EFFECTS OF COOPERATIVE LEARNING STRATEGY ON SENIOR SECONDARY TWO STUDENTS' INTEREST IN ALKANES IN POST- COVID 19 ERA IN JOS SOUTH, PLATEAU STATE, NIGERIA

Delmang, Tabitha Kamji *Ph.D*
Department of Science and Technology Education.
University of Jos, Plateau State Nigeria.
&
Luka, Bala Danyam
Department of Chemistry,
College of Arts, Science and Technology, Kurgwi,
Plateau State, Nigeria
&
Sunday, Michael Longkat
Educare Chosen High School Jos
Plateau State, Nigeria.

Abstract
The study sought to ascertain the effects of cooperative learning strategy on senior secondary two students' interest in Alkanes in post-covid- 19 era in Jos South, Plateau state of Nigeria. The study adopted the non – randomized pre-test- post- test quasi-experimental control group design. The population compromises all senior secondary two students studying Chemistry as a subject in all secondary schools in Jos south Local Government area of Plateau State. The sample of the study was made up of 125 consisting of 65 males and 60 females in senior secondary two drawn from two private and two public schools. Purposive sampling technique was used. Three research questions and three hypotheses guided the study. The cooperative learning method was used to teach the experimental group while the lecture method was used in teaching the control group. The instrument used for data collection was the Chemistry interest questionnaire (CIQ) with a reliability coefficient of 0.93 established using Richardson (K-R2) formula. The data collected were analyzed using SPSS version 25.0. Mean and standard deviation were used to answer the research questions while analysis of covariance (ANCOVA) was used to test the hypotheses at 0.05 level of significance. The findings revealed that there was a significant difference between the mean interest scores of students taught alkanes using cooperative learning strategy and those taught using the lecture method. With respect to

gender, there was no significant difference between the mean interest scores of male and female students taught alkanes using cooperative learning strategy. Going by the findings, it was concluded that cooperative learning strategy enhances students' interest in organic Chemistry (alkanes). It was therefore recommended among others that Chemistry teachers should incorporate the cooperative learning strategy into their techniques for teaching Chemistry concepts particularly organic Chemistry (alkanes).
***Keywords**: Learning, teaching, Organic Chemistry, Alkanes, post- covid-19 era, Cooperative Strategy interest in Chemistry, gender.*

Introduction

In a developing country like Nigeria, the importance of science and technology cannot be overemphasized because science and technology make available the basis for sound socio-economic and structural development of the nation. Chemistry is at the Centre of all science subjects and regarded as the king of most science and technology activities (Achimugu, 2017) Chemistry is one of the science subjects that the students are required to pass at the credit level at the senior secondary school, in order to be admitted into higher institution to study professional courses that are Chemistry based like medicine, petroleum engineering, chemical engineering, pharmacy biochemistry among others. Despite the importance of Chemistry in National development especially in the area of petrochemical Industries, the academic achievement of students in the subject has consistently remained unimpressive (Oloyede, 2010 Udu, 2017). Chemistry education researchers have traced the causes of students" Academic poor achievement in Chemistry to many factors. Prominent among them being instructional.

Strategy used by teachers (Ezeudu, 2013, Njoku & Ezenwa, 2014). Chemistry educators are challenged to look for the most innovative methods of teaching Chemistry in order for their students develop positive interest hence achieve well in the subject as well as achieving the stated goals of Chemistry education.

Cooperative Learning is an instructional method in which students work in small groups to accomplish a common learning goal under the guidance of the teacher. Cooperative learning strategies offer students the possibility to learn by applying knowledge in an environment more similar to the one they will encounter in their future work life. Teachers get the chance to work on core competencies and on students' communication and soft skills, which are valuable for students' success in life and work, integrating them in school

curricula. Cooperative learning strategies are content-free structures that can be reused in different school contexts. These are strategies that can be used both in pairs and groups with Positive interdependence, Individual accountability, Equal participation and Simultaneous interaction. In general we talk about positive interdependence when a gain for one is a benefit for the other. Pair and group members experience themselves as a team and are on the same side working toward the same goal.

