Research Article

COVID-19'S SOCIAL RESPONSIBILITY AND SS-3 STUDENTS' ATTITUDE TOWARDS MATHEMATICS AND PHYSICS IN CALABAR METROPOLIS OF CROSS RIVER STATE, NIGERIA

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ABSTRACT

This study was conducted to establish the relationship between COVID-19's social responsibility and Senior Secondary School 3 (SS-3) students' attitude towards Mathematics and Physics in Calabar Metropolis of Cross River State, Nigeria. Two hypotheses were formulated to direct the study. Correlation survey research design was adopted for the study. A total sampleof1,100 SS-3 students out of 9,756 students was selected from 24 public secondary schools for the study using stratified and proportionate simple random sampling procedures. One instrument was used; namely: Questionnaire titled "COVID-19's Social Responsibility and SS-3 Students' Attitude towards Mathematics and Physics" was used for data collection. The reliability estimate of the questionnaire was established through Cronbach Alpha reliability estimate method which ranges from .70 and .74. These estimates having met the criterion for reliability thus warranted the use of the instrument for the study. Pearson Product Moment Correlation Coefficient was the statistical technique adopted to test the hypotheses at .05 level of significance. The result of the analysis revealed that, hand washing practices, social distancing significantly relate with students' attitude towards Mathematics and Physics in Cross River State. Based on these findings, it was recommended that social responsibility should be encouraged and enforced to spur students to develop positive attitude towards Mathematics and Physics.

Keywords: COVID -19, Mathematics, Physics, Social Responsibility, Students' Attitude.

INTRODUCTION

The COVID-19 pandemic has affected educational systems worldwide, leading to the near-total closures of schools, universities and colleges. Most governments around the world have temporarily closed educational institutions in an attempt to reduce the spread of the pandemic. Here in Africa and by extension Nigeria, Covid-19 infections have been registered across the thirty six (36) states of the country including Abuja, the Federal Capital Territory (FCT). As at the time of this report, more than fifty thousand (50,000) cases have been reported; while more than thirty thousand (30,000) have made recoveries and almost a thousand (1000) deaths recorded (NCDC, 2020). Following the Covid-19 pandemic, lockdowns were introduced across nations including Nigeria and these lockdowns have drastically and negatively affected the educational institutions across countries drastically (World Health Organization, 2020). Corona virus pandemic has triggered a significant change, imposing many challenges in the primary school, secondary school, higher education community, globally. This crisis can be looked upon as an opportunity to reconstruct our longstanding educational systems and establish better and updated practices in academia, suitable for the present generation of learners. The broad goals of secondary education as captured in the National Policy on Education is the preparation for higher education, and specifically; to equip the learner to live effectively in the modern age of science and technology. It is clear that the knowledge of Mathematics and Physics is very necessary for the attainment of these goals (Federal Republic of Nigeria, 2014). Mathematics, being a bed-rock provides the spring board for the growth of Physics. It is also the gate-way and the key to science. The importance and contributions of Mathematics and Physics to the modern culture of science and technology cannot easily be ascertained. It can be said that without Mathematics and Physics there is no science; and without science, there is no modern technology; and without modern technology there is no modern society.

In spite of the importance attached to Mathematics and Physics, It has been observed that the goals is yet to achieved; and would be less attainable because of the outbreak of COVID-19. The outbreak of Corona virus negatively affected educational activities worldwide, leading to the widespread closure of schools (World Health Organization, 2020). It has created serious disruptions in academic activities, as well as in career plans. Most of the students may develop negative attitudes towards their subjects of study, as a result. The degree and direction of attitude towards Mathematics and Physics are largely determined by the kind of interest developed by students for it. Generally, attitudes are fundamental to the dynamic change of behaviors. Most students never learn to practice how to solve some Mathematics and Physics problems on their own, but rather they prefer to practice and learn other subjects even though Mathematics and Physics are made compulsory science subjects. Learning Mathematics and Physics does not only involve thinking and reasoning, it is dependent on the attitudes of the learners towards learning (Anthony and Walshaw, 2007; Grootenboer, Lomas, and Ingram, 2008; Kele and Sharma, 2014). Han and Carpenter (2014) state that attitudes consist of cognitive, affective and behavioral reactions that individuals display towards an object or the surroundings, based on their feelings or interest. The cognitive component of attitude is what the individual thinks or believes about Mathematics and Physics (Akinsola and Olowojaiye, 2008; Maio and Haddock, 2009; Mensah, Okyere, and Kuranchie, 2013). The affective component of attitude is the feeling or emotions of the individual associated with learning Mathematics (Ingram, 2015). Thus, the affective component is the source of driving the engagement of students towards Mathematics and Physics. Furthermore, the affective aspect is also influenced by the belief formed from the cognitive component of attitude, which creates a mindset that becomes constant over time and influences the feelings of the students towards learning Mathematics (Ingram, 2015; Zan and Di Martino, 2007). As such, the cognitive and affective components of attitude are interrelated and deeply interact with each other (Di Martino and Zan, 2011). The behavioral aspect of attitude is the tendency to respond in a certain way towards learning Mathematics

