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Mathematics Teachers' Perception Of Motivational Means Of Reducing Stress

By

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Abstract

The study was carried-out to examine the mathematics teachers' perception of motivational means of reducing stress at the Secondary School levels. As a descriptive research design, 120 subjects, who comprised 60 mathematics teachers and 60 non-mathematics teachers in Oyo and Lagos States, were used. Three research questions and 4 hypotheses were raised in the study at 0.05 level of significant. One instrument was adapted (Odubunmi, 1997), validated and used for the study. This instrument is tagged Questionnaire on mathematics teachers' perception of motivational means of reducing stress. Data were analyzed through simple percentages, mean and standard deviation, t-test, One-way ANOVA and Scheffe's post hoc statistical tools at 0.05 level of significance. Findings revealed that there was variance in the mean scores and standard deviations for male and female in the teaching and non-teaching staff. This variance also occurred in the qualifications and experience of respondents. There was significant gender difference between male and female teaching staff ($t_{cal} > t_{value}$ table; $df=58$; $P<0.05$), male and female non-teaching staff ($t_{cal} > t_{value}$ table; $df=58$; $P<0.05$); males of teaching and non-teaching staff ($t_{cal} > t_{value}$ table; $df=53$; $P<0.05$), females of teaching and non-teaching staff ($t_{cal} > t_{value}$ table; $df=63$; $P<0.05$) and; male and female subject of the study ($t_{cal} > t_{value}$ table; $df=118$; $P<0.05$). Also, there was significant mean difference of teaching staff as a result of their educational qualifications ($F_{cal} > F_{value}$; $df=(2,57)$; $P<0.05$); there was significant mean difference of non-teaching staff as a result of their educational qualification ($F_{cal} > F_{value}$; $df=(2,57)$; $P<0.05$). Scheffe's post hoc analysis revealed these sources of significance. The implications of these findings were analyzed in the write-up

Introduction

Teaching a large class has always been an index of Mathematics classroom due to the compulsory nature of the subject to all students at the secondary school level. This is as a result of the nation's educational goal to attain scientific level among the committee of developed nations. Mathematics is the key towards science and technology, which mark the growth and development of any nation (Justina, 1991; Igbokwe, 2000). And this is

why its teaching is placed on high premium in the secondary school level, so that every Mathematics teacher has to contend with large number of students compared to other subjects with few students. This is to say that the workload of every Mathematics teacher is bound to be on increase when one looks at what it takes to ensure a meaningful learning such as adequate teaching, assessment and feedbacks to the students. These and many others like self-development among the Mathematics teachers may contribute to varying degree of stress in the course of executing an excellent job. Teachers are candles that burn on either side of the passage to pave way for the understanding of the students. The problem then lies on the fact that too much workload may reduce the teachers' attitude towards bringing out the best among the students because, attitude is a tendency that makes individual to respond either negatively or positively to objects, people, ideas, events or situations in ones environment. Oladokun (1990) opined that attitude contributes to the final behavioural act of an individual. To further buttress another stress being faced by teachers within large community is antecedent attitude of public towards teacher as corroborated by Odubunmi (1994), which was tagged "Room to let; Teachers don't apply; Are you a teacher, why are you pricing my goods like that?" All these derogatory statements tend to bring out negative attitude among the teachers especially Mathematics teachers who have to contend with various students' misbehaviours as exemplified by different scholars (Rowsey and Ley, 1996; Kyriacou, 1987; Okebukola and Jegede, 1989). Borg et al (1991) reported that greater stress is experienced by the teachers who are not satisfied with their job and at the same time, not committed but only take to the job as a means to an end. To cope with these stresses, many teachers tend to develop relaxation after the work, sharing ideas with colleagues and engaging in other revenue generating ventures (Okebukola and Jegede, 1992). The contending issues especially in Mathematics is that the extent to which motivational drives either economically or otherwise could bring about stress reduction among the Mathematics teachers is yet to be obtained, and it is based on this premise, the present study to examine along gender and qualification.

