MATHEMATICAL THINKING PROCESSES AND PEER TUTORING

INVESTIGATING THE IMPACT OF CLASSROOM ATTENDANCE AND CONCENTRATION AT LECTURE ON THE ACADEMIC ACHIEVEMENT OF STUDENTS IN ALGEBRA IN FEDERAL COLLEGE OF EDUCATION (SPECIAL), OYO

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Abstract
A nation cannot rise above the level of its education, no doubt. The level of teaching and learning that take place in the four walls of the nation's educational institution is evident in the academic achievement of students for which the various programmes were designed and approved. For the last two decades, the determinant of students' academic performance had been an ongoing and an open ended research. Now that e-learning is thriving in the global world of technology, empirical studies to ascertain whether or not students' attendance is proportional to their success in Mathematics are few and inconclusive. This study investigates through two surveys of Attendance and Questionnaire, the impact of students' attendance and concentration at lectures in Mathematics class in Federal College of Education (Special), Oyo with the entire 100 level, Mathematics students as the target population and sample. MAT 111 titled "Algebra" which is central and pivotal to the Mathematics NCE programmes was used for the study through attendance taken at lectures coupled with a Researcher's structured questionnaire, validated by experts in the field of Mathematics Education to elicit responses from the sample. One main hypothesis was formulated and tested at 0.05 significant level. Findings revealed that students' attendance and concentration in Mathematics classroom are directly and significantly related to their academic achievement in Mathematics ($p<0.05$, $t_{cal}=4.95 > 2.04=t_{tab}$). It was recommended among others that the department of Mathematics, Management of Colleges of Education and similar institutions should always highlight the importance of attendance and concentration at lectures to students during orientation or induction for new intakes.

Keywords: *Students' achievement, classroom attendance, concentration.*

Background
Among the essential programmes for human resources development is the educational processes which cover students of each community. To improve the quality of education in tertiary educational level is thus not a new phenomenon as this explains the rationale for which educational planners often design strategies for improving the functionality of tertiary education. A long list of factors comes to play in determining the academic achievement of students at the tertiary education levels. While some are students' related, others have to do with the teachers or the environment (Meenu, 2016 & Chazen, 2020). Studies show that better attendance is related to higher academic achievement for students of all backgrounds, but particularly for children with lower socio-economic status (Epstein & Sheldon and Ready in Komakech; 2015). They

further found out that students who attend school regularly score higher in tests than their peers who are frequently absent.

Lochmiller (2013) asserted that, given the consequences of chronic absenteeism and its prevalence in schools, researchers form education, counseling and health fields were able to identify factors that predict students' absenteeism as well as estimate the cost of missing school for students both short and long term; and have suggested that individual, family, and school characteristics can influence school attendance. Some researchers posited that attending classes not only allow students to obtain information that is not contained in the textbooks or lecture materials presented on-line but also allow students varied contact with materials (lectures, review of notes, demonstrations and so on (Crede, Roch & Kieszczynka, 2010).

To a layman, students' attendance at lectures and their level of concentration while in the class are believed to play a role in determining the success or otherwise of students particularly in a Mathematics classroom setting. When thinking about the academic performance, the most important variables that come to the mind are college atmosphere, instructor's behaviour, teaching techniques, timing, students who are working, friends and class attendance (Jameel & Hamdan, 2015 and Fadare & Ayeni, 2014). Research into these factors which started over a decade ago had been ongoing and inconclusive as there have been few empirical studies on the correlation between students' attendance and concentration and students' academic achievement particularly in the field of Mathematics. This study focuses its attention on the influence of students' attendance and concentration at lectures on their academic performance in Mathematics.