To ensure positive interdependence while working with cooperative learning, two requisites must be met: students should feel on the same side and the task should require working together.

In the cooperative classroom, students work together as a team to create and to learn, but ultimately every individual student is responsible for his or her own performance. It is exactly to fulfill both positive interdependence and individual accountability that in all cooperative learning strategy students are given both time to think/work alone and to interact with peers.

In this way students' autonomy and cooperation are improved. Pair and group work is usually very well welcomed by students, but the problem is that it is difficult to check whether students are equally working. Cooperative learning strategies instead make sure every student in each team or pair is equally contributing to the final achievement. They are actually designed to make students interact and to have everyone at every step of the activity fulfil a specific task.

In sequential interaction, when only one student at a time is engaged, the teacher talks (at least) twice for each time a student talks. When the teacher is the most active participant in the classroom, students are obviously disengaged (and most likely bored as well).

Cooperative learning strategies on the contrary are designed to produce simultaneous interaction, so to engage as many students as possible simultaneously. What teachers soon observe when working with cooperative learning strategies is that working together will offer students the chance to know their classmates better. It also helps to create a better community and therefore a warmer atmosphere in the classroom. Cooperative learning, reducing students' disengagement and favoring the natural need of students for social interaction instead of contrasting it, helps also minimize classroom management issues. Moreover, cooperative learning strategies often offer

students a break from the lesson, giving them also the possibility to move around in class.

"Schools on the move" The Finnish programme "Schools on the move with 90 percent of Finnish schools participating, has proven that implementing short active breaks during the lessons improves the health and wellbeing of students, as well as school enjoyment. Cooperative learning strategies are a great opportunity to engage students in active learning methods involving movement as well. Using different strategies in class fosters communication among students, and can make the class more meaningful and fun at the same time. Communication skills are recognized to be valuable for students' future work- and personal life but yet they are often neglected in school curricula. Cooperative Learning Strategies are time consuming.

Cooperative learning strategies are not only very scalable but most of the time they require very little to no preparation and some of them last less than 5 minutes, having in this short period of time all students in class being challenged and engaged. Teachers can start by implementing one single strategy in their own lesson and then evaluate the outcomes in different school classes.

Strategies like Think-Pair-Share or Circle-The-Sage, for example, are not time-consuming at all and do not require a long preparation either. Think-Pair-Share is the solution to the situation every teacher encounters when asking a question in class: having the same student(s) answering every single time. Most of the students do not even feel challenged to think of a possible answer, not to mention speaking up. This happens for many reasons, probably not only due to a lack of knowledge or preparation, but also due to a lack of self-confidence. Moreover, research on "wait time" reveals that most teachers provide an average of only one second of think time after they ask a question. Cooperative learning strategies also engage introspective and slower students, who need time before they feel ready to answer. In Think-Pair-Share, the teacher asks a question to the whole class, as he or she would do at the beginning or at some point of the lesson.

Depending on the age and on the level of the students, it could be something that requires personal interpretation at some point or not. Students get some time to think about a possible answer- or to write it down- then they turn to their classmate sitting next to them and get some pair-time to share and discuss what they have just found out. At the end of this activity, the teacher randomly

chooses two or three pairs and asks them to briefly share their answers or responses.