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and Physics (Akinsola and Olowojaiye, 2008; Maio and Haddock, 2009; Mensah et al., 2013). Behavioral attitude is also influenced by affective attitude. Students feeling confident in doing Mathematics, is linked with being successful in Mathematics and Physics; which is regarded as a positive behavior. If students are not confident in doing Mathematics and Physics, they may not experience success, and unsuccessful behavior is regarded as negative feelings (Zan and Di Martino, 2007). Hence the behavioral component of attitude impacts on the cognitive component of attitude as well. When students see the importance of Mathematics and Physicsin real lives, they feel engaged, confident and connected to their learning (Attard, 2012). As such, the three components of attitude, confidence, importance of Mathematics and engagement are interrelated (Mensah et al., 2013).

On enquiry it was disclosed that students lose interest in the subjects because they experience difficulties. These difficulties come as a result of the language used in teaching, the calculations involved, the symbols associated with it; along with COVID-19 social responsibility and fear of been affected by COVID-19. The disruption caused by COVID-19 in the educational sector may last longer than expected if a more reliable solution for corona virus is not found on time, and the spread of the disease continues. There are no doubts, unplanned school closures can cause severe problems for students, educators, parents and the society at large. It could negatively affect the academic interest and performance of students. If the students are not engaged productively, it could lead to idleness which might result in youth involvement in crimes, loss of interest in learning, and poor academic performance. Corona virus school closures could increase student debt, extend the graduation time of students, and shatter the academic dreams of students, as well as programme schedules of educational institutions. Protracted school closures may result to increased rate of dropouts due to loss of interest and lack of resources to continue. If not well managed, school closures can also increase the rate of crime, because prolonged school closures can lead to idleness which contributes to negative peer influences and youth involvement in crimes.

In Nigeria, secondary school students resumed for studies in schools from the 4th of August, 2020 for exit classes only. Students were given two weeks within which to prepare for the West African School Certificate Examinations (WASCE) which started on the 17th of August, 2020; after the unanimous decisions reached at a virtual consultative meeting between the Federal Ministry of Education, Honorable Commissioners of Education of the 36 states, the Nigeria Union of Teachers (NUT), the proprietors of private schools, and Chief Executives of examination bodies. The meeting also resolved that a passionate appeal be made to the Federal Government through the Presidential Task Force on Covid-19 and public spirited Nigerians, for assistance to schools across the country to enable them fast track the preparations for safe reopening, as agreed. The guidelines were drafted in close coordination with health, environmental, education, and school safety experts who were tasked with the responsibility of charting a pathway for safely reopening our schools and learning facilities for quality teaching and learning.

The Guidelines for Schools and Learning Facilities Reopening after COVID-19 Pandemic Closures out lined key strategies for implementing safe, efficient and equitable plans for school reopening and operation. The document focused on attendance, social distancing, hygiene, cleaning, and non-pharmaceutical interventions for safe and healthy school activities and programs. Fortunately, we have observed that many students not only have resisted unethical practices during this crisis, but also have proactively engaged in various COVID-19 guideline activities, particularly those that could offer immediate help and assistance to the fight against the virus.

