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Using Collaborative Instructional Approach to Improve Mathematics Achievement of Students with Openness to Experience Traits During Pandemic Era in Taraba State

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Abstract

This paper focuses on the Influence of Collaborative Instructional Approach on Mathematics Achievement of Students with Openness to Experience Traits during Pandemic Era in Taraba State. Qualitative Research Design was adopted whereby data were gathered through secondary sources. Findings revealed that during the Pandemic Era, students with Openness to Experience enjoyed learning when they were exposed to Collaborative Instructional Approach. It was recommended that teachers should be encouraged to group students based on student's personal traits to improve their achievement during the Pandemic Era in Taraba State.

Keywords: Collaborative, Instructional, Approach, Pandemic Era, Achievement and Openness to Experience Traits

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Introduction

Mathematics is believed to be taught across all schools in Nigeria. Iyekekpolor and Bernard (2022) recently reported that Mathematics offers students opportunities for creative work and moments of enlightenment and joy. The researchers hinted, when ideas are discovered and insights gained, students are spurred to pursue Mathematics beyond the classroom walls since practical approach is being used as teaching method. Significantly, Iyekekpolor and others, observed that many pupils perform very poorly in Mathematics due to one reason or the other. Accorded to those reasons might be the teacher's method of teaching, classroom environment, students' perception, parents' background, and even students' personal traits among others.

Despite the importance of Mathematics in the technological development of Nigeria, some teachers are yet to incorporate ways to cope with this menace. As a matter of fact, some of the needs of students is beyond that of the classroom. Thus, group work could support learning and advance students' achievement. Pertinent to these, collaborative instructional approach is a suitable instructional approach that is believed to improve Mathematics achievement of students. As Ritu (2015) observes, collaborative learning (instruction) is viewed as an individual philosophy, not just a classroom strategy. The researcher pointed that in all situations where people come together in groups, it is a way of dealing with people with respect to individual group members' abilities (traits) and contributions.

The outbreak of an infectious disease caused by the SARS-CoV-2 virus that emerged in December, 2019 caught the world by surprise. Really, teaching and learning during that period was also believed to be adamant. Conformably, Jibrin, Adam, Shuaibu and Dahir, (2021) viewed that the outbreak of corona virus necessitated public secondary schools in Nigeria to group students into various classes from morning to evening. This move could not be achieved without using appropriate teaching methods (like collaborative instructional approach) that will accommodate group learning in teaching financial accounting. Similarly, Mathematics that is more of engaging students to think critically could be achieved as well. Ideally, in the mutual respect aspect, collaboration skills were observed when students discussed with fellow members and presentations from other groups by listening to their ideas. Greenstein (2012) states that mutual respect is potentially carried out through group learning activities. Corona virus became trending global issue, ranging from social distancing among other protocols. To that extent, the education sector

was affected intensely by the pandemic. Many schools in Nigeria and Taraba State in particular adopted remote learning to improve students' learning. Murat and Bonacini, (2020) believe that remote learning is well below standard of what could have been expected from our developing countries during the outbreak of the disease. Due to acute shortage of power supply and ICT gadgets that would facilitate remote learning in Nigerian secondary educational sector, most schools have insufficiency for textbooks and reference books and physical facilities such as classrooms, desks and chairs which paved the way for poor academic achievement of the students in schools (Sephania, Jackson, & Kipng, 2017). Additionally, Jibrin and others array that covid-19 protocol and social distancing in Nigerian schools could not achieve much as a result of overcrowding of students in class which led to problems such as indiscipline, behavioral problems, health problems, and stress on teachers and increase in drop-out rate of students.

