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GENDER INFLUENCES ON READING AND ARITHMETIC COMPETENCES AMONG PRIMARY SCHOOL PUPILS IN EBONYI STATE, NIGERIA

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Abstract:
Background and Aim: Researchers have reported that gender stereotypes influence reading and arithmetic competencies globally, limiting learners' achievements in these basic foundational domains. These reports prompted the researchers to conduct this study. Four (4) research questions and two hypotheses guided the study. **Materials and Methods:** A descriptive quantitative research survey design was adopted for the study. The population of the study comprised all the pupils in public and private basic schools in Ebonyi State. The sample of one hundred and thirty-eight (138) pupils was drawn from three L.G.As of the state. The instruments for data collection were the Reading and Arithmetic Assessment Tools, developed and validated by UNICEF. The instrument was adopted as appropriate for the study after thorough scrutiny by the experts. **Results:** The findings showed that the males' arithmetic competence level at the 2-digit level is higher than that of the 1-digit level of the females, while the female competence level in reading was higher than that of the males. **Conclusion:** Based on these findings, the researchers recommended that the Ebonyi State Ministry of Education should train teachers of basic education on gender sensitivity in classroom practices; sensitize parents on gender sensitively in education practices and recommend only materials that promote gender sensitivity for use in schools.

Keywords: gender; reading; arithmetic; competencies; theory

1. Introduction

Educational literatures are replete with reports of the influences of gender on academic competences, especially in the domains of reading and arithmetic; consequently, education researchers have made efforts to explain the possible causes. Before delving into the diverse explanations adduced by the researchers, it is expedient to define some concepts that will appear frequently in this discussion. Gender, according to Collins Dictionary (2025), is the state of being male or female in relation to the social and cultural roles that are considered appropriate for men and women. To Merriam Dictionary (2025), gender refers to the behavioral, cultural, or psychological trait typically associated with one sex. In education, Buchman and Edmunds (2018) had stated that the study of gender and education encompasses gender differences in educational outcomes such as achievement, attainment and experiences within the educational system. According to Wikipedia (2025), gender in an educational context refers to the socially constructed roles, behaviors, expressions, and identities of individuals, distinct from biological sex, which manifest within the educational environment and system. Understanding of the socially constructed roles is crucial for promoting inclusivity and addressing gender inequalities in education and society (Wikipedia, 2025). Since gender influences access to educational learning environment and outcomes, educators and school managers have crucial roles

to play to counteract those social constructs that create inequalities in educational access and learning, which transcends narrow stereotypes.

Reading as a is the process of looking at a series of written symbols and getting meaning from them (English Club 1997-2025). To Grell, Sandhu and Blakeley (2023), reading is a cognitive process that involves decoding symbols to arrive at meaning. Reading with a purpose helps the readers to direct information towards a goal and focuses their attention (Grell *et al.*, 2023). For educators and education managers, reading constitutes a multifaceted process involving such areas as fluency, spelling, alphabet word recognition, phonemic awareness, etc. (Wikipedia, 2015), and to gain proficiency in reading, at an early stage of learning, systematic phonic or specifically, synthetic phonics is adopted. Synthetic phonics is an instructional reading approach in which children learn to read by first learning individual letter sounds (phonemes) and then blending those sounds together to form words (National Literacy Trust, 2025). One of the fundamental objectives of basic education in Nigeria is for children to acquire basic literacy (FRN, 2013), and for this objective to be achieved, it requires that reading must be taught effectively and explicitly, because one of the tools of literacy is reading (Calderwood & Janovjky, 2023). The ability to read is a foundational skill for learners. Educators must eliminate all obstacles that create disproportionate opportunities for children to acquisition of reading competences as reading is important in cognitive development, gaining a deeper understanding, development of empathy and improving literacy skills (Coller, 2019).

Arithmetic as a concept connotes the branch of mathematics dealing with the properties and manipulations of numbers (Oxford Languages Dictionary). It is the fundamental of mathematics that includes the operation of numbers, which include addition, subtraction, multiplication and division (BYJU'S, 2025). It is one of the important branches of mathematics that lays the foundation of the subject for learners (Byjus, 2025). Arithmetic plays an important role in math readiness, which occurs when children begin exploring basic mathematical concepts like number recognition, counting, shapes, patterns, categorizing and sorting. It builds foundational skills, boosts confidence and develops critical thinking and problem-solving abilities (Shichida Australia, 2025). It is obvious that knowledge of arithmetic is basic to understanding mathematics at later stages of education and everyday life activities. It is the foundation for the acquisition of knowledge for practical calculations, in shops, homes, schools, etc. Since this is the case, education managers should therefore provide unhindered opportunities for children to learn and master arithmetic, as it is a precursor to the learning of some subjects in schools and the conduct of daily activities.