No matter how old students are- This strategy can be successfully used not only for small children but even in teacher training courses– it is astonishing how much mutual interaction deepens their understanding. Pairs will most of the time succeed where single students would have probably failed. Think-Pair-Share can also be used to have students reflect on a topic, even when no right interpretation is needed, and, being the simplest and most famous cooperative learning strategy, can be the first one to be implemented. Another very effective strategy for engaging students in answering a question is Circle-the-Sage. The teacher asks a question in class, and then asks every student who can answer it to stand up. All the other students can now choose a classmate and listen to the explanation. Peer tutoring has proven to be very effective for both sides: high achievers, who are already familiar with content, get the chance to prove it and learn valuable communication skills at the same time. And teachers surely don't need to be told how much you can learn by teaching! Students who missed a concept get the chance to listen to another peer explaining. Communication includes not only speaking, reading and writing, but also listening. And it is exactly in practicing the latter that the next strategy focuses on. Timed-Pair-Share is perfect for students to interact and practice the language, so it can be used in every subject where the context is everything and it makes sure every student will talk and listen for the same amount of time. After having given a topic and some time to think about it, the teacher asks students to pair up and states how long they will share- one or two minutes are a good start. In pairs, partner A shares and partner B listens. To rapidly check if the person who is talking is the one supposed to, partners can hold a pen while sharing. At the end, partners B provide positive responses, like "I enjoyed listening to you because…" or "Your most interesting idea was…" and partner switch role The strategy Timed-Pair-Share makes shy and less talkative students speak up and force everyone to be listening for a specific amount of time. Through this activity, students improve speaking and listening skills equally and get to know their classmates better. Moreover: listening without the urge to respond helps listeners focusing on the speaker and listening only to understand, which is the definition of active listening. In second-language instruction Timed-Pair-Share can be used with any possible topic, depending on language proficiency, whether for subjects like history or literature it can be used to ask for opinions or personal interpretation.

A good way to involve some movement before starting a Timed-Pair-Share and to make sure students get to talk to everybody else in the classroom and not merely their neighbour is Agree-Disagree Line-ups. The teacher announces a statement, such as, "I feel my opinion matters in this class" "Taxes should be raised" etc. The strongest 'agree' student stands at one end of the line while the strongest 'disagree' stands at the other. The remaining students stand between, closer to one end or the other. Through Timed-Pair-Share, students listen carefully to those with a similar point of view (those standing next to them in the line) or the teachers folds the line so they listen to and understand a point of view different from their own. "Students are more open to feedback from a peer than feedback from the teacher". An effective cooperative learning strategy to implement peer tutoring in class is Rally Coach. In pairs, students take turns, one student solving problems while talking through their thinking aloud, while the other listens, coaches where necessary and provides positive feedback. Roles are then reversed to do another exercise. Rally Coach can be used to maximize interaction and feedback when doing exercises in class. Students learn how to work autonomously when solving the exercise, but also how to interact, give and receive feedback from a classmate. Simultaneous interaction is provided, since every student in the class is active at the same time- either in solving the problem or coaching.

Peer tutoring's downside is that it implies that some students are weaker than others and need therefore some help. Using Rally Coach, low-achievers get the help they need when doing the exercise. Chemistry is a branch of science which deals with the study of matter and the changes it undergoes. According to Aniodoh and Eze (2013), Chemistry is the study of composition, properties, uses and structure of matter. Eze (2012) described Chemistry as a branch of science which enables learners understand what happens around them; it affords its recipients the opportunity to explore their immediate environment. Chemistry plays a very important role in national development, yet there is evidence in literature that objective of teaching Chemistry in secondary schools is yet to be attained. This has been blamed on factors like abstract nature of Chemistry, volatility of Chemistry concepts, inappropriate and uninspiring techniques. Chemistry is made up of three branches inorganic Chemistry, organic Chemistry and physical Chemistry. Organic Chemistry is considered a difficult subject for secondary school students, being organic reactions are one of the most difficult topics in organic Chemistry. Organic Chemistry is the study of the structure, properties, composition, reactions and preparation of carbon – containing compounds. Most organic compounds