It is out of the wearisomeness faced by educators during the Pandemic Era, research shows that teaching and learning was affected that prompted the researchers to determine how collaborative learning approach can improve Mathematics Achievement of students with openness to experience trait in Taraba State during pandemic. Openness to experience trait refers to individuals who tend to be creative, imaginative and curious to experience new things amongst other things. Kerr and McKay, (2013) found that openness to experience is consistently associated with all measures of creativity. It might not directly cause creativity, but it serves as a catalyst for the expression and exploration of creative ideas and activities. However, all students are active in discussion activities. It indicates that students already have adequate knowledge to provide ideas and exchange ideas (Hilario, 2015). Relatively, collaborative instructional approach is capable of improving Mathematics Achievement of students with openness to experience traits. It is believed that individuals with high level of openness to experience are interested in new things, especially new knowledge and art. Prior to their ability, the pandemic era that forced shutdown of schools in Nigeria and abroad, the need to incorporate group learning to curb spreading of the diseases could have been the best options even advancing on students' achievement.

Researchers like Hira and Anderson (2021); Ilma, Al-Muhdar, Rohman and Saptasari, (2022) posited that during the COVID-19 pandemic, learning in schools no longer empowers collaboration instructional approach. The observation results are that during online learning, students only do the tasks that are in the students' worksheets. Learning that takes place does not take a meaningful learning process for students. It causes students

to feel bored and not know each other as classmates. According to the researchers, Communication is usually carried out in one direction, between teachers and students. Students' collaboration skills during learning have not become the focus of learning. As some of the students were learning at home while others remain stranded. 'Like a bull in Chinese Man Shop' which caused parents to need help to help students learn school work especially in Mathematics and led to poor achievement.

Pathetically, the fact that individual differences exist among students in the classroom, teachers and school administrators should take into consideration the traits of the students. That is why, the researchers in this paper chose openness to experience traits among the Big Five Personality traits developed by D.W. Fiske in 1949 to determine if collaborative instructional approach can improve Mathematics Achievement of students with openness to experience traits during Pandemic Era in Taraba State.

This research work attempts to empirically find answers to questions such as; How can collaborative instructional approach improve Mathematics Achievement of students with openness to experience traits during Pandemic Era in Taraba State? What is the present level of teachers' interest towards using Collaborative Instructional Approach in Taraba State?

Literature Review and Methodology

Researchers have sought and made contributions on the use of collaborative instructional approach which studies believe that group discussion as skills in used of collaborative approach is gainful when used among students with openness to experience traits in Mathematics classroom. Presently, the paper will review empirical studies on Collaborative Instructional Approach used by teachers in Nigeria particularly in Taraba State to confirm how it impact can improve Mathematics Achievement of Students with openness to Experience in Taraba State.

Jibrin, Adam, Shuaibu and Dahir, (2021) on their study Effect of Collaborative Learning Approach during Covid-19 Pandemic on Secondary School Students' Academic Achievement in Financial Accounting in Bauchi State, Nigeria. The study determined the effect of collaborative learning approaches on secondary school students' academic achievement in financial accounting in Bauchi State, Nigeria. The population in their study comprised of 725 students from 17 senior secondary schools in Bauchi State. A total of

109 SSII students were used for the experiment. The samples were selected using simple random sampling technique. The findings revealed that there was no significant difference between the pretest mean scores of students taught Financial Accounting using Collaborative learning approach and those taught using Conventional teaching method in Senior Secondary Schools in Bauchi State. It was also revealed that Collaborative learning approach is more effective on students' academic performance than Conventional teaching method. It was recommended that teachers teaching Financial Accounting at the Senior Secondary School in Bauchi State should adopt Collaborative learning approach in teaching the subject.

Kyado, Abah and Samba (2019) in a research study Effect of Collaborative Concept Mapping Instructional Strategy on Secondary School Students' Achievement in Difficult Biology Concepts. The purpose of the study was to identify the Biology concepts students perceived as difficult and to determine the effects of Collaborative Concept Mapping Instructional Strategy (CCMIS) on the mean achievement scores of students in the perceived difficult Biology concepts. The study adopted a non-randomised Pretest-Posttest Quasi-experimental design. The sample used in their research was 276 SS2 Biology students selected from six schools from the three education zones in Taraba State using a multi-stage sampling technique. Intact classes were assigned to the experimental and control groups. The findings revealed that students exposed to CCMIS attained significantly higher mean achievement scores in Biology Achievement Test than those exposed to Conventional Teaching Strategy ($F=60.73$, $p=0.00$). In addition, male and female students taught using CCMIS did not differ significantly in achievement ($F=0.35$, $p=0.56$). Based on these findings, the study recommended among others that biology teachers should use CCMIS to teach students in perceived difficult biology concepts.

