JOURNAL OF EDUCATION FOR SUSTAINABLE INNOVATION | ISSN 3025-1052
Vol. 3, No. 1, 2025, 41-53
https://doi.org/10.56916/jesi.v3i1.1134

Mathematical achievement ability in public primary schools of Zimbabwe

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Keywords
Academic performance
Mathematics achievement
Primary education
Learning difficulties
Cognitive abilities

Article History
Received 2025-01-21
Accepted 2025-06-01

Abstract
Mathematical achievement ability often reflects the capacity of learners to grasp and apply foundational mathematical concepts. Ability to achieve in mathematics was evaluated using Wide Range Achievement Test - Expanded Edition (WRAT-Expanded) psychometric test. This comprehensive version assesses academic skills such as reading, spelling and arithmetic across a broader range of abilities and age groups. A sample of Grade 6 learners (n= 66) who were enrolled into the Avondale primary school and (n= 4) teachers, who were directly responsible for teaching the selected learners, were assessed and interviewed respectively as part of the study. The mixed approach design was used in this study and participants were selected using convenience sampling. The study was structured based on the cognitive and social constructivism theories. Findings indicated that mathematical achievement ability is in the average range, with the girls showing higher mathematical cognitive abilities as compared to boys. It emerged that the mathematical achievement ability of learners aligns with comprehension and grasping of mathematical concepts, attitude towards mathematics, and learner`s progress in mathematics. The findings also showed that performance in mathematics can be affected by learners' beliefs that it is a difficult subject, poor comprehension of mathematical terms, motivation of the teachers to teach mathematics, and lack of adequate resources to teach the subject. The study recommends teachers to be provided with in-service training programmes and refresher courses. These will equip them to respond to attitudes, and gender differences in mathematics, ensuring inclusive and equitable learning opportunities. Findings from this study, can help curriculum design and pedagogy to be learner-centered, addressing not only cognitive skills but also emotional and motivational aspects of learning mathematics.

INTRODUCTION

Mathematics is one of the most significant learning areas taught in schools because it is crucial to academic success (Jansen, Louwerse, Straatemeier, Van der Ven, Klinkenberg, & Van der Maas, 2013; Namkung, Peng, & Lin, 2019). Mathematics constitutes various domains and requires the use of complex skills to integrate a wide range of numerical concepts (Kelley, Hosp, & Howell, 2008; Lyons, Price, Vaessen, Blomert, & Ansari, 2014). The skills acquired in mathematics have been indicated to be an important backbone across many disciplines and everyday life (Huijsmans, Kleemans, Sanne, van der Ven, & Kroesbergen, 2020; Garon-Carrier, 2016). Mathematical abilities and skills start developing in the early years and continue to develop over one's academic life (Kliziene et al., 2023; Claesens &

Engel, 2013). Basic number skills are taught and this may involve the building blocks for learning more advanced mathematical concepts that assist in predicting later achievement in mathematics and other academic skills such as reading and writing (Blume, Dresler, Gawrilow, Ehlis, Goellner, & Moeller, 2021; Räsänen, Laurillard, Käser, & von Aster, 2019;). Lack of basic numerical skills has been indicated to result in fundamental weakness in Mathematical Learning Difficulties (MLD) between all age groups across various contexts (Zhang et al., 2017; De Smedt, Noël, Gilmore & Ansari, 2013).

In Zimbabwe, primary education begins when a child first enters school at 7-9 years old, and this period establishes the fundamental framework for all forms of higher education (Ministry of Primary and Secondary Education, 2018). Zimbabwe's primary education curriculum has undergone significant reforms aimed at aligning educational outcomes with national development goals and cultural heritage. The current curriculum, builds upon the previous Curriculum Framework for Primary and Secondary Education (2015–2022), emphasizing competencies, practical skills, and national identity (Makuvaza, 2018). The Zimbabwean curriculum introduces a streamlined structure for primary education, reducing learning areas to six: Indigenous Language, English Language, Mathematics, Science and Technology, Physical Education, Arts, and Social Sciences. This restructuring aims to foster critical thinking, problem-solving, and entrepreneurial skills among learners, preparing them for both academic and vocational pathways (Gasva & Phiri, 2021). Rooted in the indigenous philosophy of Ubuntu/Unhu/Vumunhu, the curriculum seeks to instill values of community, respect, and responsibility. This philosophical grounding is intended to produce learners who are not only academically competent but also culturally grounded and socially responsible (Ministry of Primary and Secondary Education, 2022).