Fadare (2021) is of the opinion that if attendance has no effect on how far a student can go in the understanding of the subject matter in a Mathematics course, many of the students would always find one excuse or the other for absconding lectures just like some other courses which can easily be picked up, read and understood. Moreover, if concentration has no effect on the level of assimilation in a Mathematics class, there wouldn't have been the need for students struggling for the front row seat in the Mathematics lecture room. Some people may wonder what students think when they miss their lectures. Most students are less likely to attend when they do not expect to learn; others believe that they have already understood the subject matter well and do not need to attend since the course materials pose no new challenge to them Ayodele (2007); some see teachers as not aligning the subject material that is taught in the class with what appears in tests and assignments and feel attending the class is a waste of their time, some students are attracted to attend and concentrate in class when the teacher transfers a boring course to an interesting course (Tom & Lori; 2006)

Attendance is an official list of people who are present at an event, institution such as church, mosque, football field, hospital and school and so on. It is the concept of people individually or as a group appearing at a location for a previously scheduled event. Hence classroom attendance at lecture which is the exact opposite of being absent in class according to online Collins Dictionary (2010) is a measure of the number of children who attend school and the amount of time they are present. According to aatozz (2018), regular school attendance is crucial to the development of children. It has a large impact on the student, the school and the community. By implication, when a student attends school, he learns to read and acquire basic Mathematics skills early enough and practicing these new skills daily promotes new learning. Also, a child that is punctual at school begins to learn how to socialize with others, follow directions and solve

problems creatively; some of these social skills cannot be practiced outside the school or classroom,

On the other way round, a child that does not attend school regularly and punctually lags behind in his class work and requires extra time and attention from the teacher to catch up and usually, this draws the teacher back and away from attending to the other students who may also need assistance. A study conducted by the United State Department of Education as reported by DeMary (2002) and Umpleby, G. (2014) showed that high school drop-outs are two and a half times more likely to be on welfare program than high school graduates. They are almost twice as likely to be unemployed than their regular attendee at school and classes The report further has it that students who are not in the class are more likely to commit crime costing the community time and money. Thus students learn to become good citizens through lessons at schools and mentoring by adults. In the educational setting, measuring attendance has a significant concern whose information can be used to gauge the effectiveness of the efforts expended in the teaching and learning situation and for future decision making. Among the critical factors affecting students' attendance at lectures are: the importance of attendance and absenteeism for the teacher, the attractiveness of content, the ability to take notes in class, the correlation of materials with the individual student's major interest, the creation of sense of curiosity in the early lectures, feedback class content, illness, peer influence and social life of students.

Ayodele (2007) conducted similar study and found out that class attendance has a significant positive correlation with examination scores in an Organic Chemistry examination. Some experts also believe that the presence of students in the classroom should be supervised, encouraged or even enforced. Rahiminia, Yazdani & Rahiminia; 2019). In the Mathematics classroom, there are some concepts wherein an absentee may find it difficult to unravel even after consulting texts and classmates. The singular act of being physically present when and where the Mathematics teacher was explaining the concepts could have done the magic of saving him the fruitless efforts being expended. This brings to mind the popular proverb of Xun Kuang (312-230BC), a Chinese Confucian philosopher, whose works were collected into a set of 32 books called the Xunzi during the Western Zhou Dynasty. The proverb as posted by Bennett in 2007 goes thus:

"What I hear, I forget
What I see, I remember and
What I do I understand"

The ancient Chinese author, Confucius was simply expressing his belief in the importance of learning from practical experience and that acquisition of knowledge and understanding are related to direct living and experiences. In most of the tertiary institutions in Nigeria, the requirement of regular attendance means that a student must have been punctual for at least 75 % in the classroom lectures to be qualified for writing the final examination. In some educational settings, attendance forms a percentage of the continuous assessment. Later, the Chinese Confucius proverb was modified by the U.S. Statesman Benjamin Franklin (1705-1790) and first translated by Dubs (1928) and reprinted in 1977 to become:

"Tell me and I forget
Teach me that I may remember and
Involve me and I will learn"

And further explained by Edgar Dale (1957), an American educator through his "Cone of Learning to become:

"I hear and I forget until I listen
I see and I forget until I watch
I do and I forget until I concentrate"

From the foregoing, one can infer that being in the classroom is a necessary condition while adequate concentration on or paying the needed attention to what is being taught is the sufficient condition for a proper learning of Mathematics concepts for that matter. Thus a combination of both classroom attendance and concentration has impact on the understanding of mathematical concepts and the overall achievement of students in Mathematics. What then is concentration? Simply put, it is the action or power of focusing all one's attention on something. The vocabulary online dictionary defines it as an act of giving all of one's attention to something at hand. The word concentration is relative and nobody can claim that he is completely distracted or always concentrating but it can be improved upon or strengthened by changing some of the existing factors in the teaching and learning situations.

