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NUMERACY ANXIETY AS A CORRELATE OF PUPILS' ACADEMIC PERFORMANCE IN ASA LOCAL GOVERNMENT AREA, KWARA STATE

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Abstract

This study investigated numeracy anxiety as a correlate of pupils' academic performance in Asa local Government, Kwara State. The study adopted correlational research design. The population for the study comprised2,711basic five pupils in both public and private basic schools. Krejcie and Morgan (1979) table was used to determine the total number of 335 basic five pupils in both public and private basic schools in Asa Local Government Area, Kwara State. Two instruments were used for the study "Numeracy Anxiety Scale" (NAS) and Numeracy Academic Performance Test (NAPT)were subjected to validity by the experts in Department of Early Childhood and Primary Education Kwara State University, Malete and a test-re-test reliability procedure was used to determine the reliability index of NAS (r=0.76).One research question was raised using descriptive statistic of percentage and mean and three research hypotheses were formulated using PPMC to test hypothesis one while t-test to test hypotheses two and three at 0.05 level of significance. The findings of the study revealed that numeracy anxiety had a significant relationship on pupils' academic performance (r= .161; p<0.05). However, gender (t = 6.637; p > 0.05) and school type (t = 2.103; p > 0.05) did not have significant difference in pupils' numeracy anxiety in Asa local Government. The study concluded that numeracy anxiety determined pupils' academic performance. Also, gender and school type had no influence on pupils' numeracy anxiety. It was recommended that teachers should provide support for pupils who experience numeracy anxiety through one-on-one support, in order to build their confidence and skills in handling numeracy and to improve their academic performance.

Keywords: Numeracy, Anxiety, Pupils' Academic Performance

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INTRODUCTION

Numeracy has been a matter of concern in education for a long time, there is a common perception that the subject is very difficult and as much as possible pupils tends to avoid numeracy. Avoiding numeracy severely restricts the fields a child can study and the jobs one can find Nowadays, however, many have realized the importance of numeracy, not only from the point of view of getting an academic qualification at school, but is also a subject that prepares one for the future, irrespective of which work of life one chooses to be a part of (Sa'ad et al., 2014**).**

Like other subjects, there are numeracy disabilities, which keep children from performing to their full potential in school and beyond. As the world's dependance on technology has grown, so too has the demand for people who can think in the abstract terms of math and science. The disparity between those who learn math with relative ease and those who struggle with math disabilities is widening at an alarming rate. Research indicates that there are a number of reasons the pupils experience difficulty learning numeracy (Akinet al., 2018).

Numeracy is an essential subject in education that inspires the development of learners' abstract thinking and problem-solving skills. According to Cresswell and Speelman (2020), learning and mastery of numeracy facilitate logical, analytical, critical, and abstract thinking among children. Numeracy offers fundamental skills such as thinking in life, establishing relationships between events, reasoning, estimating, problem-solving apart from gaining calculation skills and teaching numbers and numerical operation (Umay et al., 2017). Besides that, numeracy also provides a supportive role in understanding and mastering other sciences and art subjects. Hence, it is crucial for educators to understand the learners' barriers in learning numeracy, as it is common for pupils to have negative perceptions towards numeracy (Ashcraft, 2012).

Numeracy is essential in every facet of life as numerical skills and a fundamental requirement for daily life effectiveness (Gafar etal., 2015). Numeracy stimulates involvement and success in many careers especially those in the fields of Science Technology Engineering and Mathematics(STEM)(Ferguson et al., 2015).Following research findings that numeracy is poorly performed which causes the following factors that attributed to the subject; inadequacy of resources and teaching personnel, anxiety and fear of numeracy, poor teaching methods, overcrowded classrooms and pupils' numeracy skills and comprehension (Sa'ad et al., 2014).Scarpello (2017) reports that 75% of students stop the study of Mathematics at higher level of education and avoid many careers that related to mathematics. Therefore, Anxiety is one of the main reasons for these avoidance behaviors. Ashcraft (2012) also reported that pupils show a severe negative emotional response in situations that involve numerical activities, a situation referred to as Math (numeracy) anxiety (Ruff & Boes, 2014).

Numeracy anxiety refers to feelings of fear, worry, stress and mental bafflement that emerges among some individuals specifically related to numeracy tasks or situations(Akinola, 2020). It is a condition of a decline in feelings, confusion, and frustration in numerical thinking and understanding (Pradeep, 2011). Khatoon and Mahmood (2013) stated that numeracy anxiety also contributes to a person's feelings of discomfort and anxiety which interfere with number manipulation and numerical problem-solving in a wide range of ordinary and academic settings.

