

# Senior Secondary Schools Students' Classroom Misbehaviours: The Effect on Quality of Mathematical Argumentation

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**Abstract:-** This study investigates the effect which students' misbehaviours have on senior secondary schools mathematical argumentation. Ninety mathematics teachers were used as subjects of the study. Behavioural Mathematical Argumentation Questionnaire (BMAQ) was used to get information on the type of mathematics argumentation logics and methods that the respondents were using and the challenges they were facing. Data obtained were analyzed with Chi-square and Pearson product moment correlation statistics. The result shows that students' misbehaviours have effect on the quality of mathematical argumentation and teaching duration.

**Keywords:-** Argumentation, Students' Misbehaviours, Challenges, Quality, Teaching Duration.

## I. INTRODUCTION

Argument is a disagreement which produces different views that are expressed sometimes angrily. It arises when a point of view is being supported or opposed by facts and reasons. Argumentation is a series of actions toward accepting or rejecting a view or fact. It is a logical thinking that begins methodically from an account of facts to conclusion. In mathematics lessons, classrooms' argumentation is the use of techniques by teachers to require and empower learners to justify mathematical statements (Aberdein & Dove, 2013). Its format is: "Thinking of this (statement) because of that (justification and reasoning)". Argumentative interaction involves moments of agreement and understanding, and also controversy and disagreement which teacher's intervention always make to adjust or change the ideas that act as support for the justification for the assertions, at the end a broad unanimity could be reached (Krummheuer, 1995). So, argumentation is a social phenomenon that occurs when the subjects involved in the discussions proposed by the teacher, cooperate trying to adjust their interpretations in order to understand the concepts being discussed or to extend the discussions in an attempt to incorporate new concepts.

Many studies have identifies various factors that influence the student's argumentation skills. The quality of argumentation was found to be influenced by; the individual's content knowledge, gender, social environment, and teacher (Lin, 2018; Castro, Durango-Urrego & Pino-Fan, 2021; Indrawatiningsil, Purwanto, As'ar & Sa'dijah, 2020; Staples, Bartlo & Thanheiser, 2012; Simpson, 2015; Simon, Erduran, & Osborne, 2006.). Students' misbehaviours during this argumentation class have not well been studied deeply especially in the area of mathematics lesson. So, this study would look into the area of misbehaviours of students in mathematical argumentation.

### ➤ Statement of the problems

Onasanya (2021) linked the primary cause of teachers' burn-out and stress to students' misbehaviours in classroom. He stresses further that teachers use much time on dealing with students unruly behavioural problems while the time to present lessons and other academic activities suffers. Onasanya (2020) categorized classroom defiant behaviours into three; the least one is learning misbehaviour, follow by conduct misbehaviour; and the unruly one is emotional misbehaviour. If problem from students' defiant behaviours in a school are not solved in time; the academic activities of such school suffers because content of the curriculum may not be covered, learning opportunities may erode and teacher authority may be weaken (Sun, 2015; Soysal, 2015; Morrison, 2018). So, when the situation of this arises the authority of a teacher is weakening, his teaching methodology cannot be of good quality and the outcome of the teaching may be poor (Wang & Eccles, 2012).

### ➤ Purpose of the study

This study was made to find if there is any effect which students' misbehaviours may have on quality and time duration of argumentation in senior secondary schools mathematics lesson.

➤ *Null Hypothesis:*

The following are null hypotheses of the study:

**H<sub>01</sub>:** Students' misbehaviours have no significance effect on quality of mathematics argumentation in senior secondary schools.

**H<sub>02</sub>:** Students' misbehaviours have no significance relationship on duration of mathematics argumentation lesson in senior secondary schools.

These null hypotheses would be tested at significance level of 0.05.

## II. METHODOLOGY

An ex-post factor survey research design was used for this study. This study was done in public senior secondary schools in three local government educational areas in Ogun State Nigeria. Ten senior secondary schools were randomly sampled from each of the educational area. Three mathematics teachers were randomly selected in each sampled school. This gives total of ninety teachers as subjects for the study. Behavioural Mathematical Argumentation Questionnaire (BMAQ) is the only instrument for the study. The questionnaire is made of four sections: A, B, C and D. The first section is on informed concept; the respondent indicated his/her interest in participating in the study and not to reveal his/her identity. Section B is on background information of the respondent. Section C consists positive items on 4 point Likert

scale from 'Exactly True', 'Moderately True', 'Hardly True', to 'Not at All True' which are based on students' misbehaviours in mathematical argumentation classes. Section D consists items for respondents to pick the most common misbehaviour having in argumentative mathematics classes from the three type of classrooms misbehaviours classified by Onasanya(2020) as learning misbehaviour, conduct misbehaviour; and emotional misbehaviour; and to pick the type of duration of lesson they usually have in such classes from the five categories of: "below normal time"; "slightly below normal time"; "normal time"; "slightly above normal time"; and "above normal time".