Statement of the problem

The study was carried out to ascertain mathematics teachers' perception of motivational means of reducing stress at the secondary school level. Specifically, the study examined the relationship of perception of non-teaching and teaching staffs' gender, educational status and working experience towards motivational means of reducing stress.

As a result, the following research questions were advanced for the study, which include:

RQ 1: What are the genders means score of non-mathematics teacher's and mathematics teacher's perception of motivational-means of reducing stress?

RQ 2: What are the means score of non-mathematics teacher's and mathematics teacher's perception of motivational-means of reducing stress based on educational status?

RQ 3: What are the means score of non-mathematics teacher's and mathematics teacher's perception of motivational-means of reducing stress based on working experience?

Meanwhile, four hypotheses were raised for the study and they included

Ho₁: There is no significant gender difference in the means scores of mathematics teachers' and non-mathematics teachers' perception of motivational means of reducing stress.

Ho₂: There is no significant difference in the means scores of mathematics teachers' and non-mathematics teachers' perception of motivational means of reducing stress based on educational status.

Ho₃: There is no significant difference in the means scores of mathematics teachers' and non-mathematics teachers' perception of motivational means of reducing stress based on working experience.

Ho₄: There is no significant difference in the means scores of mathematics teachers' and non-mathematics teachers' perception of motivational means of reducing stress based on the identified three variables

Method

The study is a descriptive research design, which sought information from the teachers of Mathematics in the public secondary schools. The population to the study consisted of secondary schools' mathematics teachers in Oyo and Lagos States. But due to large areas to cover, the study focused on the mathematics teachers in Ibadan North and Ojo local government areas of Oyo and Lagos States respectively with 60 mathematics teachers selected from 20 public secondary schools (10 schools in each local government area). In each school, 3 Mathematics teachers of JS II-SS III were chosen via simple random techniques (i.e every second mathematics teacher based on the arms of the selected school); and 60 non-mathematics teachers that covered the administrative staffs and civil servants of ministry of education biased. The inclusion of the non-mathematics teaching staff was to elicit their perception as these groups prepare teachers' salaries, evaluate teachers for promotion and supervise teachers to ensure that they teach towards achieving the goal Mathematics at secondary school levels. The instrument used for the study was adapted (Odubunmi & Ishola, 1997), validated and used by the researcher, taking cognizance of the ambiguous statement reframed. The last version of the instrument tagged "Questionnaire for Mathematics teachers' perception of motivational means of reducing stress" consisted of a 15-item based on a Likert format. The internal consistency of the instrument was computed via its administration to some selected Mathematics teachers outside the main study, numbering 8. It was done within an interval of one week before the correlation coefficient value of 0.66 was obtained. The value, which the researcher felt, was within the scope of measuring and suitable for the study. The statistical tool used to analyze the data comprised of the simple descriptive statistics like mean and standard deviation, t-test, one-way ANOVA and Schaffer's post hoc analysis at a level of 0.05 significance.

Findings

RQ 1: What are the genders means score of non-mathematics teacher's and mathematics teacher's perception of motivational-means of reducing stress?

Table 1: Mean and Standard Deviation scores of Respondents based on gender

Sources/Staff	Teaching Staff (TS)			Non-Teaching Staff (NTS)			Grand total
Genders	Male	Female	Sub-total	Male	Female	Sub-total	
Count	26	34	60	29	31	60	120
Mean	54.8	54	54.3	57	53.4	55.1	54.8
Std Deviation	3.536	2.183	3.653	1.083	1.725	3.124	2.291
Percentage	22	28	50	24	26	50	100
Sum (Σx)	1425	1836	3261	1653	1655	3308	6576
Sum (Σx^2)	78404	99306	177710	94255	88491	182746	360995
Sum (Σx) ²	2030625	3370896	10634121	2732409	2739025	10942864	43243776

Table 1 shows the mean and standard deviation scores of the participants with 26(22%) and 34(28%) of male and female teaching staff respectively; and 29(24%) and 31(26%) of male and female in the non-teaching staff respectively. In the teaching staff category the mean and standard deviation (\bar{x} , σ) of male and female staff were (54.8%, 3.536) and (54.0%, 2.183) respectively and that of non-teaching staff were (57.0%, 1.083) and (53.4%, 1.725) for male and female respectively; but generally the male staff seemed to have uphold the higher mean score over their female counterparts. However, the non-teaching staffs do not seem to have accepted the idea in totality due to the higher mean score of perception of motivational means of reducing stress among mathematics teachers

2: What are the means score of non-mathematics teacher's and mathematics teacher's perception of motivational-means of reducing stress based on educational status?