Furthermore, the causes of numeracy anxiety fall within three major factors; the dispositional, situational and environmental factors (Johnson,2017).The dispositional factors deal with psychological and emotional features such as attitude towards the learning of numeracy, self-concept about numeracy and learning styles. The situational factors are direct features that result from their particular numeracy topic concerning the nature of the concept and how it is designed and carried out, the availability of or conversely lack of feedback. The environmental factors are the characteristics that affect the pupils prior to their learning numeracy topics, for example; age, gender and previous numeracy experience. People believe that numeracy anxiety and inability to be successful in numeracy are inherited from one's parents. Other

factors like peers' influence, teachers' attitude toward numeracy teaching, gender and self-doubt may increase or decrease ones' confidence in numeracy skills. Different approaches to numeracy and problems solving can affect pupils feeling of self-confidence, attitudes and most resulting to numeracy anxiety. Numeracy anxiety takes an immediate effect in numerical-related situations in everyday experiences as well as evaluative classroom situations such as answering a question in front of their peers, examinations, or any other learning assessments in the classroom(Ramirez etal., 2018). Ching (2017) stated that numeracy anxiety is an important issue and a barrier that learners must overcome as it influences pupils' academic performance in numeracy.

Academic performance among pupils do not certainly reflect the pupils' failure to grasp numerical concepts as anxiety towards numeracy may interfere with pupils' ability to solve numerical problems (Blazer, 2018).A range of research has shown that gender might modulate the numeracy anxiety-performance link Recent studies have suggested that the measurement of different aspects of math performance had variable effects on the correlation between maths anxiety and math performance (Ramirez*et al.,* 2016). For example, Beilock *et al.,*(2014) found a strongly math anxiety-performance link especially in mathematical reasoning, which assessed advanced problem-solving skills. In contrast, Harari et al. (2013)reported a weak link between maths anxiety and digital calculation, which assessed basic computational skills. In terms of the measurement form, both standard tests (e.g., Henschel and Roick, 2017; Wu *et al.,* 2017) and custom assessments (e.g.,Necka et al., 2015; Ganley and Mcgraw, 2016) were used to estimate math performance, which have not previously been noted. Overall, the incorporation of the measurement aspects and forms of math performance as two potential moderator variables (measurement aspects of math performance vs. measurement forms of math performance) in the present study was necessary.

Another interested variable is gender, it has been suggested to modulate math anxiety (Mustafa *et al.,* 2016) however, the findings were inconsistent. Several studies showed significantly stronger numeracy anxiety in females than in males (Gunderson et al., 2018) For example, Maloney et al. (2012) suggested that female might have stronger numeracy anxiety than male when dealing with tasks that involve numerical skills. Other findings suggested that girls had greater characteristic numeracy anxiety than boys; however, they did not experience higher level numeracy anxiety than boys during numeracy content learning or a numeracy content test(Goetz et al., 2013). In light of these inconsistent findings, the consequence of gender on the numeracy anxiety performance link should be explored.

Previous studies have implied that school type may also influence the numeracy anxiety-performance link. For example, the negative math anxiety-performance link was stronger in private schools than in the public schools according to the findings (Gafar,2015). Gafar, (2015)found a negative link between numeracy anxiety and academic performance in public schools. Moreover, Johnson, et al. (2017) also indicated a negative link between numeracy anxiety and academic performance private schools. Another research, academic achievement is highly valued, which would lead to the high-level anxiety of public schools(Akin, & Kurbanoglu, 2018). In contrast, children seem to be less critical of their academic performance and feel relaxed in public schools. This relationship was also examined by several studies that compared one or two schools. However, no consistent results have been found, which made it difficult to claim a general pattern of this link across schools. Therefore, additional details regarding howcross-cultural information modulated this negative relationship are needed.

However, Seng (2015) study found that there was a positive relationship between mathematics anxiety and numerical anxiety on students' mathematical performances, where students' anxiety prior to an examination showed better results in their mathematics achievements, compared to students' anxiety post examination, during quizzes, or while solving challenging mathematical problems. In addition, the study also found that students' anxiety in daily life's application was the highest compared to students' anxiety in four basic operations in numerical anxiety (Seng, 2015). Therefore, higher levels of mathematics anxiety among the students are linked to lower performance in schools or college tests or assessments with various factors (Pantoja et al., 2020) and current research reveals that the numeracy anxiety and numeracy performance link is associated with both individual factors (cognitive, affective/physiological, motivational) and environmental (social/contextual) factors(Chang, 2016).

In this study, the researcher seeks to investigate numeracy anxiety as a correlate of pupils' academic performance in Asa Local Government, Kwara State it has been observed from the literature reviewed that study of this type has never been carried out in Asa Local Government Area of Kwara State. Therefore, this is meant to fill the gap requiring empirical evidence regarding numeracy anxiety as a correlate to pupils' academic performance in Asa Local Government, Kwara State.