Learners display large individual variations in their mathematics performance in primary school (Memisevic & Biscevic, 2018). The variation in mathematical achievement among learners has been linked to genetic, cognitive, and environmental factors (Hart, Petrill, Thompson & Plomin, 2009; Kovas, Haworth, Dale, & Plomin, 2007). According to Stevens and Bevelier (2012), the cognitive factors determining mathematical achievement are working memory, processing speed, communication, and selective attention toward concepts. The environmental factors are correlated with mathematical skills such as visual motor integration, learning style, motivation, self-efficacy, mindfulness, anxiety, and self-regulated learning (Mullis, Martin, Foy, Kelly & Fishbein, 2020; OECD, 2019). Student and facilitator-related factors cannot be spared in influencing mathematical achievement abilities. These factors can spur interest, self-confidence, positive attitude, motivation, perseverance, and commitment toward learning mathematics (Mabena, Mokgosi & Ramapela, 2021).

In Zimbabwe, mathematics is regarded as a significant core subject in school curricula (Tshabalala & Ncube, 2013). This recognition demonstrates mathematics as an essential tool for national development. However, compared to other subjects, mathematics is thought to be more challenging and Mukeredzi (2013) asserts that such a view correlates with low pass rates in mathematics at grade seven in Zimbabwe. In support, Chinamasa (2008) acknowledged that despite being one of the foundational disciplines, many Zimbabwean students struggle to pass mathematics. The country's economy has been impacted by subpar mathematics performance as students are compelled to pursue careers that do not require mathematics. Other students have dropped mathematics in high school as a result of their low performance in the subject (Tshabalala & Ncube, 2013). Additionally, students failing mathematics frequently face a variety of difficult obstacles while selecting a career. Compared to other disciplines like Shona, English, and Content, Mathematics has lower pass rates. This was highlighted by Kusure & Basira (2012) and ZIMSEC result analysis (2015) showing concern over these national trends in mathematical achievement.

The Zimbabwe education system has adopted many initiatives to help learners to be able to grasp mathematical concepts (Makopa, 2011; Ndlovu, 2017; Nyagura & Riddell, 1993). Since 2014, the Ministry of Primary and Secondary Education (MoPSE) shifted the curriculum into a competence-based curriculum to tap the mathematical inborn abilities of learners. However, there has been serious national concern about marrying mathematical skills in primary, secondary, and tertiary education (Kasure & Basira, 2012; ZIMSEC Result Analysis, 2015). This indicates that much attention to mathematic achievement was given later in the lifespan of learners leaving behind primary school level.

As a learning area, mathematics therefore helps to align the national ambition of attaining upper middle-income status by the year 2030 (National Development Strategy 1 (NDS1), 2020). The learning of mathematics is all about problem-solving for value creation. This means that mathematics achievement in primary school is a precursor to critical thinking, creative thinking, innovativeness, and having a sound entrepreneurial mindset to enhance national economic development. These skills are so noble in the effective implementation of Education 5.0.

There is a dearth of literature on mathematical achievement ability in primary schools in Zimbabwe (Gasva & Phiri, 2020). Most studies on this topic have focused on secondary schools, leaving a gap on the mathematical achievement ability of primary school learners where the basic foundation is developed. In Zimbabwe, mathematics achievement ability is mainly found to correlate with gender and resources in teaching mathematics (Mupa, 2015; Nkoma, Zirima, & Chimunhu; 2013; Zirima, Chimunhu, & Nkoma, 2020). It is against this background that the current study explored mathematical achievement ability in one public primary school in Harare's Northern Central District.