Some of these factors include but not limited to: students' active participation due to positive interaction with their teachers, motivation by teachers, teachers' method and technique of teaching, presence or absence of noise pollution, teachers' knowledge of subject matter, students' class participation, oral communication between teacher and students (Van Waleek, 2004 & Fritschner, 2004). However, studies conducted by Servatyari *et al* (2019) and Haresabadi *et al* (2016) showed that multiple and effective strategies can be used by planners and teachers to increase students' concentration while in class.

Attendance Thresholds

In general, Mathematics department just like other departments in the School of Secondary Education, Science Progammes, Federal College of education (Special), (FCES) encourages and expect full attendance. In its 2012-2018 edition of Students' Information Handbook, (FCES) stipulates a 75% attendance threshold as a requirement for a student to be eligible to sit for the final semester's examination, a number of students still take attendance at lectures with levity. A challenge for Mathematics teachers comes in the implementation and enforcement of the policy and this loophole had made students to attend lectures at will thus, this non-mandatory attendance policy boosts the validity and reliability of this study. This zig-zag attendance whose effect may not be visible in some subjects has its influence in the overall performance of students in Mathematics. This is obtained in other higher institutions as well (Ayodele; 2017 & Jaykaran, *et al.,* 2011).

Statement of the problem

A lot of people which include researchers, parents, and policy-makers are of the opinion that students get higher grades when they are physically present in the classroom during lecture while to some, students' performance has no correlation with attending lectures or concentrating during lectures particularly in the case of Mathematics. Moreover, there are previous researches that had been carried out along similar trend with recommendations that such studies be replicated in other institutions and disciplines to allow generalization, thus the study as a built up on cumulative body of previous studies aims at unraveling the effects of classroom attendance and students' concentration in Mathematics classrooms on academic achievement of students in Mathematics in Federal College of Education (Special), Oyo.

Research Questions

The study seeks to provide answers to the following questions:

1. Does poor students' attendance at lectures impact their academic achievement in Mathematics?
2. Does Concentration of Students have any impact on their academic achievement in Mathematics?

Hypotheses

The study tested the only hypothesis formulated for the study at 0.05 significant level.

Ho_1: There is no statistically significant influence of Students' Attendance and Concentration at lectures on their academic achievement in Mathematics in Federal College of Education (Special), Oyo.

Methodology

Research Design

The study adopts two surveys of Classroom attendance and Questionnaire. Non mandatory students' attendances were taking in every class while the lectures were ongoing. At the end of the semester, students' attendances were collated and correlated with their performances in the final examinations of an Algebra course coded "MAT 111" for year one Mathematics Students. Moreover, a well structured questionnaire was employed on the sample.

Population, Sample and Sampling Technique

The entire Thirty-six (36) students in NCE I in Mathematics department, FCES in the 2019/2020 session form both the population and the sample for the study irrespective of gender and age.

Research Instrument and its method of Administration

The major instrument for the study is the students' attendances taken by the teacher of MAT 111 during the course of teaching the 100 level students in the 2019/2020 session and the students' scores in the MAT 111 final examination conducted at the end of the semester. In addition, a questionnaire tagged Mathematics Students' Attendance and Concentration at lectures Questionnaire (MSACQ) validated by experts in the field of Mathematics education was used to elicit responses from the sampled respondents. The items of MSACQ focused on students' attendance related factors and factors relating to concentration at lectures with respect to academic performance of students in Mathematics. The questionnaire is a modified 2-point Likert scale of Agree (A) and Disagree (D). Moreover, MAT 111, titled "Algebra" is one of the courses designed in the curriculum for the award of Nigeria Certificate in Education (NCE) by the national Commission for Colleges of education (NCCE). MAT 111 is chosen for the study simply because it is central to the NCE Mathematics curriculum; a rallying point for all the other courses and whose knowledge and applications spread across the entire Mathematics NCE programme.