Reading competence refers to the basic underlying abilities without which reading printed language could not be fully accomplished (Sadoski, 2004). It could also be conceptualized as a combination of knowledge and skills that allow a person to select, understand and organize information provided in sound and letter form and successfully use it for public purposes (Toshtemirova, 2019). Arithmetic competence, on the other

hand, is the ability to develop and apply arithmetic insight and thinking in order to solve a range of problems in everyday situations (Youth Pass, 2025). According to Mallillin and Rapsing (2025), it is a set of skills that enable citizens to effectively apply useful arithmetic in a variety of contexts.

Basically, competences in reading and arithmetic are the crucial foundational competences or skills necessary for effective societal participation, individual growth, and development, academic and occupational success. The interconnectivity of the two basic competences in personal development makes them vital, as the lack of any one could adversely affect the overall survival in life and the individual's cognitive development. The important symbiotic relationship between reading and arithmetic was amplified by Intercultural Development Research Association (IDRA) (2003) when they advised that hands-on mathematics must be combined with hands-on activities. They maintained that reading activities can help pupils analyze, interpret and communicate mathematics ideas and that hands-on mathematics can stimulate curiosity, engage pupils' interest and build important prior knowledge. Despite the importance of reading and arithmetic competences in individual well-being, there are evidences that disparities exist in male and female pupils' competences in the two domains. Some gender related factors have been established to mediate between reading and arithmetic and competences. For instance, Baruch and Levy (2024) had noted that the origin of gender differences in arithmetic has been attributed to sociological influences and stereotype threat, which have been shown to have a damaging effect on girls' mathematics performances. For the disparities in reading competence, Hek, Buchman, and Kraaij Kamp (2019) pointed out that the relationship between reading interest and reading performance is stronger for boys than for girls. Gender as a concept in this discussion is the social and cultural construct of the differences between men and women, which encompasses norms, behaviors and expectations. These roles are learned through socialization and can differ among societies and times (Tayade, 2022). Education managers' understanding of gender must center on examining how these social constructs shape behaviors and influence the learning environment, educational outcomes and access to opportunities. Some of the explanations adduced by researchers that account for the gender differences in these two areas or domains are as follows:

1.1 Modular Theory

The theory by Jerry Fodor explains that there are different cognitive abilities and that some of these abilities are related to arithmetic, while others are related to reading. These cognitive abilities are located in a specific brain module (an innate, self-contained domain-specific system). Hence, researchers have suggested that differences in brain structure / function, which may be influenced by either genetic or environmental factors, could lead to differences in the development and the activity of the modules. This could cause the observed differences in the competence levels between males and females in the subject areas such as reading and arithmetic. The modularity theory, therefore, posits

that there are innate neural structures or mental modules in the brain which have distinct and established and evolutionary developed functions (Wikipedia, 2024). These module developments vary between genders based on genetic or environmental factors.

1.2 Visuospatial Abilities

This refers to the cognitive process of recognizing, integrating, and analyzing visual forms and spatial relationships (Wikipedia, 2024). It has been observed by researchers that gender influence, which leads to variation in male and female competence levels in arithmetic and reading, could be linked to mental rotation (imagining how an object looks if rotated), and spatial reasoning (location and relationship of objects in space). Their effects are pronounced in areas requiring spatial visualization. Some studies have postulated a strong link between visuospatial skills (ability to represent, analyze and mentally manipulate objects) and arithmetic in females, while others are of the view that males do better than females in visuospatial tasks. This postulated differences according to researchers accounts for males showing stronger ability in arithmetic operations that involves visuosopatial reasoning. Researchers have also reported that challenges arising with visuospatial processing can cause challenges in reading, due to the inability to process visual information (Tafti, Ehsan, Xixis, 2024).