Trisnaningsih and Mona-Adh (2020) undertook a study on the Effectiveness of Online Collaborative Learning during Covid-19 Pandemic. The purpose of this research is to explain the effectiveness of online learning in growing collaborative learning of the students during Covid-19 pandemic. Data collection in their report was through google form distributed to 57 subject teachers and the interview on the students who conduct online learning. The research results showed that eventhough the teacher can utilise online learning application well, they still encounter difficulty in building collaborative learning among the students whereas collaborative learning is a pivotal thing in building active learning activity on the students. It was recommended that coordination and support from

the government, parents, the school, even the teacher are necessary in creating online collaborative learning effectively. Also, that online learning encourages the emergence of social distancing behaviour and can minimise direct contact between the teacher and students.

Ariani and Valiantien (2022) undertook a study on Collaborative learning for enhancing students' academic achievement in online Grammar Class: an experimental study. The purpose of the study was to highlight the effectiveness of collaborative learning in improving students' academic achievement. Sixty (60) students participated in the study and findings revealed that the pretest and posttest mean scores were significantly different ($t(59) = -5.977$, $p < 0.05$).

Adamu, Nuhu, Menchak and Yubsih (2021) conducted a research on Perception of Psychosocial Factors of Classroom Environment and Academic Achievement in Mathematics among Students in Jalingo, Taraba State Nigeria: Implications for Counselling. The study examined the Relationship between Psychosocial Factors of Classroom Environment and Academic Achievement in Mathematics among Secondary School Students in Jalingo Education Zone of Taraba State Nigeria. The researchers formulated one research question and one hypothesis. A descriptive survey research design was adopted. The target population of 4,144 JSS II students from fifty (50) public secondary schools in the Jalingo Education Zone was used. A sample of 436 JSS II students was selected using a simple random sampling technique (hat and draw) without replacement. Two instruments were used to collect data: Mathematics classroom environment scale Questionnaire (MCESQ) and first-term Junior Secondary class two (JSS II) Mathematics Internal Examination Results of 2019/2020 academic session. Cronbach Alpha coefficient of the split-half method was used to ascertain the reliability of the instrument. ($r = 0.80$ and 0.86, $p < .001$). A two-tailed test and ANOVA were used to answer the research question and hypothesis, respectively. The result indicated there was a relationship between students' perception of the psychosocial classroom environment and academic achievement in Mathematics. Counselling implications is that psychosocial factors of the classroom environment of Mathematics class should be implemented in terms of high-quality teachers, friendly interaction in class and meaningful grading of learning materials.

Other Scholars, Martey and Aborakwa-Larbi (2016) investigated the effects of personality factors (extroversion, neuroticism, openness to experience, agreeableness, and conscientiousness) on academic performance among tertiary students. Academic performance had a relationship with personality trait of conscientiousness, agreeableness, and openness to experience, according to the data. However, extroversion and neuroticism showed no relationship. Another study by Gana, Oluwafeyisayomi, and Idowu (2020) investigated the impact of personality factors on secondary school students' English language proficiency. The study used a descriptive survey research design. To pick 300 respondents, simple random sample procedures was utilised. The study's findings demonstrated that students' performance was influenced by their openness to experiences and extraversion personality qualities. Neuroticism, agreeableness, and conscientiousness were not found to be predictors of students' success. Even Britwum, Amoah, Acheampong, Sefah, Djan, Jill and Aidoo (2022) studied on do Extraversion, Agreeableness, Openness to Experience, Conscientiousness and Neuroticism Relate to Students' Academic Achievement: The Approach of Structural Equation Model and Process Macro. The purpose of the study was to examine how personality trait relates to academic achievement of College of Education Students in Ghana. Descriptive cross-sectional survey design within the positivist paradigm was employed. A multi-stage sampling procedures was used. Their findings revealed that extraversion, agreeableness, conscientiousness and neuroticism were not predictors of academic achievement of the students. Openness to experience was the only predictor of students' academic achievement. It was recommended that school officials, educators, and parents should think about how vital it is to understand students' personality qualities.