Educational interventions to promote hand washing in school settings aim to improve knowledge and awareness about healthy hand hygiene to reduce the spread of pandemics and have been associated with reduced absenteeism and gastrointestinal infections, and increased compliance with hand washing (Brummet, 2014). An individual, or agent, may be more likely to wash their hands when they understand why and how to do it.

Learning, hygiene and health are strongly inter-linked as children miss school or perform poorly when they are suffering from diseases related to poor hand washing. Hand washing or good hygiene practices help ensure children are healthy, so they can attend class and learn. Globally, children miss a cumulative 272 million school days each year due to diarrhea, and spread of diseases. Hand washing with soap has been found to help reduce school absenteeism that is caused by diarrhea, influenza, infective diseases and conjunctivitis by up to 50%. The use of hand sanitizers was found to reduce COVID-19, rhino rhea, a common symptom of the flu and cold-like illnesses which could have affect students' attitude to learning negatively (Hutton and Haller, 2004: Pickering, Davis, Blum, Scalmanini, Oyier, Okoth, Breiman, and Ram, 2013).

Azuogu, Ilo , Nwimo, Azuogu,and Onwunaka (2016), examined the extent of hand washing practice among secondary school students in Ebonyi State, Nigeria. The sample comprised 420 male and female students in both junior and senior classes selected through a multi-sampling method from government schools, located in both urban and rural areas of Ebonyi State. The instrument for data collection was a 3-point scaled, 18-item self-structured questionnaire eliciting responses on extent of hand washing with soap and running water in 15 situations requiring hand washing. The extent of hand washing was found to be low among secondary school students with a mean score of 1.31 to concretize learning.

High incidence of COVID-19 has been noted among secondary school students in Nigeria. The place of contaminated hands in the transmission of these diseases especially living quarters with close proximity, like schools, has been observed. These diseases can be prevented, if students wash their hands with running water and soap or sanitizer.

Social distancing is one of the measures of hygiene which have proven to be effective reactions to the threat of increasing numbers of COVID-19 cases and fatalities. In every day practice, we are used to balanced and shared decision-making based on national or international guidelines on an individual level, together with our patients and their families and caregivers. According to Uscher-Pines, Schwartz, Ahmed, Zheteyeva, Meza, Baker, Uzicanin (2018) the aim of "social distancing" is important. to protect the health of our society. Political decision makers have to keep in mind that it does not come without side effects; and that the children, adolescents and their families bear a major burden of these measures. Instead of "social distancing", measures that enable "physical distancing" with maintained "social connectedness" should be aimed. Effective alternatives for school closures may be "physical distancing" measures such as to keep students in classrooms and to decrease the number of students per class and to increase space between students, In response to school closures, UNESCO (2020) recommended the use of distance learning programmes, social distancing and open educational applications and platforms that schools and teachers can use to reach learners remotely and limit the disruption of education.

According to Michael (2020).Closing schools are not the only option to mitigate corona virus. He advocated for authorities to give parents

some flexibility to choose what is best for their families, while implementing stronger mitigation measures. However, the president of the New South Wales Teachers Federation opposed the opening of schools during the outbreak of corona virus. He believed that "the design of their schools and the size of the classrooms makes it impossible" to implement social distancing in schools.

Another Nigerian study by Owoeye and Yara (2011) which analyzed the results of 50 schools in the West African School Certificate Examination on the other hand, found no statistically significant difference between the performance of students in large classes and small classes. Therefore, social distancing resulted to small class size which significant influenced students' attitude to learning. As shown by these two studies by Adimonyemma et al. (2018) and Pawlowska et al. (2014). Large class sizes have been shown to have negative effect of interpersonal relationships among students and teachers. It is likely that better interpersonal relationships among students in smaller class sizes contributed to the better performance observed among these students, compared to their counterparts in larger classes. Frenzel, et al, (2007) in their finding acknowledging that learning environment, which includes class size, as result of social distancing has great influence on students' academic achievement in Mathematics. Michael (2020) reported that dozens of independent schools in Australia were shut down at New South Wales, while some moved to online classes. Students learn from home, while some schools were opened but implemented strong measures to ensure social distancing strategy. The opening of schools amidst the corona virus pandemic was backed by the Australian governments to enhance teaching and learning.