1.3 Cognitive Processing

This is the intricate mental functions that enable individuals to perceive, reason, remember and learn; they help in thinking, learning, and understanding (Batista, 2024). They are crucial in the retrieval of relevant knowledge from memory. This function of the brain accounts for the variation observed in genders in relation to reading and arithmetic operations, which are the determinants of the individual level of competence. Research findings suggest that girls sometimes demonstrate superior verbal fluency (Hek, Buchmann and Kraaykamp, 2017) while boys do better than girls in spatial tasks (NLM, 2014). These differences sometimes narrow over the years, casting doubt on the assumption of a fixed or genetic differentiating factor (American Psychological Association APA, 2014; Tafti, Ehsan, Xixis, 2024)

1.4 Executive Functions

These are higher-order cognitive abilities, which include working memory (WM), inhibitory control, cognitive flexibility, planning, reasoning, and problem solving. They help individuals to achieve goals, adapt to novel everyday life situations and manage social interactions (Cristoforl, Zimmerman and Crafman, 2019). Based on executive function, Zhang, Xu, Jin, Chen; Zhang and Zhang (2022) suggested that females may have a stronger association with better executive function and mathematical competence, particularly in habitation control. To support this claim, NLM (2022) reported that executive function enables girls to perform better in reading comprehension than boys.

Vica (2022) further maintained that there are no sex differences in tasks associated with executive functions.

2. Social Cognitive Theory (SCT)

For Berndura's 1986 social cognitive theory, individuals learn about the world in three ways: direct teaching (being guided to practice a skill); observing someone's behavior (Modeling); and enactive experiences (experiencing Positive, negative or neutral consequences for actions) (Schunk&Pajarea, 2010). He (Bandura) also identified three domains of personal efficacies – perceived academic self-efficacy, perceived social self efficacy; perceived self-regulating efficacy. On the basis of the ways individuals learn, learning could result from observing, modeling and imitating others, leading to gender differences in arithmetic and reading (Mozahen, Boulod, & Ghanem, 2020). The theory on the domains of personal efficacy suggests that academic differences between boys and girls including reading and arithmetic could be attributed to the obvious fact that boys tend to have strong academic self-efficacy in arithmetic and science subjects (Wikipedia, 2025; Hueng, 2013; Skaalvik & Rankin, 1994) while girls outperform boys in reading because of their exposure to positive models of reading, and strong self efficacy in reading (Ameyaw & Kwabena, 2019). Therefore, exposure of children to different models and experiences based on their genders can strongly impact their self-efficacy and beliefs about their abilities in different subjects (Papyrina, Strebel and Roberson 2021). Bandura, however, cautions that it is pertinent to note that the observed differences in the competence levels between girls and boys in arithmetic and reading may be products of social and environmental factors rather than innate differences (Wikipedia, 2025). Researchers have equally identified other mediating factors between gender and variations in reading and arithmetic competence levels between males and females. Some of the mediating factors, according to the researchers, include societal expectations and Stereotypes (Vos, Marinova, Deleon Sasangule&Reygveot,2023; Siemsmuntoni & Retelsdorf, 2018; Chang & Rawian, 2025). The belief that certain professions or subjects are masculine or feminine by society sometimes shapes students' beliefs about their personal competences. This, in turn, impacts positively or negatively on the pupils' arithmetic and reading competences.

3. Anxiety and Self-concept

Research has suggested that arithmetic anxiety, which gives rise to low self esteem on one's ability in arithmetic operations, can lead to girls developing lower competence than boys (Vos *et al.*, 2023). Hence, math anxiety and low self-esteem lead to differences between genders in mathematics achievements. The same also applies to reading anxiety, which equally impacts negatively on individual reading competence. Therefore, there is a need for interventions that will reduce arithmetic and reading anxieties so as to promote

academic success and ensure equitable opportunities for all children within the learning environment.

The challenge of gender influence on pupils' reading and arithmetic competences is global. Researchers from different parts of the globe have acknowledged these influences in their reports (Vos *et al.*, 2023; Rodriguez, Bibiana, Pineiro, Estevez, Baruch *et al.*,2024; Hek *et al.*, 2019; Obeka, Nwigwe and Usulor, 2023). Ikoro and Eleri (2017) and Obiako (2023) had reported that there is poor student achievement in reading and arithmetic in Ebonyi State. The poor achievement was reported by Obeka, Nwigwe and Usulor (2023) to vary among males and females. The reported variation was equally observed by Ngwoke, Okonkwo, Obeka and Igiri (2022) as they noted that there is disparity in the learning interest in the English language in Ebonyi state, with females showing higher interest and attitude. In arithmetic, there is a paucity of research evidence on the influence of gender on the level of competences; however, Obeka *et al.* (2023) suggested that boys may be having higher inclination towards the study of arithmetic and science than girls. The present study was motivated by the paucity of research reports or evidence on the level of gender influences on the arithmetic and reading competencies of primary 3 to 6 pupils in Ebonyi State Basic Education.

