



ENVIROMENTAL FACTORS AND REMEDIES ON SECONDARY SCHOOL STUDENTS' MATHEMAPHOBIA IN EBONYI STATE

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ABSTRACT

This study titled Environmental Factors and Remedies on Secondary School Students' Mathemaphobia in Ebonyi State was carried out in Ebonyi State Nigeria to determine the actual effect of environment on secondary school students' fear for mathematics and the remedies for it. The study made use of survey research design which has four research questions and two hypotheses. The instrument for data collection is 'Enviromental Factors and Remedies on Secondary School Students' Mathemaphobia (EFRSSM)' and is made up of thirty-two items questionnaire. The study used simple random sampling techniques to select 400 junior and senior secondary school students for the study. Results of the study showed that environment factors that contributes to secondary school students' mathemaphobia. The hypotheses showed that, both gender and age have no significance difference on the environmental factors to secondary school students' mathemaphobia. It also discover that, employment of enough qualified mathematics teachers, provision enough mathematics teaching and learning materials, use of learner centred method of teaching mathematics among other environmental factors will reduce mathemaphobia among secondary school students.

Keywords: Mathematics, Environment, mathemaphobia and Remedies.

Introduction

The recent rating of Ebonyi State as the poorest and most educational disadvantage state in the Southern part of Nigeria by the Bureau of Statistics (2020) is an indication that all is not well with the education system of the state, being that educationally developed state should be able to defeat poverty to prove the popular saying that, "knowledge is power". No wonder that Mathematics which is one of the major subjects that facilitate human development has been faced with the problem of poor performance as a result of students' mathemaphobia. The performance of secondary school students in mathematics over the years have been poor as rightly reported by many researchers such like; Igboke (2010), Iji and Uka (2009) and Nweke and Ali (2020). The objectives, aims and goals of Nigeria mathematics education are yet to be achieved. Nweke and Alio (2001) stated that; students' achievement in mathematics examinations, both internal and external, from year

to year has never been encouraging. They made it clear that the students' achievement in mathematics has been poor and disturbing. Azuka (2001) noted that out of the entire subjects studied in our educational system, mathematics is worst hit with several problems affecting it's study at all levels of the educational system. Since the identification of this ugly situation in our educational system and mathematics in particular many researchers has been working seriously to find a way out of the poor performance of students especially in mathematics.

The word Mathemaphobia is a combination of two words "mathematics" and "phobia". Mathematics is a science subject that studies size and number manipulation while Phobia is an irrational (unreasonable) fear for something Nweke and Ali (2020). Putting the two together to form "mathemaphobia" meaning - irrational (unreasonable) fear for mathematics. The online Advance learners dictionary defined environment as the totality of ones surrounding condition both seen



and unseen. Attamah (2012) states that, environmental factors play more role in child learning

factors to secondary school students' mathemaphobia?

Hypotheses.

The following null hypotheses were tested using z-test statistics at 0.05 significant level;

- Ho₁ There is no significance difference between the opinions of Junior and Senior secondary school Students on the environmental factors to mathemaphobia in Ebonyi State.
- Ho₂ There is no significance difference between the opinions of Junior and Senior secondary school Students on the remedies to the environmental factors to mathemaphobia in Ebonyi State.

Review of Literature

Concept of Environment

The online Advance learners dictionary defined environment as the totality of forces surrounding condition both seen and unseen. The makeup of this environment include; our homes, school, teacher, students friends, government, laboratories, methods of teaching, teaching materials culture, religion etc. Environmental influence in the teaching and learning cannot be overemphasized. That is why Ogbonna (2002) stated that, a child is the product of his environment. Environmental influence has impact on the achievement and interest of students in academic work. Dewey in Ogbonna (2002) in his own pointed out that, we do not educate directly but rather indirectly by means of the environment. This is to say that an academic friendly environment is likely to promote better teaching and learning whereas an academic unfriendly environment will likely bring disaster to teaching and learning.

Applying this principle to the teaching and learning of mathematics, it will be observed that our local set-up (that is our environment) is not friendly to the teaching and learning of mathematics as indicated by Nweke and Ali (2020).