Statement of the Problem

Over the years, it has been identified that numeracy has been emphasizing on textbooks reading and its memorization rather than nurturing critical analysis. This trend has posed a serious encounter in the academic performance of pupils in numeracy, there has also been a noticeable lack effort from various education stakeholders to address the challenges. Since basic schools is the foundational of all levels of education where numeracy anxiety is demonstrated, no doubt, it will cause serious problem to pupils when they transit to higher levels of education. Therefore, this study seeks to identify and proffer appropriate measure towards alleviating or eliminating numeracy anxiety on pupils' academic performance in Asa Local Government area, Kwara State.

Research Question

1. What is the level of pupils' numeracy anxiety in Asa Local Government?

Research Hypotheses

$H_0$1: There is no significant relationship between pupils' numeracy anxiety and academic performance in Asa Local Government, Kwara State.

$H_0$2: There is no significant difference in pupils' numeracy anxiety based on gender in Asa Local Government, Kwara State.

$H_0$3: There is no significant difference in pupils' numeracy anxiety based on school type in Asa Local Government, Kwara State.

Methodology

The study adopted correlational research design. The design allowed to know if there are existing relationship between pupils' numeracy anxiety and academic performance. The targeted population for this study were all the private and public school primary five pupils in Asa local Government area, Kwara State. According to Kwara State School Census (2018-2019), there are total number of2,088pupils in public primary schools and 623pupils in private primary schools in Asa Local Government Area of Kwara State, out of which 335 primary five pupils in both private and public schools were used as sample size, the study adopted the Krejcie and Morgan 1970 sample table. The instruments for this study were" Numeracy Anxiety Scale" (NAS)and comprised 10 items concerning situations involving numeracy anxiety scale and was based on a 3-point Likert scale (3—Always, 2—Sometimesand 1—Never), while Numeracy Academic Performance Test (NAPT)adapted from the Mathematics for Primary Schools book 5 which was used to test pupils' performance in numeracy. The instruments were validated by experts in the Department of Early Childhood and Primary Education Kwara State University, Malete, the corrected version was used to determine the reliability in both private and public primary schools in Moro Local Government area of Kwara state which is not part of the study using Test re-test method. The results of the first and second tests were used to determined internal consistency of the instrument and it yielded a reliability coefficient of 0. 89, while the numeracy test was further subjected to pilot testing. Reliability coefficient was established using Kudar Richardson (21) formular at 0.76.Descriptive statistic of percentage and mean were used to answer the research question while Pearson Product-Moment Correlation (PPMC)was used to test hypothesis one while t-test was used to test hypotheses two and three at 0.05 level of significance.

Results

Research question: What is the level of pupils' numeracy anxiety in Asa Local Government?

Table 1

level of Pupils' Numeracy Anxiety in Asa Local Government

S/N	Items	Mean
1	Numeracy-related tasks makes the pupils feel nervous	**2.09**
2	It is challenging for the pupils to concentrate on numeracy problems because of the anxiety	**1.63**
3	Multi-related situations caused the pupils feel overwhelmed.	**1.73**
4	The pupils compare theirnumeracy capabilities negatively to others	**2.37**
5	Pupils feel tense especially when they are in numeracy classes or engaging in numeracy activities	**1.87**
6	Pupils believed they can improve in numerical skills with proper support and strategies.	**1.86**
7	Pupils prefer doing something else than work on numeracy problems	**1.77**
8	The pupils found it difficult solving numeracy problem in a time limited setting	**2.33**
9	Numeracy has always been a source of stress for the pupils due to the nature of the subject	**2.22**
10	The pupils often feel worry on their poor performance in numeracy	**2.00**
	Weighted Average	**1.98**

Decision: Low: 0.00 – 1.49 Average: 1.50 – 2.49 High: 2.50 – 3.00

Table 1 shows the responses in the level of pupils' numeracy anxiety in Asa Local Government Area, Kwara State. It was indicated that the following items were average: It is challenging for the pupils to concentrate on numeracy problems because of the anxiety (Mean=1.63), Multi-related situations caused the pupils feel overwhelmed (Mean=1.73), pupils feel tense especially they are in numeracy classes or engaging numeracy activities (Mean=1.87), pupils believed they can improve in numerical skills with proper support and strategies (Mean=1.86), pupils prefer doing something else than work on numeracy problems (Mean=1.77), Numeracy-related tasks makes the pupils feel nervous (Mean=2.09), I often compare my abilities negatively to others (Mean=2.37), Numeracy problem solving in a time limited setting. (Mean=2.33), Numeracy has always been a source of stress for me due to the nature of the subject (Mean=2.22) and the pupils often feel worry on their poor performance in numeracy (Mean=2.20). The weighted average (**1.98**) which is a numeric indicator that the level of pupils' numeracy anxiety in Asa Local Government Area of Kwara State was average