4. Statement of Problem

Research has shown that gender differences exist in pupils' achievement in arithmetic and reading competences globally and locally (Imasuen&Omorogbe, 2016; Obeka *et al.*, 2023; Ngwoke *et al.*, 2022; Vos *et al.*, 2023). These differences in the pupils' achievement are manifestations of their different levels of competences occasioned by gender influences. However, the extent to which gender influences these competences in Ebonyi State is yet to be known. This study on the influence of gender on arithmetic and reading competences was designed and poised to inquire into and determine this level of influence. The study explored whether significant differences existed between male and female pupils' arithmetic and reading competences in Ebonyi State basic education.

4.1 Purpose of the Study

The purpose of this study was to determine whether there were gender influences in the competence levels of male and female pupils in reading and arithmetic.

Specifically, the study determined the level of:

1) Gender influence on male pupils' arithmetic competence.
2) Gender influence on female pupils' arithmetic competence.
3) Gender influence on male pupils' reading competence
4) Gender influence on female pupils' reading competence.

4.2 Research Questions

Four (4) research questions were raised to guide the study. They were;

1) What is the arithmetic competence of primary 3 to 6 male pupils in Ebonyi State?
2) What is the arithmetic competence of primary 3 to 6 female pupils in Ebonyi state?
3) What is the reading competence of primary 3 to 6 male pupils in Ebonyi State?
4) What is the reading competence of primary 3 to 6 female pupils in Ebonyi State?

4.3 Hypotheses

Two null hypotheses, which were tested at an alpha level of 0.05, were formulated that guided the study:

Ho_1: There is no significant difference in the arithmetic competence levels of male and female pupils of primary 3 to 6 in Ebonyi State.

Ho_2:There is no significant difference in the reading competence levels of male and female pupils in primary 3 to 6 in Ebonyi State.

5. Research Methodology

The research design of choice for this study is a quantitative descriptive survey. The researchers adopted this non-experimental research method in order to systematically collect and quantify data that describe the characteristics (reading and arithmetic competences) of the selected population. The data collected by the researchers were methodically analyzed using percentages.

The population of the study comprised all the 290,499 pupils in public and private schools in Ebonyi State. This number is made up of 146,179 males and 144,220 females (EB, MoE, 2022). Two Education zones (Onueke and Abakaliki) were sampled using simple random sampling techniques (SRS) for the study. A purposive sampling technique was used to sample primary 3 to 6 in the state for the study. The choice of primary 3 to 6 pupils was that a child in primary 3 and above should be able to read with ease alphabets, words, simple sentences and paragraphs. Such a child should be able to recognize 1-digit and 2-digit figures. The child should also conduct basic addition and division. A total of 138 pupils (male and females) were sampled for the study using Simple Random Sampling (SRS). The two data collection instruments: Reading Assessment (RA) and Arithmetic Assessment (AA) were used to collect data for the study. The two instruments were developed and validated by UNICEF and Teaching at Right Level TaRL (Nigeria). The researchers adopted them as their contents were adjudged comprehensive for the study. Reading competences were classified into five levels by the instruments. Level I (Beginner level): a learner who cannot identify at least 4 out of 8 alphabets in the section. Level 2 (the word level): a learner who can identify and pronounce at least 4 out of 8 words. The sentence level (A learner can read two out of four sentences correctly), and the paragraph level (A learner can read a paragraph and comprehend the meaning from the paragraph. For the arithmetic assessment tool, there are also five levels. Level 1 is the beginner (a learner cannot identify at least four out of the 8 1-digit numbers). Level 2: this is the 1-digit (learner can identify 4 of the 8 1-digit

numbers). Level 3, which is the 2-digit level (a learner can identify at least four of the 8 2-digit numbers). Level 4, which is the subtraction level (pupils can solve at least one of two subtractions) and level 5, the division level (a learner can carry out at least one of the two divisions in the section. A child who cannot accomplish the objective of each level is presumed to belong to the preceding level.

6. Results

Research Question I: What are the arithmetic competences of primary 3 to 6 male pupils in Ebonyi State?