Concept of Mathemaphobia

The word mathemaphobia is derived from two English words 'mathematics and phobia'. Mathematics is a course of study that uses numbers (symbols) and diagrams to study the relationship between man and his environment. Mathematics studies the relationships among quantities, magnitudes, and properties and of logical operations by which unknown quantities, magnitudes, and properties may be deduced while phobia is an irrational (unreasonable) fear for something



(mathematics) (Nweke and Ali, 2020). That is to say that mathemaphobia is an irrational fear for

response of the respondents to each item in the questionnaire was used to determine the answer to each question. A mean value of 2.50 was calculated as a limiting value. Therefore, any mean value of 2.50 and above was accepted while a mean value less than 2.50 was rejected. The null hypotheses were tested using z-test statistics under 0.05 alpha level of significance. Decision on the hypotheses was based on; Reject H_0 if z-calculated is greater than z-critical (1.96) and Accept H_0 if z-calculated less than z-critical. The standard deviation is used to determine how divergent the opinions of the respondents are.

Presentation and Analysis

The results are presented according to the research questions and hypotheses in tables. There are four research questions and two hypotheses for the study.





Research Question 1 What are the human factors that contribute to secondary school students' mathemaphobia in Ebonyi state?

Table 1 above show responses of Junior and Senior secondary school students on the
Table 1: Mean rating and standard deviation of Junior and Senior students' opinion on human factors on secondary school students' mathemaphobia in Ebonyi state.

Junior =200, Senior=200 Total = 400

S/N	ITEMS	JUNIOR			SENIOR			JUNIOR/SENIOR		
		\bar{X}	SD	Rk	\bar{X}	SD	Rk	\bar{X}	SD	Rk
1	My parents members discourages me from studying mathematics	2.84	1.21	A	2.92	1.17	A	2.88	1.19	A
2	It is my friends and pair groups that discourages me from studying mathematics	2.42	1.11	R	2.19	1.03	R	2.30	1.07	R
3	My teachers and class members are the once that discourages me from studying mathematics	2.86	1.10	A	2.92	1.14	A	2.89	1.12	A
4	Government and School Administrators discourages me from studying mathematics	2.97	0.98	A	2.97	1.04	A	2.97	1.01	A
5	Our people not doing well in mathematics discourages me from studying mathematics	2.80	1.41	A	2.78	1.33	A	2.79	1.37	A
6	My siblings and neighbours discourages me from studying mathematics	2.22	1.03	R	2.46	0.97	R	2.34	1.00	R
7	Do like My religion and belive makes me to hate mathematics and discourages me from studying mathematics	2.25	1.09	R	2.19	0.99	R	2.22	1.04	R
8	Educational programmes and policy makes me not to have interest in studying mathematics.	2.95	1.13	A	3.03	1.15	A	2.99	1.14	A
Grand Mean		2.66	1.13	A	2.68	1.10	A	2.67	1.12	A

Note: \bar{X} =Mean; SD = Standard Deviation; A=Accepted; R=Rejected; Rk =Remark

Table 1 above show responses of Junior and Senior secondary school students on the human environmental factors contributing to secondary school students' mathemaphobia. The Junior has a grand mean 2.66 and standard deviation of 1.13 while the Senior has grand mean of 2.67 and standard deviation of 1.12. The grand mean of 2.67 which is greater than the limiting mean value of 2.50 and the standard deviation of 1.12 for both Junior and Senior is used to conclude that human factors contributes to secondary school students' mathemaphobia in Ebonyi State.



Research Question 2

What are the material factors to secondary school students' mathemaphobia in Ebonyi state?

Table 2, show above show responses of Junior and Senior secondary school students on the material environmental factors contributing to secondary school students'

Table 2: Mean rating and standard deviation of Junior and Senior students' opinion on material factors on secondary school students' mathemaphobia in Ebonyi State.

Junior =200, Senior=200 Total = 400

S/N	ITEMS	JUNIOR			SENIOR			JUNIOR/SENIOR		
		\bar{X}	SD	Rk	\bar{X}	SD	Rk	\bar{X}	SD	Rk
9	Not having mathematics testbooks discourages me from studying mathematics	3.08	0.98	A	3.14	0.96	A	3.11	0.97	A
10	Lack of learning materials discourages me from studying mathematics	3.01	1.04	A	2.89	1.08	A	2.95	1.06	A
11	None practical use mathematics knowledge discourages me from studying mathematics	2.87	0.97	A	3.03	0.93	A	2.92	0.95	A
12	Poor remunerations to mathematics students and teachers discourages me from studying mathematics	3.28	0.95	A	3.32	0.91	A	3.30	0.93	A
13	Lack of finance is the major cause of my negative attitude toward mathematics	2.74	0.98	A	2.54	1.00	A	2.64	0.99	A
14	Poor state of secondary school discourages me from studying mathematics	2.78	1.04	A	2.82	1.06	A	2.80	1.05	A
	Not using teaching aid in									
15	teaching mathematics courses dislikeness for the subject.	2.81	1.16	A	2.69	1.00	A	2.75	1.08	A
Grand Mean		2.94	1.02	A	2.92	0.99	A	2.93	1.01	A