RESEARCH QUESTIONS AND HYPOTHESES

Research Questions

The following research questions were raised to guide the study:

- How does hand washing practice relate to students' attitude towards Mathematics and Physics?
- To what extent does social distancing relate to students attitude towards Mathematics and Physics?

Hypotheses

Based on the specific objective and research question raised, the following null hypotheses were put forth to guide the study:

Ho1. Hand washing practice does not significantly relate to students' attitude towards Mathematics and Physics
Ho2. Social distancing does not significantly relate to students attitude towards Mathematics and Physics.

METHODS

Research Design, Population and Sample

The study area was Calabar Metropolis of Cross River State which comprises of Calabar South and Calabar Municipality Local Government Areas (LGAs). The research design used for this study was the correlation survey design. The population for the study consisted of all SS-3 students in 24 public secondary schools in two LGAs. There are sixty-nine public mixed secondary schools with nine thousand, seven hundred and fifty six (9,756) SS-3 students in Cross River State. A multi-stage sampling technique involving stratified and simple random techniques were adopted in selecting 1100 students in the study area. The schools were stratified based on gender and local

government area. Out of a total of 24 public secondary schools, 15 (62.5%) of schools were randomly selected for the study; from the selected schools in each local government, 62.5% of the total number of students were selected using proportional sampling technique giving a total sample of 1,100 students for the study.

Data Source and Analysis

One instrument was used: A questionnaire titled "COVID 19's Social Responsibility and Students' Academic Achievement in Mathematics and Physics". The questionnaire consisted of two sections, A and B. Section A described the bio data of the respondents, which include gender while section B was developed on the main variable such as hand washing practices, social distancing and attitude to Mathematics and Physics. The questionnaire was based on four point scale used in measuring responding opinion level of agreement or disagreement such as Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD). The instrument was face-validated by two experts in measurement and evaluation. Corrections were pointed out by the experts and adjusted by the researchers and the document was considered valid. The reliability estimate of the questionnaire was established through Cronbach Alpha reliability estimate method which ranges from .70and .74. These estimates having met the criterion for reliability, thus warranted the use of the instrument for the study. The statistics package for social sciences (SPSS) computer programme was used to analyze the data collected. The data for the hypotheses were analyzed using Pearson Product Moment Correlation Coefficient for the hypothesis two.

RESULTS AND DISCUSSION

The result of the analysis is presented in the table 1 & 2. The hypotheses were tested at .05 significance level.

Result for Ho1

Hypothesis one: Hand washing practices do not significantly relate to students' attitude towards Mathematics and Physics. The independent variable in this hypothesis is Hand washing practices while the dependent variable is students' attitude towards Mathematics and Physics. Pearson Product Moment Correlation Coefficient statistical tool was used in testing this hypothesis. The result of the analysis is presented in Table 1

Table 1. Pearson Product Moment Correlation Analysis of the relationship between Hand washing practices and students' attitude toward Mathematics and Physics (N=1100)

Variables	$\sum x$ $\sum y$	$\sum x^2$ $\sum y^2$	$\sum xy$	r-cal r-value
Hand washing	10,256	176,267		
			163,186	.662* .000
Students' attitude toward Mathematics and Physics	13,516	205,162		

* Significant at .05, critical r=.139, df = 1098

The result of the analysis as presented in Table 1 reveals that the calculated r-value of .662 is significant at .05 level of significance, with 1098 degree of freedom. With this result, the null hypothesis which stated that hand washing practices do not significantly relate to students' attitude towards Mathematics and Physics was rejected. This result implies that, hand washing practices has a significant relationship with students' attitude towards Mathematics and Physics. The positive r implies that the more they practice hand washing, the more they developed positive attitude towards Mathematics and Physics. On the other hand, the lesser their hand washing practice,

the more they developed negative attitude towards Mathematics and Physics, tend to be.

Result for Ho2:

Hypothesis two: Social distancing does not significantly relate to students' attitude towards Mathematics and Physics. The independent variable in this hypothesis is social distancing while the dependent variable is students' attitude towards Mathematics and Physics. Pearson Product Moment Correlation Coefficient tool was used in testing this hypothesis. The result of the analysis is presented in Table 2 below.