To answer research question one, the researchers consulted the output of the analysis of data collected from the sampled primary 3 to 6 pupils' arithmetic competence presented in Table 1.

Table 1: The overall and levels of male pupils' arithmetic competence by class in sampled schools in Ebonyi state

Qty	Class	Beginner	1-digit	2-digit	Subtraction	Division
No (%)	3	8(38)	4(19)	7(33)	1(5)	1(5)
No (%)	4	2(13)	2(13)	9(35)	3(19)	0(0)
No (%)	5	0(0)	2(13)	6(38)	8(49)	0(0)
No (%)	6	1(6)	2(12)	7(41)	3(18)	4(23)
No (%)	Overall	11(16)	10(14)	29(41)	15(21)	5(7)

As shown by the output in Table 1, the overall arithmetic competence levels are as follows: beginner level, 16%; 1-digit level (14%); 2-digit level (41%); subtraction (21%); and division (7%). This shows that the overall competence level of the male pupils, which is 41%, is at the 2-digit number level. On class level analysis, for primary 3, beginner level had 8(38%); 1-digit level had 4(19)%, 2-digit level had 7(33%); subtraction had 1 (5%), and division also had 1 (5%). The dominant arithmetic competence level here is beginner, with 8(38%). For primary 4, the beginner had 2 (13%); 1-digit had 2 (13%); 2-digit had 9 (35%); subtraction had 3 (19%), while division had 0%. Here, the dominant male arithmetic competence is 2-digit with 35%. This is a level of competence that should be achieved in primary 2 (FRN, 2013). For the primary 5 male pupils, the beginner level had 0; the 1-digit level had 2 (13%), the 2-digit level had 6 (38%), subtraction had 8 (49%), while division had 0. The dominant level here is subtraction with 49%.This is an instructional objective that should be achieved in primary 2 (Obiakor, 2023). For the male primary 6 pupils, the beginner level had 1 (6%), 1-digit level 2 (12%), 2-digit level 7 (41%), subtraction level 3 (18%), and division had 4 (23%). Hence, the arithmetic dominant competence level is a 2-digit level with 41% score. Hence, only 4 pupils representing 23% of the sampled male pupils are at division competence level, which is an instructional objective in primary basic 4 (Gbenga, 2011).

Research question 2: What are the arithmetic competence levels of primary 3 to 6 female pupils in Ebonyi State?

Table 2: The output on the overall and class level arithmetic competence levels of females in primary 3 to 6 pupils in Ebonyi State basic education

Qty	Class	Beginner	1-digit	2-digit	Subtraction	Division
No (%)	3	3(18)	11(65)	1(9)	0(0)	2(12)
No (%)	4	1(6)	10(56)	2(11)	11(11)	3(16)
No (%)	5	0(0)	6(35)	2(11)	2(11)	7(41)
No (%)	6	1(6)	1(6)	6(38)	5(13)	3(19)
No (%)	Overall	5(7)	28(41)	11(16)	9(13)	15(22)

From the output of the data analysis shown in Table 2, the overall female arithmetic competence levels are as follows: beginner level 5 (7%); 1-digit level 28 (41%); 2-digit level 11 (16%); subtraction level 9 (13%) and division level 15 (22%). This shows that 41% of the sampled female pupils are still at 1-digit competence levels. 1-digit arithmetic calculation is a behavioural instructional objective in Primary 1 (Class 1). This is a foundational skill that should be acquired at an early grade level in order for children to progress at other levels of education. On a class-by-class basis, in primary 3, beginner level had 3 (18%); 1-digit had 11(65%); 2-digit level had 1 (9%), subtraction recorded zero; and division had 2 (12%). This shows that the dominant competence level here is 1-digit with 65%. This is the competence level that pupils who have completed primary 1 should have acquired (FME, 2013). For primary 4, the beginning level had 1 (6%); the 1-digit level had 10 (56%); the 2-digit and subtraction levels had 2 (11%) respectively; while division had 3 (16%). Here as well, the dominant arithmetic competence level for females is 1-digit, at 56%. In primary 5, the beginner level had zero; - 1-digit and 2-digit levels had 11% each, while division had 41%. The dominant level here is division, which had 41%; regrettably, 35% of the classes are still at the 1-digit level. For primary 6, the beginner and 1-digit level had 1 (6%) each. The 2-digit level had 6 (38%); the subtraction and division levels had 6(31% and 3 (19%) respectively.

