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Impact of Persuasive Communication on Pupils Attitude towards Mathematics

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ABSTRACT

This study explores the impact of persuasive communication on pupils' attitudes towards mathematics, a subject often perceived as challenging and uninteresting by many students. The research aims to investigate whether persuasive communication strategies can positively influence pupils' attitudes, thereby enhancing their engagement and motivation in learning mathematics. Aquasi-experimental design was employed, involving a sample of pupils from selected schools. The experimental group received persuasive communication interventions, including messages highlighting the relevance and importance of mathematics in everyday life, while the control group did not receive such interventions. Data were collected through surveys and analyzed using statistical methods to compare the attitudes of both groups. The findings revealed that pupils who received persuasive communication interventions exhibited significantly more positive attitudes towards mathematics compared to the control group. Specifically, the intervention group showed increased interest, motivation, and confidence in learning mathematics. The study highlights the importance of effective communication in shaping pupils' attitudes towards mathematics and suggests that educators can play a crucial role in promoting positive attitudes by using persuasive communication strategies. The implications of this study are significant for mathematics education. By incorporating persuasive communication strategies into their teaching practices, educators can potentially improve pupils' attitudes towards mathematics, leading to better academic performance and increased interest in STEM fields. The study's findings also underscore the need for teacher training programs to emphasize the development of effective communication skills, particularly in promoting positive attitudes towards mathematics.

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INTRODUCTION

Mathematics is a universal subject taught to children in every part of the world. It is looked at as a life tool because everyone needs the knowledge of mathematics to function effectively and efficiently irrespective of one's job or profession. No wonder mathematics is a requirement for admission into all courses in tertiary institution. It is needed for the advancement of science and technology as well as development of problem solving skills. In mathematics, simple concepts like addition, subtraction, division, and multiplication which are usually encountered in our daily living are taught. Other concepts such as sorting, building, recognizing patterns, making comparison and describing environment are also involved in the teaching and learning of mathematics (Oloda et al., 2024). Mathematics is a requirement in every intellectual endeavor and human development to cope with challenges of life (Kunwar, 2020). Any foundation laid for children at the early age of life plays a very important role in the development of cognitive, physical skills and future academic performance. According to Meacham (2023), early childhood education set the goal for students to grow in cognitive development, enhance language and literacy skills, develop healthy social and emotional learning. Thus, children need to develop interest in mathematics even at the primary school level. This can be achieved through persuasive communication (Eriba, 2013).

Inspite of the recognized importance of mathematics and its broad applicability to everyday life, it is considered difficult hence poor performance is usually recorded in schools. Okafor and Anaduaka (2013) presented a statistical analysis of students' performance in mathematics between 2000 and 2011. The analysis of data obtained from WAEC department of research and statistics showed that no year recorded up to 40% credit pass except in 2008 that 57% was recorded. The failure may not be unrelated to the fact that the children had poor attitude towards mathematics even at the primary school level. This trend is not limited to Nigeria alone as Makondo and Makondo (2020) while comparing the performance of students in four subjects at Mavuzani High School Zimbabwe found that the performance of the students in mathematics was the least for the four years considered (i.e 2010-2013).

Different reasons have been attributed to this poor performance of students such as inappropriate teaching methods, teachers' ineffectiveness, inability to complete the syllabus and poor attitude of students (Tshabalata and Ncube, 2012). The attitude of students is of great importance. According to Okafor and Anduaka (2013), many students have obnoxious notion that learning mathematics is a very difficult task. It was observed that adults including parents, siblings, and teachers, do not see anything wrong in performing poorly in mathematics. This negative attitude could be as a result of poor orientation which often leads to negative mindset developed at the early stage of learning.

Uveriawe (2023) observed that children can develop negative mindset which leads to failure or positive mindset which leads to success. The negative mindset is usually formed by pupils based on what they hear from older pupils, siblings or even adults, not necessarily their own personal experience. Learner mindsets is critical in education and important for an in-depth understanding of the differences in learners performance in the classroom and also in forecasting differences in their eventual achievement (Uveriawe,2023). It is important to set a good foundation in mathematics for children early in life to develop a positive attitude that can carry them in their future academic performance. The impression that mathematics is an abstract and a difficult subject reserved for a selected few with 'magic" brain has to be changed (Okafor and Anaduaka, 2013). This orientation can be changed by making the children to see the need for the subject early in life, to know that the skill is required for life; that almost every aspect of life requires and involves one mathematical concept or the order; this can be achieved through persuasive communication (Eriba, 2013). This research set out to determine the impact of persuasive communication on pupils' attitude towards mathematics.