contain carbon and hydrogen, but they may also include any number of other elements example, nitrogen, oxygen, halogens, phosphorus, silicon, Sulphur. Organic chemistry is vital because it's the study of life and every one of the chemical reactions associated with life. Several careers apply an understanding of chemistry, like doctors, veterinarians, dentists, pharmacologists, chemical engineers and chemists. Organic Chemistry plays a neighborhood within the development of common household chemicals, foods, plastics, drugs and fuels. Most of the chemicals are part of lifestyle. In an age disrupted by corona virus diseases (COVID – 19), Chemistry educators are challenged to look for the most innovative methods of teaching Chemistry in order for their students to develop interest and achieve substantially as well as achieving the stated goals of Chemistry education. The use of cooperative learning strategy to teach Chemistry particularly organic Chemistry seem as a promising option to provide knowledge skills and also enhance students' interest as they work in collaboration during social distancing. Cooperative learning is theoretically based on the work of psychologists like Vygotsky, Piaget among others who propose that learners actively construct knowledge in a social context (Conway, 1997) Cooperative learning refers to the instructional strategies in which pairs of small group of learners work together to accomplish a shared goal (Ogbu 2008). The purpose of cooperation is for learners to maximize their own and each others' learning with members of the group all striving for joint benefit. Cooperative learning according to Adams (2013), employed many of the following characteristics and strategies in the classroom. Positive inter – independence face to face interactions. Individual accountability, social skills and group processing. Group work has served as a pedagogical tool in a variety of learning situations Ogbu (2008). Explains that group work is the act of working together with a group of people all trying to solve the same problem. This strategy is different from a situation where the teacher leads and dominates learning activities thereby having all decision made regarding purposes, content and participation in his/her hands. Cooperation learning offers learners skills for example, skills of critical thinking and interdependent behavior. The students experience joint workplace. The essential elements of cooperative learning are, positive interdependence, face to face promotive interaction, individual and group accountability, interpersonal and small group skills and processing. Cooperative learning interaction in chemistry classroom offers students the opportunity to develop interest in Chemistry as well as record positive achievement in the subject. Hence learning cooperatively by interaction between students enables them to not only work together in solving problems easily but also making wise decisions using both thoughts and teaching or

logic and intuition. Closely related to cooperative learning strategy of teaching is interest of students in chemistry learning. Interest is an important variable in the academic achievement of chemistry particularly organic chemistry because when an individual is interested in chemistry especially organic chemistry that individual becomes eager to learn it. Interest is a persisting inclination to be attentive and enjoy some activities in contents. Paul (2013) observes that interest can help learners think more deeply and remember more accurately. According to the author, interest has power to transform struggling performance in learners to a new academic achievement. In the teaching and learning of organic chemistry in secondary school, it is necessary to arose the interest of students so as enhance students' achievement in organic chemistry. Gender is a variable which plays an important role in the learning process. Chukwu (2012) sees gender as the behavioural culture and psychological characteristics associated with boys and girls which may influence their academic achievement. Ezeudu, Gertrude, Chiaha, Chioma, Anazor, Eze, Omeke (2015) concluded that, males performed better than females on a SWOT analysis of male and female students achievement in Chemistry.

The COVID 19 pandemic learning disruption has seriously affected interactive and hands – on experiences in laboratories. However, cooperative learning strategy is a panacea to teaching organic Chemistry in post COVID -19.

On the 21st March, 2020 plateau state government directed that pre – primary, primary, secondary schools and tertiary institutions in the state to close for the fear of the dreaded and deadly coronavirus. Government also directed that all forms of overseas trips to be hold till further notice, be it conferences, seminars, workshops and ceremonies. During the first wave of COVID – 19, the Government of Plateau state directed plateau citizens to continue to adhere strictly to safety measures and public enlightenment programmes were issued by the state ministry of health in order to curb the spread of the diseases.

Poor students' interest and achievement in Chemistry is alarming. Many researchers point out that organic Chemistry is difficult because it is a very demanding branch of Chemistry that requires a lot of thinking. In organic. Chemistry, students are tasked with learning a large number of reactions, nomenclature and molecular theory. Many students have never encountered organic chemistry before and become bogged down by the amount of information they must know because the scope of organic Chemistry to be covered is very wide. This frustrates the students as they try to study organic chemistry because they do not understand it, they avoid studying it and try to

skip the topic since it is always the last topic to be treated in senior secondary class three. Amaefula (2012) and Njokwu 2014 strongly believed that the instructional approach adopted by Chemistry teachers is to a large extent responsible for the observed consistent poor achievement and interest in Chemistry. The lecture teaching method lacks students' cooperation and interaction required for effective learning of organic Chemistry, adequate students' cooperation and interactions are required for effective learning of Chemistry concepts which are mainly difficult and abstract (Nwezi, 2015). Such cooperation and interactions are found in the cooperative learning strategies. This paper therefore investigated the effects of cooperative learning on students' interest in Alkanes in both public and private schools.