Research Question 3: What is the reading competence level of primary 3 to 6 male pupils in Ebonyi state?

Table 3: The output on the overall and class level reading competence levels of sample male pupils in Ebonyi State

Qty	Class	Beginner	1-digit	2-digit	Subtraction	Division
No (%)	3	8(40)	7(35)	3(15)	1(10)	0(0)
No (%)	4	2(13)	7(44)	4(25)	3(19)	0(0)
No (%)	5	0(0)	5(28)	6(33)	5(27)	2(11)
No (%)	6	1(6)	3(19)	4(25)	2(13)	6(37)
No (%)	Overall	11(16)	22(31)	17(24)	12(17)	8(11)

From Table 3, the overall competence levels showed that beginners had 11 (16%), letter level had 22 (31%), word level had 17 (24%), sentence level had 12 (17%), and paragraph level had 8 (11%). This shows that the overall dominant reading competence level across all the classes is at the letter level, with 31%. This competence is achieved by the end of primary 1 (Ikuen, 2017). On a class level basis, Table 3 showed that the beginner level in primary 3 had 8 (40%); letter level had 7 (35%), word level had 3 (5%); sentence level had 2 (10%) whiles paragraph had no score. Hence, the dominant reading competence level for the males is beginner. This is the level of competence expected of a primary one pupil who enrolled in school and didn't attend kindergarten. For the primary four pupils, the beginner level had 2 (13%); letter level had 7 (44%), the word level had 4 (25%) sentence level had 3 (195), while paragraph had zero. Here majority of the pupils are at the letter level (a competence that should be acquired at the end of primary 1). For primary 5, the beginner level had zero; letter level had 5 (28%); word level had 6(33%), sentence level had 6(335); sentence level had 5(28%) and paragraph had 2 (11%). The dominant male reading competence level here is word this is a competence for primary 2 pupils (Obiakor, 2023). For primary 6, the beginner level had 1 (6%), letter level had 3 (19%), word level had 4 (25%), sentence level had 2 (13%), and paragraph level had 6 (38%). Here, the paragraph level is the dominant male reading competence level.

Research Question 4: What is the reading competence level of female pupils in primary 3 to 6 in Ebonyi state?

Table 4: The output on the overall and class level reading competence levels of females in primary 3 to 6 pupils in Ebonyi State Basic Education

Qty	Class	Beginner	1-digit	2-digit	Subtraction	Division
No (%)	3	3(17)	12(66)	1(6)	0(0)	2(12)
No (%)	4	1(5)	10(53)	3(16)	2(11)	3(16)
No (%)	5	0(0)	5(33)	2(13)	2(13)	6(40)
No (%)	6	1(6)	1(6)	5(31)	6(38)	3(19)
No (%)	Overall	5(4)	28(41.2)	11(16.2)	10(14.7)	15(20.59)

From the Table 4 the overall beginner level is 5(7.4%); for letter level it is 28(41.2%), for word 11(16%); for sentence it was 10(14.7%) and paragraph it was 14(20.51%). This shows that the female pupils' dominant competence level is at the letter level with 41.20%. This is an educational objective in Primary 1. At the class levels, the beginner level in primary 3 had 3 (17%); the letter level had 12 (66%); the word level had 1 (6%); the sentence level had zero; while the paragraph level had 2 (11%). Hence, the dominant competence level here is at the letter level with 66% (an objective which is supposed to be for primary one pupils). For primary four, the beginner level had 1 (5%), word level 10 (53%), word 3 (16%), sentence level 2 (11%), and paragraph 3 (16%). Here, the dominant competence level is letter level. For primary 5, the beginner level had zero; letter level had 5 (33%); word and sentence had 2 (13%) each, while paragraph had 6 (40%). Hence, the dominant

competence level is paragraph. For primary 6, the beginner and letter levels had 1 (6%) each: the word level had 5(31%), while the sentence and paragraph had 6 (38) and 3(19%) respectively. The dominant competence level is sentence level.

6.1 Hypotheses

Two hypotheses were formulated to guide this study. The hypotheses were tested at an alpha level of 0.05 level of confidence.

Ho_1: There are no significance differences in the overall level of arithmetic competences of males and female pupils of primary 3 to 6 in Ebonyi state basic education.

To answer this question, the researchers used the output of the test of significance in Table 5.