Note: \bar{X} =Mean; SD = Standard Deviation; A=Accepted; R=Rejected; Rk =Remark

mathemaphobia. The junior has a grand mean 2.94 and standard deviation of 1.02 while the senior has grand mean of 2.92 and standard deviation of 0.92. The grand mean of 2.93 which is greater than the limiting mean value of 2.50 and the standard deviation of 1.01 for both Junior and Senior is used to conclude that material factors contributes to secondary school students' mathemaphobia in Ebonyi State.



Research Question 3

What are the effects of gender on secondary school students' mathemaphobia in Ebonyi state?

Table 3: Mean rating and standard deviation of Junior and Senior students' opinion effect of gender on secondary school students' mathemaphobia in Ebonyi state.

Junior =200, Senior=200 Total = 400

S/N	ITEMS	JUNIOR			SENIOR			JUNIOR/SENIOR		
		\bar{X}	SD	Rk	\bar{X}	SD	Rk	\bar{X}	SD	Rk
16	Not having mathematics testbooks discourages me from studying mathematics	2.88	1.10	A	2.86	0.78	A	2.87	0.94	A
17	Lack of learning materials discourages me from studying mathematics	2.52	1.03	A	2.38	1.13	R	2.45	1.08	R
18	None practical use mathematics knowledge discourages me from studying mathematics	2.53	1.12	A	2.57	1.14	A	2.55	1.13	A
19	Poor remunerations to mathematics students and teachers discourages me from studying mathematics	2.64	1.02	A	2.62	0.94	A	2.63	0.98	A
20	Lack of finance is the major cause of my negative attitude toward mathematics	2.69	0.92	A	2.65	0.86	A	2.67	0.84	A
21	Poor state of secondary school discourages me from studying mathematics	2.66	0.89	A	2.64	0.95	A	2.65	0.92	A
Grand Mean		2.65	1.00	A	2.62	0.97	A	2.64	0.98	A

Note: \bar{X} =Mean; **SD** = Standard Deviation; **A**=Accepted; **R**=Rejected; **Rk** =Remark

mathemaphobia. The junior has a grand mean 2.94 and standard deviation of 1.02 while the senior has grand mean of 2.92 and standard deviation of 0.92. The grand mean of 2.93 which is greater than the limiting mean value of 2.50 and the standard deviation of 1.01 for both Junior and Senior is used to conclude that material factors contributes to secondary school students' mathemaphobia in Ebonyi State.



Research Question 3

What are the effects of gender on secondary school students' mathemaphobia in Ebonyi state?

Table 3: Mean rating and standard deviation of Junior and Senior students' opinion effect of gender on secondary school students' mathemaphobia in Ebonyi state.

Junior =200, Senior=200 Total = 400

S/N	ITEMS	JUNIOR			SENIOR			JUNIOR/SENIOR		
		\bar{X}	SD	Rk	\bar{X}	SD	Rk	\bar{X}	SD	Rk
16	Not having mathematics testbooks discourages me from studying mathematics	2.88	1.10	A	2.86	0.78	A	2.87	0.94	A
17	Lack of learning materials discourages me from studying mathematics	2.52	1.03	A	2.38	1.13	R	2.45	1.08	R
18	None practical use mathematics knowledge discourages me from studying mathematics	2.53	1.12	A	2.57	1.14	A	2.55	1.13	A
19	Poor remunerations to mathematics students and teachers discourages me from studying mathematics	2.64	1.02	A	2.62	0.94	A	2.63	0.98	A
20	Lack of finance is the major cause of my negative attitude toward mathematics	2.69	0.92	A	2.65	0.86	A	2.67	0.84	A
21	Poor state of secondary school discourages me from studying mathematics	2.66	0.89	A	2.64	0.95	A	2.65	0.92	A
Grand Mean		2.65	1.00	A	2.62	0.97	A	2.64	0.98	A