Table 2: Mean and Standard Deviation scores of Respondents based on educational status

Source	Teaching Staff (TS)				Non-Teaching Staff (NTS)				Grand total
Educational Status	NCE /OND	1 ST DEGREE	POST 1 ST DEGREE	Sub-total	NCE /OND	1 ST DEGR.	POST 1 ST DEGREE	Sub-total	
Count	27	25	08	60	20	24	16	60	120
Mean	56.6	51	57	54.3	55.2	56.9	54.6	55.7	55.0
Std Devia	1.938	3.453	2.000	4.155	1.685	1.098	1.590	2.308	2.305
Percentages	22.5	20.8	06.7	50	16.7	20.0	13.3	50	100
Sum (Σx)	1528	1275	456	3259	1104	1366	874	3343	6600

Sum (Σx^2)	86598	65323	26024	1779 45	60998	77732	47739	186469	363638
Sum (Σx) ²	23347 84	1625625	20793 6	4168 345	1218816	1865956	76387 6	1117564 9	4356000 0

Table 2 describes the mean and standard deviation scores of the participants along their educational qualifications with 27(22.5%), 25(20.8%) and 8(6.7%) for the NCE/OND, First Degree holders and Post first degree holders of the teaching staff respectively; and 20(16.7%), 24(20.0%) and 16(13.3%) for the NCE/OND, First Degree holders and Post first degree holders of the non-teaching staff respectively. In the teaching staff category the mean and standard deviation (\bar{x} , σ) of the NCE/OND, First Degree holders and Post first degree holders are (56.6%, 1.938), (51.0%, 3.453) and (57.0%, 2.000) respectively and that of non-teaching staff are (55.2%, 1.685), (56.9%, 1.098) and (54.6%, 1.590) for the NCE/OND, First Degree holders and Post first degree holders respectively; but within the teaching staff post first degree holders had highest mean scores and agree with the means of reducing stress. In contrast, within the non-teaching staff post first-degree holders had least mean scores and disagree with the means of reducing stress.

RQ 3: What are the means score of non-mathematics teacher's and mathematics teacher's perception of motivational-means of reducing stress based on working experience?

Table 3: Mean and Standard Deviation scores of Respondents based on working experience

Source	Teaching Staff (TS)					Non-Teaching Staff (NTS)					Grand
Experience	0-5	6-10	11-15	16& Above	Sub-total	0-5	6-10	11-15	16& Above	Sub-total	-total
Count	17	13	16	14	60	13	17	15	15	60	120
Mean	54.2	55.1	53.4	57.2	54.9	54.2	53.8	56.8	53.6	54.6	54.8
Deviation	2.07 1	3.58 5	1.70 4	1.03 3	2.681	3.43 0	2.28 7	1.12 3	1.74 6	2.30 7	2.296
Percent ages	14.2	10.8	13.3	11.7	50	10.8	14.2	12.5	12.5	50	100
Sum(Σx)	921	716	854	801	3293	705	915	852	804	3275	6576
Sum(Σx^2)	5001 3	3963 5	4567 1	4582 1	18114 0	3834 2	4929 4	4841 3	4314 0	1791 89	36099 7
Sum(Σx) ²	8482 41	5126 56	7293 16	6416 01	10843 849	4970 25	8372 25	7259 04	6464 16	1072 5625	43243 776