Table 5: The output of the chi-square test of independence of pupils of primary 3 to 6 in Ebonyi state

Gender	Quantity	df	X^2crit	X^2cal	Decision
Males	70	4	9.488	25.264	Sig.
Females	68				
Total	**138**				
	Alpha = 0.05				

From the output on Table 5, the chi-square test of independence at df of 4 and 0.05 level of significant had a critical (Xcrit) value of 9.48, while the calculated chi-square (xcal) had a value of 25.264. This shows that the calculated value is significant, therefore there is a significance difference in the male and female pupils' level of competence in arithmetic in Ebonyi state.

Ho_2: There is no significant difference in the overall level of reading competences of male and female pupils of primary 3 to 6 in Ebonyi State.

To answer this question, the researchers relied on the output of the chi-square test of independence shown in Table 6.

Table 6: The output of the chi-square test of independence on the overall level of reading competences of males and female pupils of primary 3 to 6 in Ebonyi state

Gender	Quantity	df	X^2crit	X^2cal	Decision
Males	70	4	9.488	20.23	Sig.
Females	68				
Total	**138**				
	Alpha = 0.05				

From the output on Table 6, the chi-square test of independence at df 4 and alpha level 0.05 had a critical (Xcrit) of 9.488. The table also showed that the calculated chi-square

value was 20.23, which was significant. Based on the outputs, the researcher refused to accept the null hypothesis of no significance difference, but rather held that there is a significance difference in the overall level of male and female pupils' reading competence in Ebonyi state.

7. Summary of Findings

1) The overall dominant level of arithmetic competence of male primary 3 to 6 pupils in Ebonyi State was 2-digit, which was closely followed by subtraction.
2) The overall dominant level of arithmetic competence of female primary 3 to 6 pupils in Ebonyi state is 1-digit level. This was followed by the division level.
3) The overall dominant level of reading competence of male primary 3 to 6 pupils in Ebonyi state was letter level, followed by word level.
4) The dominant level of reading competence of female pupils 3 to 6 in Ebonyi State was letter followed by paragraph.
5) The test of significance of difference in the overall level of competence of male and female pupils in arithmetic showed a significance difference in favour of males (dominant level, 2-digit followed by subtraction), females (dominant level 1-digit followed by division).
6) The chi-square test of significance of difference in the overall levels of competences offemales and males in reading showed a significance difference in favour of females (dominant level, letter, and followed by paragraph) while males had a dominant level of letter, followed by words.

8. Discussions

The discussions of the findings of this study were based on the summary of the findings, which emanated from the research questions and hypotheses that guided the study. The findings of the study showed that the overall dominant arithmetic competence level for males in Ebonyi State was 2-digit (41%), followed by subtraction (21%), while that of females was 1 –digit (41%), followed by division (22%). This is very appalling as those competences are supposed to be attained in primary 2 (for 2 digit) and primary 1 (for 1 digit)(FRN 2013). These observed differences in male and female arithmetic competences were confirmed to be significant by the test of hypothesis at the 0.5 level of significance. The differences in the male and female pupils' levels of competences had earlier been reported by Alordiah, Akpadaka and Oviogbodu (2016); Vos *et al.* (2023); and Vica (2022). These researchers maintained that males perform better than females in arithmetic. The origin of gender differences in the competence levels of males and females in arithmetic was attributed by Baruch *et al.* (2024) to sociological influences and stereotypes.

According to Skaalvik *et al.* (1994), males have higher math self-concept and self-perceived arithmetic skills than females, and males have higher math motivation than

females. Finally, Vos *et al.* (2023) reported that mediation analysts demonstrated that math anxiety and explicitly related gender stereotypes partially and wholly mediated the relationship between gender and arithmetic performance. There should be deliberate efforts by all the education stakeholders to deradicalize learners on stereotypes. This is important because of the negative impact of stereotypes and the attendant implications on the study of mathematics. For instance, if a pupil accepts that his/her gender cannot do well in mathematics, it will lead to a self-fulfilling prophecy each time the pupil performs poorly in mathematics. It will limit the pupil's attempt to work hard on tasks related to mathematics. This will culminate in pupils' poor learning, poor academic growth, and poor achievement. This faulty assumption is unacceptable, hence parents, teachers, and society should strive to challenge gender stereotypes, create an enabling enviroment that is supportive and inclusive, which encourages pupils regardless ofher/his gender to develop arithmetic skills, self-confidence and a sense of responsibility in allpupilsat all levels of learning of mathematics and specificallyin arithmetics which is the precursor of mathematics (BYJUS, 2025; and Wikipedia, 2025). In line with these findings, education stakeholders in Ebonyi State, especially Ebonyi State Ministry of Education and its line ministries and agencies, should strive to extricate pupils from the impediments of arithmetic anxiety, sociological influence, stereotypes and gender influence that have globally held back females from aspiring to catch up with their males folks in arithmetic. These impediments are sociological constructs arising from stereotypes rather than being innate.