Results, Analysis and Discussion

After the conduct and scoring of MAT 111 final examination at the end of the first semester 2019/2020, the researcher collated the students' attendances taken during MAT 111 lectures, their scores in the examination and the responses of sampled respondents to MASCQ for analysis. The data collected were analyzed in tabular forms with descriptive statistics and chi square test as follows:

Table 1: t-values of students' performance in MAT 111 with respect to their attendance at lectures

Category	N	Mean score in MAT 111 Examination	SD	df	Significant level	t-cal	t-tab	Decision
Students that had **below 75%** in class attendance	12	24.1	11.69					We reject Ho_1
Students that had 7**5% and above** in class attendance.	24	45.4	13.09	34	0.05	4.95	2.04	

From Table 1, the calculated t-value (4.95) is greater than the critical t-value (2.04). Hence, we reject Ho_1 and conclude that students' attendance and concentration has significant influence on students' academic achievement in Mathematics. Thus, this corroborates the findings of Ayodele (2007) who conducted similar study and found out that class attendance has a significant positive correlation with examination scores in an Organic Chemistry examination.

Table 2: Contingency Table on responses to MSACQ (and their corresponding percentages)

Item	Agree	%	Disagree	%	Total
1	31	86.1	05	13.9	36
2	17	47.2	19	52.8	36
3	13	36.1	23	63.9	36
4	24	66.7	12	33.3	36
5	26	72.2	10	27.8	36
6	11	30.6	25	69.4	36
7	09	25.0	27	75.0	36
8	15	41.7	21	58,3	36
9	28	77.8	08	22.2	36
10	07	19.4	29	80.6	36
Total	**181**		**179**		**360**

Table 3: Decision Table on Ho_1

Category	Frequency	df	Significance level	χ^2 Calculated	χ^2 table	Decision
Agree	181					We reject
Disagree	179	9	0.05	72.79	16.92	Ho_1

Moreover, Table 3 shows that the value of chi-square calculated (72.79) is greater than its critical value (16.92), also affirming that attending lectures has a significant influence on students' performance in Mathematics. This is in tandem with the findings of Tom and Lori (2006) who in a study posited that attendance should be made mandatory it is positively correlated with students' performance in schools' subject. Personal interaction and interview with some of the sampled respondents revealed that many of the students attend lectures for

attending sake just to avoid the attached punishment but rather the teacher should make his class interesting using different creative and motivating techniques that will attract students to his/her class.

Conclusion

The study focused on measuring whether there was a relationship between students' attendance and concentration at lectures and their academic performance in Mathematics courses. The researcher took the pain of taken students attendance in all the MAT 111 (Algebra) classes, a course which is pivotal and central to the Nigeria Certificate in Education (NCE) Mathematics programme as spelt out in the National Commission for Colleges of Education (NCCE) Minimum Standard, From the findings of the study, it could be concluded that a positive correlation existed between the two variables of Classroom attendance and Academic Achievement in Mathematics. A possible consequence of non-attending or being absent in a Mathematics lecture was a poor performance of the absentee or non-frequent student.

Moreover, from the researcher's interactions with the students in the Algebra classes, it was discovered that many students attend classes for the sake of attending so as to meet the 75% attendance threshold, a pre-requisite for eligibility to write examinations rather than being motivated or interested to attend in conformity with the Chinese Confucius proverb (and modified) of Xunzi.

Recommendations

Sequel to the findings from the students, it is hereby recommended that:

i. All hands must be on deck to promote cooperation between parents and the school to stimulate and encourage the students to adhere to attendance at lectures.
ii. The parents being the first agent of socialization should always raise students to have a culture of commitment in all their life affairs.
iii. The College or similar institution should always highlight the importance of attendance and concentration at lectures to students during orientation or induction for new intakes so they can develop a positive attitude to punctuality at lectures.
iv. The College Management or Management of allied institutions should always enrich the learning environment to bring about students' punctuality at lectures.
v. The teachers of Mathematics should adopt creative methods of teaching that will stimulate students to attend lectures with utmost concentration, for better understanding of course contents and the overall performance of students in Mathematics.

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