Table 3 shows the mean and standard deviation scores of the subjects along with their working experience as 17(14.2%), 13(10.8%), 16(13.3%) and 14(11.7%) for the teaching staff of years of experience as (0-5), (6-10), (11-15) and (16 and above) years respectively and non-teaching staff as 13(10.8%), 17(14.2%), 15(12.5%) and 15(12.5%) for the

teaching staff of years of experience as (0-5), (6-10), (11-15) and (16 and above) years respectively. In the teaching staff category the mean and standard deviation (\bar{x} , σ) of the (0-5), (6-10), (11-15) and (16 and above) years are (54.2%, 2.071), (55.1%, 3.585), (53.4%, 1.704) and (57.2%, 1.033) respectively while the non-teaching staff of (0-5), (6-10), (11-15) and (16 and above) years are (54.2%, 3.430), (53.8%, 2.287), (56.8%, 1.123) and (53.6%, 1.746) respectively. This result is interesting in the sense that both teaching and non-teaching staff of categories (0-5) years had the same mean score while others varied and determined by their experience on the motivational means of reducing stress among mathematics teachers

H₀₁: There is no significant gender difference in the means scores of mathematics teachers' and non-mathematics teachers' perception of motivational means of reducing stress.

Table 4 t-test of respondents scores

Source	Between	t-cal	t-val	Df	Significant	Variables
Genders	Male & female	1.868	±1.645	58	P<0.05*	TS
	Male & female	19.208		58		NTS
	TS & NTS	-4.509		53		Males
	TS & NTS	2.093		63		Females
	Male & female	-2.586		118		Over all

*Significant

Table 4 shows the gender's-test scores of the subjects along with the finding that there was significant mean difference between male and female of the teaching staff (t-cal>t-table value; df= 58; P<0.05), there was significant mean difference between male and female of the non-teaching staff (t-cal>t-table value; df= 58; P<0.05), there was significant mean difference between teaching and non-teaching staffs of the male staff (t-cal<t-table value; df= 53; P<0.05) was significant mean difference between teaching and non-teaching staffs of the female staff (t-cal>t-table value; df= 63; P<0.05), there was significant mean difference between male and female of the over all staff (t-cal<t-table value; df= 118; P<0.05). The result confirms that both teaching and non-teaching staff's genders beclouded the perception of the motivational means of reducing stress among the mathematics teachers.

H₀₂: There is no significant difference in the means scores of mathematics teachers' and non-mathematics teachers' perception of motivational means of reducing stress based on educational status.

Table 5: ANOVA of respondents in Educational Status

Variations/Variables	Teaching Staff (TS)	Non-Teaching Staff (NTS)
Sum of Squares between Groups	472	170.42
Sum of Squares within Groups	455	37.78
Sum of Squares Total	927	208.2
Degree of freedom between groups	2	2
Degree of freedom within groups	57	57

Degree of freedom Total	59	59
Mean Square between groups	236	85.21
Mean Square within groups	7.982	0.663
Mean Square Total	-	-
F-value	3.13	
F-calculated	29.566	128.56
Significant	P<0.05*	P<0.05*

*Significant

Table 5 shows the ANOVA scores of the subjects along with their educational status that there was significant mean difference in the perception of the teaching staff on the means of reducing stress among the mathematics teachers ($F_{cal} > F_{table}$ value; $df = (2, 57)$; $P < 0.05$), and also there was significant mean difference in the perception of the non-teaching staff on the means of reducing stress among the mathematics teachers ($F_{cal} > F_{table}$ value; $df = (2, 57)$; $P < 0.05$), which lead to Scheffe's post hoc analysis as shown in table 6 below.

Table 6: Scheffe's post hoc analysis on Educational Status

Variations		Scheffe's values	
I th group	J th group	TS	NTS
NCE/OND	1 st Degree	15.0266*	4.8951*
	Post 1 st Degree	0.04639	3.2177*
1 st Degree	Post 1 st Degree	5.6946*	27.4751*

*Significant

Table 6 shows that there was significant difference in the mean perception holders of NCE/OND and First Degrees, First Degrees and Post first degrees but no significant difference in the mean perception of the NCE/OND and Post first degree in the group of teaching staff. On the other hand finding reveals that there was significant difference in the mean perception holders of NCE/OND and First Degrees, OND/NCE and Post first-degree, and First Degrees and Post first degrees of the non-teaching staff. The implication of this finding remains that educational qualification of respondents determine their reasoning level of the perspective as well as the nature of routine which they daily engaged in.