The findings of this study again showed that the male dominant level of reaching competences in Ebonyi State was letter level (31%), followed by word (24%), while that of the females was letter 41.2%, followed by paragraph (20.59%). By this, therefore, it is obvious that the females' reading competence is better than the males, as the chi-square test of independence showed a significant difference in favour of the females. The observed differences found in this study were similar to those of Hek *et al.* (2019), Logan & Johnson (2010) and McGeown (2009). The observed variations in male and female reading level of competences were attributed by researchers to factors like developmental maturation, socialization and cognitive differences. The variations were further linked to the fact that girls tend to read more, and they are more likely to be encouraged than boys to read (Kyei, 2024). It had also been reported that boys experience less reading enjoyment and are less frequent readers in their free time than girls (Hek *et al.*, 2019). This information on the cause of the disparity between males and females in reading competence should be seriously considered by stakeholders in Education in Ebonyi State and beyond, so that they will work to eliminate those identified factors which cause the observed differences in males' and females' competence levels that hinder pupils' utmost development of reading competences. It is obvious that reading proficiency is crucial for academic success for all learners, irrespective of gender. Disparities in reading competencies between genders can lead to far-reaching consequences in the educational achievement of children. It has implications for educational and occupational

opportunities. Understanding the implications of gender influences on the reading competencies is essential for Ebonyi State Ministry of Education, parents and other stakeholders to assist them in designing strategies to address the gaps. The approach may be multifaceted, cutting across biological (based on the modular theory) and social factors (based on gender stereotype assumptions). Stakeholders should provide reading materials to all pupils. Male and female pupils should have unhindered access to reading material and reading times. Stakeholders should encourage pupils to develop positive attitudes towards reading. This will stimulate pupils' interest in reading both intrinsically and extrinsically.

9. Conclusion

Arithmetic and reading competences are the foundational skills individuals need to succeed in academic and other endeavors. Gender, a social construct, most often interferes with or confounds with services, attention, efforts, and encouragement given to different individual by different societies in their life endeavors. Concerned by the negative impact of gender influence on reading and arithmetic, as reported in some educational literature, the researchers carried out this study to gauge the influence of gender on the level of arithmetic and reading competences of primary 3 to 6 pupils in Ebonyi State basic education. The purposes of this study were to determine the level of gender influences on male and female pupils' arithmetic competencies and the level of gender influence on male and female pupils' reading competencies. The findings of the study revealed that there is a significant difference in the level of arithmetic competences between males and female pupils, and the test of the hypothesis showed that the difference is in favour of male pupils. The findings of the study further showed that there is a significant difference in the level of reading competences of male and female pupils of primary 3 to 6 in Ebonyi state. The test of the hypothesis showed that the difference is in favour of females. The findings of this study should be a guide to education stakeholders to know that the products of the Universal Basic Education program in the state are underachievers. This is because, apart from the influence of gender on pupils' level of competences in the two domains, some pupils in the upper primary (Class 3-6) are still bereft of basic competences they should have acquired in primary 1 and 2 of the basic education. These competences are the foundation for a life of learning (World Bank, 2024).

9.1 Recommendations

Based on the findings of this study, it is here being recommended that urgent actions should be taken by relevant stakeholders to remedy the situation. Specifically, the state Ministry of Education and the line Ministries, Departments and Agencies (MDAS) should, as a matter of urgency:

1) Train teachers on gender sensitivity in classroom practices. This is to bridge the gender gap that currently exists in the classrooms.
2) Recommend for use in the classroom materials that are gender sensitive.
3) Sensitive parents on gender sensitivity in educational practices and career choice for their children.
4) Adopt for use in all the schools, the gender mainstreaming policy booklet developed by the Federal Ministry of Education and development partners.

Conflict of Interest Statement
The authors declare no conflicts of interest.

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