Method

The study employed the non – randomized control group, post – test quasi experimental design. A sample of 100 senior secondary two students from two public and two private senior secondary schools was drawn from the students' population of 183 using purposive sampling technique. The researchers developed an instrument known as Chemistry Interest Questionnaire (CIQ) and was used for data collection. The instrument was validated by three experts from the Department of Science and Technology Education, University of Jos. The instrument was trial tested using **Kuder Richardson (K – R_{20})** formula which yielded the coefficient of 0.93. The lesson plans (six for the cooperative learning strategy group and six for the lecture method were developed by the researchers on teaching the topic Alkanes in organic Chemistry. The treatment lasted six weeks during which data were also collected at various intervals using the questionnaire. The data collected were analysed using mean and standard deviation to answer three research questions while Analysis of Covariance (ANCOVA) was used to test the three hypotheses at 0.05 level of significance.

The study was guided by the following research questions:

1. What is the mean interest score of senior secondary two Chemistry students taught alkanes Using cooperative learning strategy and lecture method?

2. What is the mean interest score of senior secondary two male and female Chemistry students taught alkanes using cooperative learning strategy and lecture method?

3. What is the mean interest score of senior secondary two private and public Chemistry students taught alkanes using cooperative learning strategy and lecture method?

1. There is no significant difference between the mean interest score of private and public senior secondary two Chemistry students taught alkanes using cooperative learning strategy.
2. There is no significant difference between the mean interest score of senior secondary two male and female Chemistry students taught alkanes using cooperative learning strategy.
3. There is no significant difference between the mean interest score of senior secondary two private and public Chemistry students taught alkanes using cooperative learning strategy.

Table 1: Mean Interest Score and Standard Deviations of Students in Pre-Test and Post Test.

	Pre-test		**Post-test**			
Experiment control	**Mean score**	**Standard deviation**	**Mean Score**	**Standard deviation**	**Gain score**	**No. of subjects (N)**
Cooperative Learning	32.0310	8.2731	64.8644	10.0300	32.8344	90
Lecture Method	35.7856	10.8607	43.2587	9.8203	7.4731	93
Total						**183**

Table 1 shows that students taught using lecture method had the highest mean interest score of 35.7856 in the pre-test. The students taught using cooperative learning had the least mean interest score of 32.0310 in the pre-test. There was the highest deviation score from the mean interest score of 10.8607 in the lecture method group than that of the cooperative learning strategy with the deviation mean interest score of 8.2731. In the post-test, students taught using cooperative learning strategy had the highest mean interest score of 64.8644 with the standard deviation of 10.0300 and the gain mean score of 32.8334 while students taught using lecture method had the least mean score of 43.2587 with the standard deviation mean score of 9.8203 and the gain mean score of 7.4731.The high mean interest score for the cooperative learning is suggestive of the fact that the strategy was effective in developing student's interest in learning alkanes. This is because in the post-test, the gain mean interest score

for the cooperative learning was higher than that of the lecture teaching method as seen in table 1.

Table 2: Mean Interest and Standard Deviation Scores of Male and Female Students Taught Alkanes Using Cooperative Teaching Strategy.

Sex	No. of respondent	Pre-Test		Post- Test		
		Mean score	Standard Deviation	Mean Score	Standard Deviation	Mean Gain
Male	53	11.29	1.11	23.78	2.86	12.49
Female	37	11.22	1.09	22.92	1.81	11.71
Mean difference		0.07		0.86		0.79

Table 2 revealed that the mean difference of both sexes was 0.79. This difference though small is in favor of the male students. This implies that male students had slightly higher interest rate using cooperative learning strategy.