H₀₃: There is no significant difference in the means scores of mathematics teachers' and non-mathematics teachers' perception of motivational means of reducing stress based on working experience

Table 7: ANOVA of respondents on experience

Variations/ Variables	TS	NTS
Sum of Squares between groups	11.70	208.8

Sum of Squares within groups	397.50	219.8
Sum of Squares Total	409.20	428.6
Degree of freedom between groups	3	3
Degree of freedom within groups	56	56
Degree of freedom Total	59	59
Mean Squares between groups	3.90	69.6
Mean Squares within groups	7.10	3.93
Mean Squares Total	-	-
F-value	2.76	
F-calculated	0.549	17.71
Significant	P>0.05	0.33*

*Significant

Table 7 shows the ANOVA scores of the subjects along with their experience that there was no significant mean difference in the perception of the teaching staff on the means of reducing stress among the mathematics teachers ($F\text{-cal} < F\text{-table value}$; $df = (3, 56)$; $P > 0.05$), but there was significant mean difference in the perception of the non-teaching staff on the means of reducing stress among the mathematics teachers ($F\text{-cal} > F\text{-table value}$; $df = (3, 56)$; $P < 0.05$), which lead to Scheffe's post hoc analysis below.

Table 8: Scheffe's post hoc analysis experience

Variations		Scheffe's values	
1 th group	J th group	TS	NTS
(0 - 5)	(6 - 10)	NIL	0.17495
	(11-15)	"	1.2286
	16 and above	"	0.28353
(6 - 10)	(11 - 15)	"	2.02767
	16 and Above	"	0.081107
(11 - 15)	16 and Above	"	4.27481*

*Significant

Table 8 shows that there was no significant mean difference in the perception all teaching staff and some group of non-teaching staff on the motivational means of reducing stress among the mathematics teachers but however, there was significant mean difference in the perception of the non-teaching staff with group (11-15) and (16 and Above) years. The implication of the finding is that the older the years of experience the more they perceived the need for the motivational needs of reducing stress via the identified means.

H₀₄: There is no significant difference in the means scores of mathematics teachers' and non-mathematics teachers' perception of motivational means of reducing stress based on the identified three variables

Table 9: ANOVA for all three variables

Source	Sum of Squares	Df	Mean Square	F-cal	F-value	Significant
Between	3.2	2	1.6			

Within	1900.4	357	5.32	0.301	2.99	P>0.05
Total	1903.6	359				

Table 9 shows the ANOVA scores of the subjects based on over all three variables of the study and it was found that there was no significant mean difference in the perception of the teaching staff on the means of reducing stress among the mathematics teachers ($F_{\text{cal}} < F_{\text{table value}}$; $df = (2, 357)$; $P > 0.05$).

Discussion and Conclusion

Study has shown that teachers handling large classes like Mathematics have to contend with varying degree of stress in the course executing their job and as a result needs means of reducing stress in order to perform the task. However, the teaching staff believed that some of these means could reduce the stress as corroborated in the finding of Odubunmi (1997) though in some cases at variant due to their attributes like genders, qualification and experience; the non-teaching staffs do not share all these ideas as means of reducing stress among the mathematics teachers. This might not be unconnected to their non-physical presence in the classroom to observe the management of the classroom by the teachers. The irony of the matter is that these set of non-teaching staff are saddled with the responsibility of promoting teachers based on their effectiveness, which is discernable via students' performance. Moreover, the classroom comprises of varying degree of intellectuals whom mathematics teachers have to contend-with, therefore more experienced teachers need to be motivated in order to reduce brain drain. This could further be enhanced via different seminars to the serving teachers and recruitment of qualified ones to cope with trends of event. More importantly, the headship of the ministry of education ought to be already served teachers so as to understand the rigour which classroom mathematics teachers passed-through in order to motivate them towards discharging effective job. In conclusion, less motivated mathematics teachers would continue to produce half-baked students of Mathematics that retard the nation science and technology for which Mathematics is the language of understanding.

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