Secondary method of data collection was used to collect existing data for this paper. Findings from other contributions within Taraba State and without were examined. This attempt was to find out if collaborative instructional approach can improve mathematics achievement of students with openness to experience traits During Pandemic Era in Taraba State. The choice of using this method was geared towards assessing some weaknesses faced by teachers in Taraba and how the use of collaborative instructional approach can improve students with openness to experience trait during pandemic era. This attempt was prompted after the believe by other scholars that individual traits exist and students learn differently in pace. Through discussions with some selected teachers in the State, influenced the researchers to use qualitative studies for this paper. All opinions,

observations, points jotted as suggestions, online group discussion and comments including recommendations by others, the researchers regarded them as information to produce liable recommendations.

Discussion

In light of the above reviewed of literatures and findings made by other researchers, this paper made the following contributions:

Few researches have so far been made in examining students with specific personality traits in Mathematics. Studies so far contributed in Taraba State are the work of Kyado, Abah and Samba (2019) who believes that students exposed to CCMIS attained significantly higher mean achievement scores in Biology Achievement Test than those exposed to Conventional Teaching Strategy ($F=60.73$, $p=0.00$); Adamu, Nuhu, Menchak and Yubsih (2021) who found there was a relationship between students' perception of the psychosocial classroom environment and academic achievement in Mathematics. These reports connote findings by Ritu (2015) who observes that collaborative learning (instruction) is viewed as an individual philosophy, not just a classroom strategy. It simply means that with different traits in the classroom, the individual philosophy as stated and students' perception are believed to be what build up a student with openness to experience. However, the likely situations to what condition of the classroom might be, as attested by Greenstein (2012) who posited that mutual respect is potentially carried out through group learning activities (e.g. Collaborative instructional approach). Similarly, Trisnaningsih and Mona-Adh (2020) added, even though the teacher can utilize online learning application well, they still encounter difficulty in building collaborative learning among the students whereas collaborative learning is a pivotal thing in building active learning activity on the students. Addressing this finding, if collaborative instruction is required, it can be that during pandemic era with its protocol and guidelines given to schools; use of remote learning requires grouping to allow students associate and relate with one another. Britwum, *et. al,* (2022) found out that Openness to experience was the only predictor of students' academic achievement. In this regard, findings revealed that during the pandemic era, students with openness to experience enjoyed learning when they were grouped.

Conclusion

Based on the review of literature and the findings made so far in this paper, it is concluded that using collaborative instructional approach can improve Mathematics Achievement of students with openness to experience traits in Jalingo Education Zone, Taraba State, Nigeria. The idea and use of collaborative instructional approach is still reporting low, looking at how requisite it has been even in the period of the Pandemic. It is believed that incorporating collaborative instructional approach can help solve challenges of maintaining Pandemic protocol in the classroom and students with openness to experience traits could benefit a grouped classroom where ideas can be shared among themselves.

Recommendations

It is recommended in this paper that:

1. Government should introduce training programmes for teachers across secondary schools in the state to learn various teaching methods especially collaborative instructional approach to improve Mathematics Achievement of individuals with different traits.
2. Teachers should be encouraged to group students based on students' personality traits to improve their achievement during Pandemic Era in Taraba State.
3. There is need to restructure our Secondary Education so that students can learn, associate and corporate with one another to improve students with openness to experience trait in the State.

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