Research Hypothesis One: There is no significant relationship between pupils' numeracy anxiety and academic performance in Asa Local Government Area of Kwara State

Table 2

Summary of correlation analysis showing the relationship between pupils' numeracy anxiety and academic performance in Asa Local Government Area, Kwara State

Variable	N	Mean	SD	r	Df	Sig.	Decision
Numeracy Anxiety	335	32.22	2.215	.161	333	.023	Significant
Academic Performance		60.24	9.070				

Table 2 shows that there is no significant relationship between pupils' numeracy anxiety and academic performance in Asa Local Government Area of Kwara State. The calculated value of rcal was .161 and degree of freedom was 333, the observed P-value ($p<0.05$). Therefore, the null hypothesis that states that there is no significant relationship between pupils' numeracy anxiety and academic performance in Asa Local Government Area, Kwara state was rejected. This implies that there was a relationship between numeracy anxiety and pupils' academic performance in Asa Local Government Area of Kwara state.

Hypothesis Two: There is no significant difference in pupils' numeracy anxiety based on pupils' gender.

Table 3

significant difference in pupils' numeracy anxiety based on pupils' gender.

Gender	N	Mean	SD	t	Df	Sig	Decision
Male	143	31.13	2.391	6.453	333	.409	Not Significant
Female	192	33.04	1.663				

Table 3 show the difference in pupils' numeracy anxiety based on pupils' gender. ($t = 6.453$; $df = 333$; $p > 0.05$). The hypothesis is therefore not rejected in the light of the result since the significant value is greater than 0.05. This implies that there was no significant difference in pupils' numeracy anxiety in Asa Local Government Area of Kwara State based on gender.

Hypothesis Three: There is no significant difference in pupils' numeracy anxiety based on pupils' school type.

Table 4

Table showing the significant difference in pupils' numeracy anxiety based on school typein Asa Local Government Area, Kwara State.

School type	N	Mean	SD	t value	Df	Sig	Decision
Public	182	32.49	1.918	2.111	333	.307	Not Significant
Private	153	31.82	2.559				

Table 4 show the difference in pupils' numeracy anxiety based on pupils' school type. ($t = 2.111$; $df = 333$; $p > 0.05$). The hypothesis is therefore not rejected in the light of the result since the significant value is greater than 0.05. This implies that school type had no significant difference in pupils' numeracy anxiety based on school type in Asa Local Government Area, Kwara State

Discussion of Findings

The findings of this study revealed that the level of pupils' numeracy anxiety in Asa Local Government Area of Kwara State was average. This implies that numeracy anxiety could be developed as a result of a pupils' prior negative experiences learning numeracy in the classroom or at home. This finding is in line with Adam (2018) which revealed that there was no significant relationship between pupils' numeracy anxiety and academic performance in Asa Local Government area of Kwara State. This implies that Anxiety determines pupils' academic performance in numeracy. This study is also in tandem with Akin (2018) which stated that there was no positive correlation between Mathematics anxiety and Mathematics attitude in Oyo State, Nigeria. This implies that numeracy anxiety has positive correlation with pupils' academic performance. This study is also in line with Blazer (2019) who reported that numeracy attitudes of basic school pupils were not linked to their numeracy anxiety.

The finding of the study further revealed thatthere was no significant difference in pupils' numeracy anxiety in Asa Local Government Area of Kwara State based on pupils' gender. This implies that gender had no influence in pupils' numeracy anxiety. Similarly, this finding supported Gafar (2015) who stated that there was a highly significant negative influence between anxiety level and mathematics achievement based on gender. This finding also supported in the test score of Karimi (2017) which stated that there was no difference in the anxiety levels of male and female respondents. The study confirmed the results of difference in anxiety levels of males and females.

The finding of the study revealed that there was no significant difference in pupils' numeracy anxiety in Asa Local Government Area of Kwara State based on pupils' school type. This implies that school type had no influence in pupils' numeracy anxiety. Similarly, the study supported the finding by Gunderson et al. (2018) who found out that school type had no significant difference in students' math anxiety to their mathematics performance.

Conclusion

Based on the findings of the study, it can be concluded that numeracy anxiety determined pupils' academic performance in Asa Local Government area of Kwara state. Also, pupils' numeracy anxiety had no influence on gender and school types.

Recommendations

Based on the above findings, the following recommendations were made

1. Teachers should provide support for pupils who experience numeracy anxiety through one-on-one support, and create a supportive learning environment in which pupils do not feel threatened and allow them to relax
2. Teachers should also provide gender specific support by encouraging the female pupils and build their confidence on numeracy and other science subjects
3. Use variety of strategies, different pupils learn in different ways, so it is important to use range of teaching strategies especially encourage child-centered method. This may include visual aids, hands-on activities and group work.

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