Persuasive communication simply means persuading others to understand what one is trying to get across to the listeners. It is usually intended to shape, reinforce or change the response of another or others. This is seen in advertisement, book reviews or even political rallies. Persuasive communication plays very important role in education, it encourages and motivates students to adopt attitudes and behaviours that will bring about learning and self-development. Through effective communication educators can make students to participate effectively in classroom activities (Eriba, 2013). Ogunbuyi et al. (2019), used persuasive communication to change test anxiety and negative attitude towards mathematics of students in Nigerian Air Force Secondary schools. Also, Etonihu and Agu (2020), found a significant difference in the attitude rating of students who were taught reproductive health education using persuasive communication strategy compared to those taught using the conventional teaching method. Could persuasive communication be used at the primary level to motivate pupils' interest in mathematics? Persuasive communication strategy using primary school pupils may change their orientation/mindset towards mathematics and hence make them develop desired attitude towards mathematics that can foster good achievement.

Though there are different types of persuasive communication theory, the one chosen for this research is Rational Model Theory. This theory is based on the fact that people behave in predictable ways based on their beliefs and values (Roling, Foster, and Clayton, 2023). This theory requires that the audience be presented with

evidence that their beliefs are wrong. At the primary school level, the pupils often hold the belief that mathematics is difficult and reserved for a few. Showing them that this notion is wrong by presenting to them evidence that mathematics is meant for all may bring about a change in mindset and hence attitude.

Studies revealed that students perform poorly in mathematics (Karikari, et al., 2020; Mabena et al., 2021; Bah, 2022). This poor performance has been attributed to many factors prominent being the attitude of students towards mathematics. The attitude is so much so that it is more or less an accepted norm. No one feels ashamed to mention his/her poor performance even in public (). The fact that the society, siblings, parents and even teachers do not see anything wrong in this poor performance is a cause to worry. Mathematics is a subject required by everyone to function effectively and efficiently in life and for technological advancement of a nation. The poor attitude shown by students is likely to have been picked at the primary school due to bad comments about mathematics from senior school mates, siblings, parents, and other adults. Is it likely that this poor orientation can be changed from the primary school; to catch them young using persuasive communication aimed at making the pupils to see the need and value of mathematics in their lives?

In light of the above data, the present study was designed to

i. Determine the attitude of primary school pupils in Pankshin LGA of Plateau State towards mathematics.
ii. Determine the effect of persuasive communication strategy on the attitude of the pupils towards mathematics.
iii. Determine the effect of gender on the change of attitude of the pupils towards mathematics.

Research question and Hypothesis

The following questions were asked to guide the study

i. What is the attitude of primary school pupils in Pankshin LGA towards mathematics?
ii. What is the impact of persuasive communication strategy on the attitude of the pupils?
iii. Is the effect of the persuasive communication strategy affected by gender of the pupils?

Also the following hypotheses were tested at 0.05 level of significance:

i. There is no significant difference in the mean score of the pupils on the persuasive communication strategy before and after treatment.
ii. There is no significant difference on the effect of persuasive communication strategy based on gender

METHODOLOGY

Design: the research used a pre-test post-test quasi-experimental design. The pre-test and post-test were administered to samples of intact classes learning under comparable classroom conditions. The control and experimental groups were selected from two different schools. One school served as the control and the other school served as the experimental group. This was done to tackle the effects of diffusion. The control group did not receive the persuasive communication strategy but the experimental groups did.

Population and Sample: the population for the study was 1000 pupils of Fatima Primary School Pankshin and Federal College of Education Demonstration Center Pankshin. A random sampling technique was used for selecting the sample of 108 pupils for experimental group and 50 pupils for control group in two intact classes of 3 and 4 in both schools respectively.

Instruments for Data Collection: A questionnaire was used which consisted of two sections: section A and section B. in section A, the bio-data of the pupils was sought. Section B consists of 15 statements on a 3-point Likert Scale comprising seven positive statements and eight negative statements. The statements were concerned with student attitudes and general beliefs about mathematics.

Procedure for Data Collection/ Administration of treatment: nine research assistants were used which comprised of the class teachers and the mathematics teachers. A pre-test was administered using the questionnaire before the treatment. The treatment- math rhyme, was administered to the pupils with the help of the research assistants. The pupils were made to chant the rhyme at least twice a day for two weeks. The rhyme is as follows:

I love math, math is fun, and math is for my own good. I need mathematics in my life, everybody needs mathematics. I use mathematics every day. During play, at home, in dressing, in walking, in cooking, or in the farm. Oh! Oh! Math, math, math! Everywhere I go, I need math to do things well. I love math, math is a friend not an enemy.

After two weeks, the post-test was administered using the questionnaire again.