The instrument was validated by some experts in mathematics education. A pilot study was conducted with 20 mathematics teachers selected from the population but not from the sampled schools. Test-retest reliability coefficient of 0.815 was obtained; this indicates that the instrument is reliable. The instrument was administered to the subjects by the researcher. The subjects filled and returned the questionnaire and analysis was carried on the data obtained from the returned questionnaires.

## III. RESULTS

Age and teaching experiences of respondents are presented in the table 1 and its multiple bar charts are also presented in figure 1 below:

**Table 1:** Teaching Experience and Age of Participants

Age of Respondents	YEARS OF TEACHING MATHEMATICS				Total
	1 – 10	11 – 20	21 – 30	Above 30	
Below 25 years	12	-	-	-	12
25 – 34 years	10	15	-	-	25
35 – 44 years	5	6	17	-	28
45 – 54 years	2	6	3	4	15
Above 54 years	-	2	4	4	10
<b>Total</b>	29	29	24	8	90

Table 1 shows that teachers with lowest teaching experiences of 1 – 10 years cut across all ages except those that are above age of 54, while those with highest teaching experiences (above 30 years teaching mathematics) are in ages groups of 45 and above.

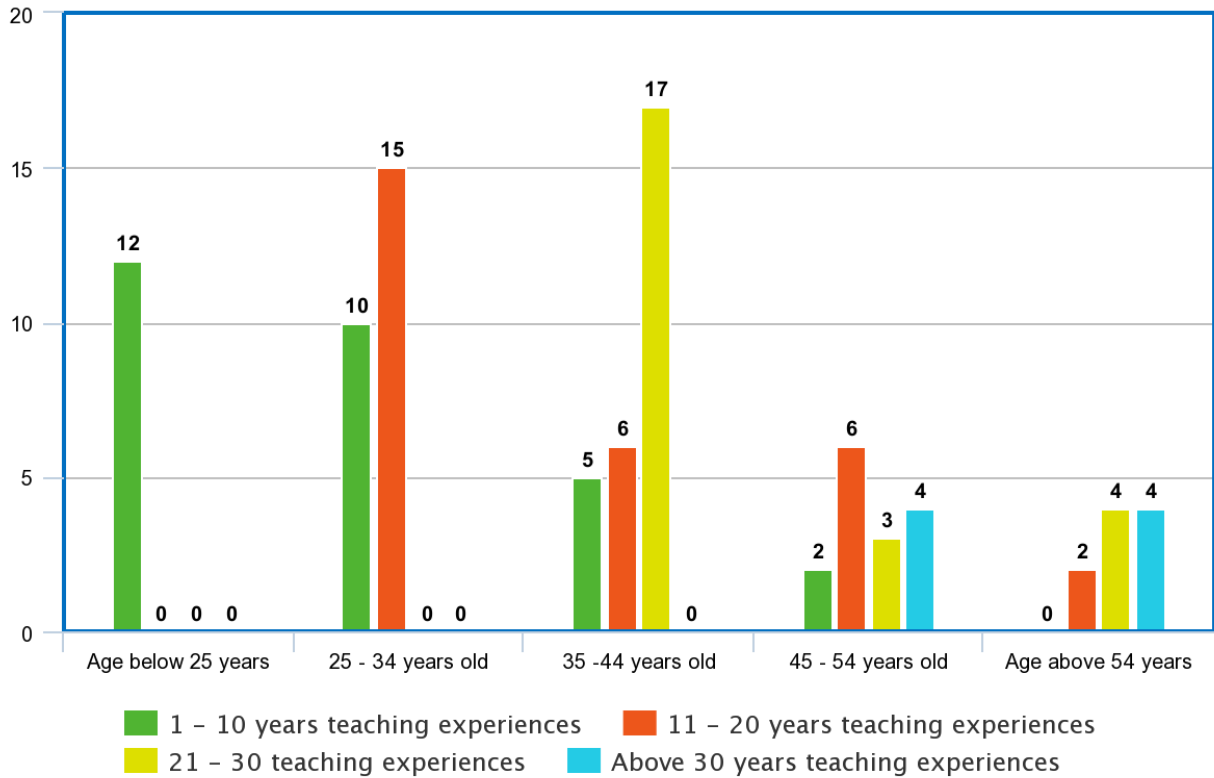


Fig 1: Age of Participants and Teaching Experiences in Mathematics

meta-chart.com

Chi-square statistics was used to test the first null hypothesis, the result is in table 2 below:

Table 2: A 6 x 4 contingency table on observed influenced of students’ misbehaviours on senior secondary schools mathematics argumentation classes.