Note: \bar{X} = Mean; SD = Standard Deviation; A=Accepted; R=Rejected; Rk =Remark

From Table 3, show responses of Junior and Senior secondary school students on the effect of gender on environmental factors contributing to secondary school students' mathemaphobia. The Junior has a grand mean 2.65 and standard deviation of 1.00 while the Senior has grand mean of 2.62 and standard deviation of 0.97. The grand mean of 2.64 which is greater than the limiting mean value of 2.50 and the standard deviation of 0.98 for both Junior and Senior is used to conclude that gender contributes to secondary school students' mathemaphobia in Ebonyi State.

Research Question 4

What are the remedies to the environmental factors to secondary school students' mathemaphobia in Ebonyi state?

Table 4: Mean rating and standard deviation of Junior and Senior students' opinion on the remedies to the environmental factors to secondary school students' mathemaphobia in Ebonyi state.

Junior =200, Senior=200 Total = 400



S/N	ITEMS				SENIOR			JUNIOR/SENIOR		
		\bar{X}	SD	Rk	\bar{X}	SD	Rk	\bar{X}	SD	Rk
22	Organising seminars,nd conferences to educate people on the importance of maths will reduce mathemaphobia	3.46	0.73	A	3.50	0.81	A	3.48	0.77	A
23	Provision of enough teaching and learning mathematics materials will reduce mathemaphobia	2.96	0.92	A	2.94	0.88	A	2.95	0.90	A
24	Improve welfare of mathematics students and teachers will reduce mathemaphobia	3.09	0.88	A	3.21	0.96	A	3.15	0.92	A
25	Use of native language and local materials for teaching maths will reduce mathemaphobia	2.91	0.93	A	2.87	0.97	A	2.89	0.95	A
26	Employment of capable hands to teach maths will reduce mathemaphobia	3.31	0.77	A	3.27	0.81	A	3.29	0.79	A
27	Use of modern teaching materials in teaching maths will reduce mathemaphobia.	2.81	0.94	A	2.63	0.76	A	2.72	0.85	A
28	Increase funding of secondary schools will reduce mathemaphobia	2.52	0.93	A	2.56	0.91	A	2.54	0.92	A
29	Having practical aspect of maths examination will reduce mathemaphobia.	2.52	1.23	A	2.40	1.03	R	2.46	1.13	R
30	Use of learner centered methods of teaching maths will reduce mathemaphobia.	2.86	1.19	A	2.80	1.21	A	2.83	1.20	A
31	Making sure that any maths graduate is given authormatic good job.	3.25	0.74	A	3.27	0.75	A	3.26	0.73	A
32	Educating secondary school gudiance and counselling teachers to encourage their students to study mathematicss.	2.81	0.97	A	2.79	0.99	A	2.80	0.98	A
Grand Mean		2.95	0.93	A	2.93	0.92	A	2.94	0.92	A

Note: \bar{X} =Mean; SD = Standard Deviation; A=Accepted; R=Rejected; Rk =Remark



From Table 4, show responses of Junior and Senior secondary school students on the remedies to the environmental factors contributing to secondary school students' mathemaphobia. The Junior has a grand mean 2.95 and standard deviation of 0.93 while the senior has grand mean of 2.93 and standard deviation of 0.92. The grand mean of 2.94 which is greater than the limiting mean value of 2.50 and the standard deviation of 0.92 for both Junior and Senior is used to conclude that the above are remedies to the environmental

Table 5: The opinions of Junior and Senior secondary school Students on the human environmental factors to secondary school students' mathemaphobia

Gender	N	\bar{X}	SD	Df	Ls	Z-CAL	Z-CRIT	REMARK
Junior	200	2.66	1.13					
				398	0.05	0.18	1.96	Accepted
Senior	200	2.68	1.10					

Note: \bar{X} =Mean; **SD** = Standard Deviation; **Df** = Degree of freedom; **Ls** = Significance Level; **N** = Total Number of Respondents.

factors to secondary school students' mathemaphobia in Ebonyi State.

Results of Hypotheses

Ho₁ There is no significance difference between the opinions of Junior and Senior secondary school Students on the human environmental factors to secondary school students' mathemaphobia in Ebonyi state.