Table 2. Pearson Product Moment Correlation Analysis of the relationship between social distancing and students' attitude toward Mathematics and Physics (N=1100)

Variables	$\sum x$ $\sum y$	$\sum x^2$ $\sum y^2$	$\sum xy$	r-calr-value
Social distancing	11,062	182,153		
			163,667	.527*.000
Students' attitude towards Mathematics and Physics	13,516	205,162		

* Significant at .05, critical r=.139, df = 1098

The result of the analysis as presented in Table 1 reveals that the calculated r-value of .527 is significant at .05 level of significance with 1098 degree of freedom. With this result, the null hypothesis which stated that social distancing does not significantly relate to students' attitude towards Mathematics and Physics was rejected. This result implies that, social distancing has a significant relationship with students' attitude towards Mathematics and Physics. The positive r implies that the more social distancing there is in schools, and classrooms, the more positive their attitude towards Mathematics and Physics tend to be. On the other hand, the lesser their social distancing, the more students' negative attitude towards Mathematics and Physics tend to be.

DISCUSSION AND CONCLUSION

The result of the first hypothesis reveals that hand washing practice significantly relates to students' attitude towards Mathematics and Physics. According to Brummet (2014) educational interventions to promote hand washing in school settings, aim to improve knowledge and awareness about healthy hand hygiene to reduce the spread of pandemics and have been associated with reduced absenteeism and gastrointestinal infections, and increased compliance with hand washing. The finding is in line with that of Hutton and Haller, (2004) and Pickering, Davis, Blum, Scalmanini, Oyier, Okoth, Breiman, and Ram, (2013) who found hand washing with soap to help reduce school absenteeism that is caused by diarrhea, influenza, infective diseases and conjunctivitis by up to 50%. The use of hand sanitizers was also found to reduce COVID-19, rhino rhea, a common symptom of the flu and cold-like illnesses which could have affect students' attitude to learning negatively.

The result of the second hypothesis revealed that social distancing significantly relate to students attitude toward Mathematics and Physics. According to Uscher-Pines, Schwartz, Ahmed, Zheteyeva, Meza, Baker, Uzicanin (2018) the aim for "social distancing" are important to protect the health of our society; political decision makers have to keep in mind that it does not come without side effects and that children, adolescents and their families bear a major burden of these measures. In response to school closures, UNESCO (2020) recommended the use of distance learning programmes, social distancing and open educational applications and platforms that schools and teachers can use to reach learners remotely and limit the disruption of education. As shown by these two studies by Adimonyemma et al. (2018) and Pawlowska et al. (2014), large class sizes have been shown to have a negative effect of interpersonal relationships among students and teachers. It is likely that better interpersonal relationships among students in smaller class sizes contributed to the better performance observed among these students, compared to their counterparts in larger classes. Frenzel, et al, (2007) in their finding acknowledging that learning environment, which includes class size as result of social distancing, has great influence on students' academic achievement in the Mathematics classroom. In Australia, Michael (2020) reported that dozens of independent schools were shutdown at New South Wales while some moved to online classes. Students learn from home, while some schools were opened but implemented strong measures to ensure social distancing strategy. The opening of schools amidst the corona virus pandemic was backed by the Australian government

CONCLUSION AND RECOMMENDATIONS

The COVID-19 pandemic and its disruptions have created an opportunity for the restructuring of the optometry educational system. The Guidelines for Schools and Learning Facilities Reopening after COVID-19 Pandemic Closures out-line key strategies for implementing safe, efficient and equitable plans for school reopening and operation. Based on the finding of this study, it could be concluded that COVID 19's social responsibility become very necessary and essential because it declines or promotes students' attitude toward Mathematics and Physics. Therefore, COVID 19's social distancing and hand washing practice are very important factors that should be considered in schools aid students' attitude toward Mathematics and Physics. On the basis of findings of the study the following recommendations were made:

- Hand washing equipment/practice should be provided and encouraged by government, parents, private firms in schools, to aid in development of positive attitude towards Mathematics and Physics. This will go a long way to enhance students' academic performance and motivate them to learn.

- Social distancing should be encouraged and enforced in schools to reduce the spread of COVID-19 and spur students' to develop positive attitude towards Mathematics and Physics.

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