Statistical Analysis: the data was collected and analyzed using mean, t-test and one-way ANOVA.

RESULT

Table 1: The effect of persuasive communication strategy on attitude

S/N	Statements	CONTROL (PRE-TEST) N=50	CONTROL (POST-TEST)	EXPERIMENTAL (PRE-TEST) N=108	EXPERIMENTAL (POST-TEST)
1	I like mathematics	1.86	1.90	2.29	2.72
2	I often do mathematics practices	1.96	1.76	1.85	2.53
3	I do math's assignment/homework	2.38	2.38	2.37	2.63
4	I feel bad when I fail mathematics problem	1.92	1.94	2.31	2.39
5	I stop practicing mathematics problem when I fail.	2.14	2.14	1.81	2.44
6	I blame the teacher when I fail mathematics problem	2.08	2.04	2.09	2.26
7	Mathematics should be for only intelligent people.	1.82	2.02	1.91	2.39
8	I can live without mathematics	1.70	2.08	2.23	2.36
9	my heart skips when our next lesson is mathematics	1.70	1.94	1.97	2.27
10	I feel good and wait for mathematics lesson always	1.78	1.78	2.04	2.32
11	I can fail mathematics it doesn't matter	2.12	2.12	2.06	2.44
12	my parent will not be happy with me if I fail mathematics	2.28	2.28	2.48	2.48
13	I do my corrections when I fail mathematics problem	2.54	2.48	2.33	2.59
14	I believe maths is difficult because my friends say so	1.82	1.82	1.70	1.79
15	if maths is needed in my future career, I will still read the course	1.90	1.90	2.15	2.15
Average Mean Score		2.00	2.04	2.11	2.38

Table 1 shows the effect of treatment on the attitude of the pupils. The mean score of both the control and experimental group is 2.00 and 2.11 respectively. This is considered low. Though these values are up to the criteria or acceptance which is 2.00. It is not an encouraging attitude that will spur pupils to study mathematics as is required for scientific advancement. Thus, the attitude of primary school pupils in Pankshin LGA towards mathematics is not very good. However, there was a change in their attitudes as seen in the table. The mean score for the experimental group increased from 2.11 to 2.38 after treatment, which is an increase of 0.27. This implies that the treatment had an effect on the pupils. So persuasive communication strategy has effect on the attitude of the pupils.

Table 2: Effect of Persuasive Communication Strategy on Attitude towards Mathematics Based On Gender for Experimental Group

S/N	Statements	MALE (PRE-TEST) N=60	MALE (POST-TEST)	FEMALE (PRE-TEST) N=48	FEMALE (POST-TEST)
1	I like mathematics	2.28	2.75	2.31	2.69
2	I often do mathematics practices	1.85	2.47	1.85	2.60
3	I do math's assignment/homework	2.37	2.63	2.38	2.63
4	I feel bad when I fail mathematics problem	2.28	2.4	2.33	2.39
5	I stop practicing mathematics problem when I fail.	1.75	2.47	1.88	2.39
6	I blame the teacher when I fail mathematics problem	2.08	2.25	2.10	2.27
7	Mathematics should be for only intelligent people.	1.92	2.42	1.89	2.35
8	I can live without mathematics	2.22	2.35	2.25	2.35
9	my heart skips when our next lesson is mathematics	1.93	2.28	2.02	2.25
10	I feel good and wait for mathematics lesson always	2.05	2.35	2.02	2.29
11	I can fail mathematics it doesn't matter	1.95	2.43	1.94	2.44
12	my parent will not be happy with me if I fail mathematics	2.48	2.48	2.48	2.48
13	I do my corrections when I fail mathematics problem	2.35	2.58	2.31	2.60
14	I believe maths is difficult because my friends say so	1.50	1.50	1.96	2.17
15	if maths is needed in my future career, I will still read the course	2.17	2.20	2.15	2.08
Average Mean Score		2.08	2.37	2.13	2.40

Table 2 shows the effect of the persuasive communication strategy on the pupils based on gender. From the table, it is clear that the mean score of the pupils increased after treatment with the male increasing by 0.29 and the females increasing by 0.27. Thus gender has no effect on how the pupils received the treatment. From the control group shown in table 3, the difference is observed to be 0.04 for males and 0.03 for the females. The increase in the attitude may be as a result of the familiarity of the questions.