Table 5 above shows that the calculated Z-Calculated is 0.18 which is far below the Z-Critical of 1.96. This means that Ho₁ which states that, there is no significance difference between the opinions of Junior and Senior secondary school Students on the human environmental factors to secondary school students' mathemaphobia in Ebonyi state is accepted.

Ho₂ There is no significance difference between the opinions of Junior and Senior secondary school Students on the remedies to the environmental factors to secondary school students' mathemaphobia in Ebonyi state.

Table 6: The opinions of Junior and Senior secondary school Students on the remedies of the environmental factors to secondary school students' mathemaphobia.

Gender	N	\bar{X}	SD	Df	Ls	Z-CAL	Z-CRIT	REMARK
Junior	200	2.95	0.93					
				398	0.05	0.32	1.96	Accepted
Senior	200	2.92	0.92					

Note: \bar{X} =Mean; **SD** = Standard Deviation; **Df** = Degree of freedom; **Ls** = Significance Level; **N** = Total Number of Respondents.

Table 6 above shows that the Z-Calculated is 0.32 which is far below the Z-Critical of 1.96. This shows that there is no significance difference between the opinions of Junior and Senior secondary school Students on the remedies to environmental factors to secondary school students' mathemaphobia in Ebonyi state.



Summary of Findings

This study was to determine the environmental factors to secondary school mathemaphobia in Ebonyi State. The result of both the research questions and the hypothesis shows that;

1. Family members, teachers, class members, Government and School Administrators, Culture and tradition have hand in secondary school students' mathemaphobia in Ebonyi state.
2. Government educational programmes and policy, unemployment are among the causes secondary school students' mathemaphobia in Ebonyi state.
3. Gender bias is also a major cause secondary school students' mathemaphobia in Ebonyi state. Where female are regarded as a weaker sex which cannot study mathematics that is believed to be for stronge people.
4. Poor incentives to mathematics students and teachers was also seen as one of the causes secondary school students' mathemaphobia.
5. Organising workshops, seminears,and conferences to educate people on the importance of mathematics will reduce mathemaphobia.
6. Provision of enough teaching and learning mathematics materials, use of learner centered methods of teaching will go along way in reduce mathemaphobia.
7. The study also discovered that; there no significance difference between the opinions of Junior and Senior secondary school Students on the environmental factors to secondary school students' mathemaphobia in Ebonyi state.
8. The study also discovered that; there no significance difference between the opinions of male and female secondary school students on the environmental factors to secondary school students' mathemaphobia in Ebonyi state.

Conclusion

The study found that; family members, teachers, class members, friends, Government educational programmes and policy, unemployment none availability of mathematics teaching and learning material, wrong method of teaching mathematics are the major causes of secondary school students' mathemaphobia.

The study suggested employment of enough qualified mathematics teachers, provision enough mathematics teaching and learning materials, use of learner centred method of leaching mathematics, organising workshops, seminears,and conferences to educate people on the importance of mathematics as ways to reduce mathemaphobia among secondary school students in Ebonyi State.

The hypothesis results shows that; there is no significance difference between the opinions of “junior and senior” and “male and female” students on the environmental factors to secondary school students' mathemaphobia in Ebonyi state.

Recommendations

Based on the results of the study, the following recommendations are made;

1. Parents and Guardians should be educated on the importance of mathematics to the overall development of their wards and cannot contribute in any way to madness of any kind. This will make them to encourage their wards to study mathematics and also discard the idea about mathematics.
2. Workshops and seminars should be organized for serving mathematics teacher regularly to update them on the recent developments in teaching and learning of mathematics and also to keep them a brace with the developments in the field of mathematics.
3. Mathematics instructors (mathematics teachers without mathematics teaching qualification) should be made to go through a detailed in service training on how to teach mathematics.
4. Unguided utterances about mathematics that suggests that mathematics is for people with special brain, can make one mad as mathematics, has no real life application etc should be guarded against especially from mathematics teachers and instructors.
5. Government should sponsor production of textbooks on the practical teaching and learning of mathematics in secondary schools. These textbooks will be reference materials for serving teachers in teaching of mathematics.
6. Modern methods of teaching mathematics should be adopted throughout the secondary schools in Ebonyi State. such methods like problem solving approach,



target task approach, laboratory approach, discovery approach, etc should be adopted in teaching of mathematics in Ebonyi State.

This if implemented will reduce the abstract nature of mathematics and go along way in reducing the fear of it.

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