Table 3: Mean Interest Scores and Standard Deviation of Scores of Private and Public Chemistry Students in Pre-Tests and Post-Test Due to Treatment.

Treatment group	Type of school	Pre interest		Post interest		Gain mean score	No. of resp.
		Mean	Standard deviation	Mean	Standard deviation		
Cooperative Learning	Private	38.909	9.16368	65.255	10.7827	26.4	55
	Public	36.444	9.33117	63.422	10.7036	27.0	35
Lecture methods	Private	43.878	12.0755	52.082	9.31137	8.20	50
	Public	40.6818	13.61732	47.341	12.8442	6.66	43

Table 3 shows that for the pre-interest, the higher mean score was recorded by private school students taught using Lecture teaching method with mean score of 43.8776 than that of public school students taught using cooperative Learning with mean interest score of 38.9091. There was the higher standard deviation of scores from the mean interest score for private school students in the lecture method group than those students in private schools taught using cooperative Learning strategy. In the post interest, private school students taught using cooperative Learning had the higher mean score of 65.2545 than

those private school students taught using Lecture method with mean interest score of 52.0816. There was a higher standard deviation of scores from the mean interest score in the cooperative Learning group than that of Lecture teaching method. The gain mean scores of the private school students were 26.35 and 8.20 for the cooperative Learning and lecture method respectively. Thus after treatment, private schools students gained higher mean score in cooperative Learning group followed by those in Lecture teaching method group. In the pre-interest, public school students taught using Lecture teaching method had the higher mean score of 40.6818 than that of public school students taught using cooperative learning strategy score. In the post-interest, public school students taught using cooperative Learning had the higher mean score of 63.4222 than those public schools students taught using Lecture teaching method with the mean score of 47.3409. There was a higher standard deviation scores from the mean interest score in the cooperative Learning. The mean gain score of the public school students are 26.98 and 6.66 for the cooperative Learning group and Lecture teaching method group respectively. Therefore, after treatment, public students gained higher mean score in cooperative Learning than those in lecture method. Table 3 showed that cooperative Learning is the most effective strategy in developing private and public schools interest in learning alkanes.

Table 4: Post Interest Analysis of Covariance of Students Post Interest due to Treatment and Gender

	Type III sum of squares	**DF**	**Mean Square**	**F**	**Sg**
Corrected model	583.759	4	145.940	86.051	.000
Intercept	37.888	1	37.888	22.340	.000
Interest	1.235	1	1.235	0.728	.405
Treatment	289.918	1	289.918	170.945	.000
Sex	0.068	1	0.68	0.040	.844
Treatment X Gender	0.055	1	0.055	0.033	.859
Error	28.831	78			
Total	**5009.000**	**183**			
Corrected Total	**612.591**	**182**			

R squared = 953 (Adjusted R. Squared = 942 Data presented in table 4 shows that treatment as main factor had a significant effect on interest in alkanes. This was because the F-value of 170.945 in respect of the treatment group as main effect was shown to be significant at 0.005 levels. This therefore, implies

that cooperative learning strategy improved students' interest in alkanes significantly. This evidence further proved that instruction in cooperative learning strategy was effective in enhancing students' interest in alkanes.

Table 5: ANCOVA Tests for Mean Interest Scores of Male and Female Students Taught Alkanes using Cooperative Learning Strategy. Dependent Variable; Post -Test

Source	Type III sum of squares	D	Mean square	F	Significance
Corrected model					
Intercept	1920.120a	2	240.909	145.100	.000
Pre-test	1938.001	1	1938.001	220.005	.000
Gender	192.005	1	192.005	141.119	.000
Error	54.100	1	54.100	117.523	.101
	358.908	88	1.929		
Total	**49104.000**	**90**			
Cor. Total	**300.809**	**89**			

The difference in the mean interest score between male and female students taught alkanes using cooperative learning strategy is not significant. ANCOVA Test result on table 12 reveals that there is no significant difference between the mean interest scores between male and female students taught alkanes using cooperative learning strategy F (1.090) = 117.523, P(0.101>0.050). The null hypothesis is therefore not rejected. This means that cooperative learning strategy enhanced significantly both male and female students' interest in alkanes.