Table 3: Effect of Persuasive Communication Strategy on Attitude towards Mathematics Based on Gender for Control Group

S/N	Statements	MALE (PRE-TEST) N=28	MALE (POST-TEST)	FEMALE (PRE-TEST) N=22	FEMALE (POST-TEST)
1	I like mathematics	1.82	1.86	1.50	1.54
2	I often do mathematics practices	2.00	1.75	1.50	1.43
3	I do math's assignment/homework	2.39	2.36	1.86	1.89
4	I feel bad when I fail mathematics problem	1.93	1.96	1.50	1.50
5	I stop practicing mathematics problem when I fail.	2.11	2.11	1.71	1.71
6	I blame the teacher when I fail mathematics problem	2.11	2.00	1.61	1.64
7	Mathematics should be for only intelligent people.	1.86	2.00	1.43	1.61
8	I can live without mathematics	1.68	2.07	1.36	1.64
9	my heart skips when our next lesson is mathematics	1.68	1.96	1.36	1.50
10	I feel good and wait for mathematics lesson always	1.79	1.79	1.39	1.39
11	I can fail mathematics it doesn't matter	2.07	2.07	1.71	1.71
12	my parent will not be happy with me if I fail mathematics	2.29	2.29	1.79	1.79
13	I do my corrections when I fail mathematics problem	2.54	2.50	2.00	1.92
14	I believe maths is difficult because my friends say so	1.82	1.86	1.43	1.39
15	if maths is needed in my future career, I will still read the course	1.89	1.93	1.50	1.50
AVERAGE MEAN SCORE		1.99	2.03	1.58	1.61

Table 4: Paired T-Test Comparing the Pre-Test and Post-Test of Experimental Group

TEST PHASE	N	MEAN	SD	T	df	P(two-tailed)	t-critical (two-tailed)
PRE-TEST	15	226.87	24.95	5.04	14	0.000187*	2.14
POST-TEST	15	257.47	23.96				

P≤ 0.001

Table 4 shows that there is a significant difference in the mean score of the pre-test and post-test of the experimental group

Table 5: Paired T-Test Comparing the Pre-Test and Post-Test of Control Group

TEST PHASE	N	MEAN	SD	T	df	P(two-tailed)	t-critical (two-tailed)
PRE-TEST	15	100.00	12.58	-1.08	14	0.296	2.14
POST-TEST	15	101.93	10.68				

P≤ 0.001

Table 5 shows no significance difference in the mean score of the control group for both pre-test and post-test.

Table 6: Independent Samples T-Test Comparing Control and Experimental Groups on Post-Test Scores.

GROUP	N	MEAN	SD	T	df	P(two-tailed)	t-critical (two-tailed)
CONTROL	15	257.47	23.96	22.97	19	2.53E-15	2.09
EXPERIMENTAL	15	101.93	10.98				

P≤ 0.001

Table 6 confirms that the treatment had a serious effect on the students attitude towards mathematics after treatment. The table shows a significant difference in the mean scores of the experimental and control group.

Table 7: Gender-Based Differences in Persuasive Communication Strategy

SOURCE OF VARIATION	SS	Df	MS	F	P-VALUE	F-CRIT
BETWEEN GROUPS	3.29	1	3.29	0.0022	0.96	5.98
WITHIN GROUPS	9145.81	6	1524.30			
TOTAL	9149.11	7				

P≤ 0.001

DISCUSSION

The findings of this research shows that like Eriba 2013 and Ogunbuyi et al., 2019, the attitude of the pupils towards mathematics can be changed using effective communication. A positive attitude towards mathematics is highly needed for not just better performance but also for effective living as application of mathematical concepts are usually needed to cope with challenges of life (Kunwar, 2020).

Since early childhood education plays very important role in the future education of children (Menchan, 2023), it becomes imperative that children should be made to develop positive attitude towards mathematics. Some of the negative attitude towards mathematics are just impression picked from the environment such as believing mathematics is difficult because their friends say so and that mathematics is for intelligent people. Changing this mindset through persuasive communication will surely bring about positive attitude towards the study of mathematics. The treatment given to the children made it clear that mathematics is need by everybody and everywhere. That is a friend and not an enemy. If this mindset is imbibed the attitude will change this will be followed by better attitude as mathematics phobia (Kunwar, 2020) will disappear.

CONCLUSION

It was observed that students perform poorly in mathematics. The poor performance is attributed among other factors to poor attitude towards mathematics. The research was then carried out to see if the attitude of primary school pupils can be changed through effectively communication to catch them young. The research from the analysis of the results show that this is very possible. Thus making positive effort using the correct approach can change the attitude of pupils towards mathematics.

RECOMMENDATION

From the findings, it is hereby recommended that:

1. Teachers should use effective communication at the primary schools to change the pupils' attitude towards learning.
2. The mathematics rhyme used here can be presented to pupils to make them learn early in life that they need mathematics and that it is not an enemy but a friend.

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