Item	Exactly True	Moderately True	Hardly True	Not at All True	Total
1	27 (22.5)	25 (22.33)	18 (21.83)	20 (23.33)	90
2	23 (22.5)	30 (22.33)	14 (21.83)	23 (23.33)	90
3	20 (22.5)	14 (22.33)	32 (21.83)	24 (23.33)	90
4	16 (22.5)	21 (22.33)	22 (21.83)	31 (23.33)	90
5	37 (22.5)	22 (22.33)	12 (21.83)	19 (23.33)	90
6	12 (22.5)	22 (22.33)	33 (21.83)	23(23.33)	90
Total	135	134	131	140	540

Expected frequencies are in bracket, d. f. = 15,  $P \leq 0.05$ ,  $\chi^2 = 45.785^{**}$ , crit. value = 24.996 \*\* Significant at 2-tailed

In the above table, the calculated chi-square is 45.785 this is greater than its critical value of 24.996. This implies that the result is significant. Hence, the null hypothesis is rejected and the alternative hypothesis that students’ misbehaviours have significance effect on quality of mathematical argumentation in senior secondary schools is upheld.

Pearson product moment correlation statistics was used to test the second null hypothesis which is on the relationship between duration of lesson and quality of misbehaviours in mathematics argumentation class. Learning misbehaviour was rated as 1; conduct misbehaviour rated as 2; and emotional misbehaviour rated as 3. Class duration was scored as: below normal time 1, slightly below normal time 2, normal time 3, slightly above normal time 4, and above normal time 5. The analysis is in table 3 below.

**Table 3:** Pearson Product Moment Correlation Analysis on Quality of Misbehaviours and Lesson's Duration in Mathematics Argumentation Classes

Variable	Mean	Standard Deviation	N	R	P	Remark
Quality of Misbehaviours	1.889	0.7809	90	-0.5793	0.00001	Significant
Duration of Lesson	2.778	1.3563				

Table 3 shows the correlation coefficient of -0.5793, this is moderate negative correlation as the misbehaviour is higher the duration of lesson is short and vice versa;  $P < 0.05$  implies that the result is significant. Hence, the second null hypothesis on quality of misbehaviour and lesson duration is rejected while its alternative one which states students' misbehaviours have significance relationship on duration of mathematics argumentation lesson in senior secondary schools, is accepted.

#### IV. SUMMARY OF FINDINGS

- Students' misbehaviours have negative effect on the quality of mathematical argumentation in senior secondary schools. Those misbehaviours did not allow the method to be better than conventional method.
- Many teachers use less than normal time allocated for their teachings in a problematic mathematical argumentation classes.

#### V. DISCUSSION

The result of the analysis shows that there is significant effect of students' misbehaviours in quality of mathematical argumentation in senior secondary schools' classes. This is in line with Sun (2015); Morrison (2018); and Staples, Bartlos & Thanheiser (2012) findings that problems not solved in time from students' defiant behaviours in schools cause academic activities of such schools to suffer in the areas of: content of the curriculum which may not be covered; learning opportunities which may erode; and teacher authority which may be weaken. The result also shows that the quality of students' misbehaviours reduces the duration of teaching. This implies that as the misbehaviours increases to higher level the duration of lesson reduces; teachers just rush the class and left, this is in support of O'Merra & Prendergast (2017) that having enough time to teach and learn is only necessary in friendly and conducive environment. But the finding is in contrary to Gracin & Trupcevic (2022) which believes that mathematics teachers need more time than other teachers to teach mathematics, and Boaler (2014) findings that failure to use enough time by mathematics teachers always make students to develop mathematics anxiety.

#### VI. CONCLUSION

Argumentation is one of the good methodologies that can be used in teaching mathematics in a friendly condition but the misbehaviours of some senior secondary students are affecting the quality of this method towards teaching and learning mathematics successfully.

#### RECOMMENDATION

The following are recommended for secondary schools mathematics teachers:

- Teacher should set rules before starting argumentation in mathematics class.
- Teacher should be firm in the class such that his/her authority is not weakened; he/she should not rush out of class whatever be the condition of students' misbehaviours.
- Teacher should not be biased when applying necessary sanction against students that are breaking the class rules.

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