and attitude in biology in Awka education zone, Anambra State, Nigeria. *Journal of Biological Education*, 56(2), 1-10.

Orji, C. O. (2017). Attitude of students towards science, technology, engineering, and mathematics (STEM) education. *Journal of STEM Education*, 18(2), 5-13.

Robertson, J. (2006). Think-pair-share: A teaching strategy to encourage student engagement. *Journal of Education and Human Development*, 1(1), 1-8.

Van, H. T., & Ramon, A. (2012). Effects of jigsaw learning on students' attitudes in a Vietnamese higher education classroom. *Journal of Education and Human Development*, 1(1), 1-10.

Vygotsky, L. S. (1999). The collected works of L. S. Vygotsky: Vol. 6. Scientific legacy. Plenum Press.

Weidman, J. C., & Bishop, M. P. (2009). The jigsaw technique in the EFL classroom. *Journal of Language and Linguistics*, 8(1), 1-12.

Yakubau, A. M., & Abdullahi, A. (2022). Effects of jigsaw cooperative learning strategies on students' interest and performance in social studies in Taraba State, Nigeria. *Journal of Social Studies Education*, 11(1), 1-12.