Table 6: Mean Interest Scores and Standard Deviation of Scores of Private and Public Chemistry Students in Pre-tests and Post-test due to Treatment.

Treatment group	Type of school	Pre interest		Post interest		Gain mean score	No. of resp.
		Mean	Standard deviation	Mean	Standard deviation		
Cooperative learning	Private	38.909	9.16368	65.255	10.7827	26.4	55
	Public	36.444	9.33117	63.422	10.7036	27.0	35
Conventional (lecture) method	Private	43.878	12.0755	52.082	9.31137	8.20	50
	Public	40.6818	13.61732	47.341	12.8442	6.66	43

From table 6, it can be observed that treatment by school types is not significant at P<0.05. The interaction is not significant at P<0.647. Therefore, it can be concluded that hypothesis six is accepted. This implies that the observed differences in the interest mean scores of private and public school students among treatment learning strategies are merely due to chance.

Discussion

The purpose of the study was to determine the effects of cooperative Learning strategy on interest of Chemistry students in Alkanes in Jos South, Plateau State. The findings are discussed based on the three research questions and three hypotheses. The finding showed that students taught Alkane using cooperative learning strategy had a higher interest than those taught using the lecture method. The finding also showed that the mean interest scores of those taught using cooperative learning strategy was significantly higher than those taught using lecture method. This finding corroborates the finding of Njoku (2016) who maintains that students' interest is significantly correlated with their academic achievement in school subjects; that teaching Chemistry concept using cooperative learning strategy enhances students' interest. Students taught alkanes using cooperative learning strategy developed more interest and hence had higher mean achievement scores than those taught using the lecture method. The findings on gender shows that there was no significant difference in the mean interest scores of male and female students taught Alkanes using cooperative learning strategy. The study revealed that cooperative learning strategy yielded a significant difference on students' interest in organic Chemistry (Alkanes) than lecture method. The implication is that the cooperative learning being a learner – centered strategy was applied to achieve goals of Chemistry education in the teaching of organic Chemistry (Alkanes). Interest in Chemistry is a positive first step in achievement. This agrees with Njoku (2012) who posits that this study has proved that the learner centeredness of cooperative learning can greatly improve the students' interest in teaching organic Chemistry (Alkanes) which in turn enhances students' achievement in Chemistry.

The lecture teaching method has been described as an uninteresting to the students and ineffective due to its teacher centeredness, lack of activity and overcrowded classroom, which may promote Covid – 19 transmissions for the students and teachers. Teachers' extensive dependence upon lecture method in teaching the difficult organic Chemistry concepts, does not enhance or arouse students' interest in learning.

This is in consonance with Ezeliora (2010) who maintains that students' poor achievement and lack of interest in Chemistry could be traced to the Chemistry teachers' excessive use of lecture method. Gender as a variable has no significant influence on students' interest and achievement in organic Chemistry concepts.

Conclusion

Based on the findings of the study, the researchers have concluded that the use of cooperative learning strategy enhances students' interest in Alkanes more than the lecture method. The implication is that the continued poor interest and achievement of students in Alkanes can be improved upon if Chemistry teachers use cooperative learning strategy more than the lecture method. There is no gender disparity in interest among Chemistry students when taught Alkane using cooperative learning strategy. This implies that cooperative learning strategy is more rewarding to students in terms of interest regardless of gender and could therefore help in narrowing the gender gap in interest in Chemistry generally.

Recommendations

From the findings of the study, the following recommendations are thus made:

1. Chemistry teachers should use cooperative learning strategy which provides students the opportunity to share ideas and carry out activities with real objects in their classroom settings to enhance their interest and academic achievement.

2. Ministry of Education should organize workshops and seminars to train in – service Chemistry teachers so as to create awareness on the use of cooperative learning strategy.

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