THEORETICAL FRAMEWORK

The study was structured based on the cognitive (Piaget, 1971) and social constructivism theories (Vygotsky, 1978). According to the constructivism philosophy, the child participates Vygotsky, 1978 actively in the learning process (Elliott, Kratochwill, Littlefield Cook & Travers, 2000). Learning is constructed and the material to be used in teaching of mathematics is supposed to be shaped and adjusted based on the learner`s cognitive structures, social interaction, previous learning, and environment. The adoption of constructivist learning theory in this study is justified by the idea that mathematics instruction should start with topics and situations that learners are already familiar with, allowing them to integrate new information into their pre-existing knowledge structures. This correlates with the Zimbabwe new curriculum, which emphasizes that learning should be associated with the surrounding environment for new knowledge presented in the context of real life is easy to understand (MoPSE, 2016). In support of this view, Biggs and Tang (2011) posit that knowledge should be conveyed in a way that does not significantly alter learners' cognitive models. Furthermore, according to Vygotsky (1978), the process of creating meaning is fundamentally influenced by community. Therefore, the environment in which students are raised has an impact on their cognitive development. Sharing and negotiating socially constructed information is therefore at the heart of all learning and teaching.

The Zone of Proximal Development (ZPD), a constructivist notion that emphasizes a learner's ability to execute straightforward activities while working with a facilitator or their peers, served as the inspiration for the adoption of constructivist learning theory (Wass & Golding, 2014). Students should be able to fill in the blanks and extrapolate from the information and materials the teacher presents through the learning of mathematics. The objective should be to provide students with the knowledge and abilities to make independent decisions and find relevant information from a variety of sources to

address their problems and difficulties (Vygotsky, 1978). When social constructivism is used in mathematics instruction, it emphasizes problem-solving and encourages teachers and students to interact in the learning process. Teachers are supposed to encourage students to develop their solutions to problems.

During their time in primary school, children significantly improve their mathematical knowledge, skills, and cognitive abilities. According to the constructivist idea, learning mathematics should promote the development of reasoning and problem-solving skills (Smith, 2004). Finding a solution to a problem or an obstacle and achieving a goal that was not previously feasible are both examples of problem-solving. An intelligence-specific accomplishment is problem-solving and this is what Piaget considered to be the actual developmental stage at the formal operational stage. Rational systematic reasoning serves as a sign of intelligence at this level as well as operational thinking and the exploration of symbols related to the tasks at hand, for example, schoolwork. As these stages of cognitive development unfold, learners become more self-confident in their reasoning abilities and, consequently, their ability to perform academically (Huitt & Hummel, 2003).

Statement of the Problem

The issue of mathematics underachievement has persisted unsatisfactorily and uninterrupted despite several studies that have been conducted and recommendations that have been made and put into practice in Zimbabwe (ZIMSEC Result Analysis, 2015). Globally, the problem of underachievement has been attributed to a wide variety of factors ranging from cognitive abilities, inheritance, and biological and environmental settings (Passolunghi & Lanfranchi, 2012). The mathematical achievement ability of primary school learners makes more sense and value to the literacy rate of the community. A careful approach is therefore needed to narrow down achievement gaps experienced by learners in the learning of mathematics. If the factor that enhances mathematical achievement abilities has not been addressed, the Zimbabwe education system will be far away from reaching the international best standards. It was therefore prudent to explore mathematical achievement ability in a public primary school to produce industrious and innovative students.

Purpose of the Study

To explore mathematical achievement ability in one public primary school in Harare Northern Central District.

METHODS

Research Design

This study used a convergent mixed research design. The convergent design is the method whereby the researcher gathers and analyses both qualitative and quantitative data during the same stage of the research process, and then combines the two sets of results into a comprehensive interpretation (Creswell & Plano Clark, 2011). Both quantitative and qualitative data are gathered and given equal weight in this design as the researcher was able to integrate the advantages of both study approaches as recommended by Hall (2013) and Gibson (2012). Thus, a mixed research method design was used in this study to integrate the results and develop conclusions using both quantitative and qualitative methodologies. The mixed methods technique has its advantages that help make findings more focused and concrete that may not be achievable using a single method.

Participants and Setting

In this study, the population consisted of two classes of grade 6 learners at one public primary school in Harare`s northern central district. All learners in grade six were included, that is, a sample size

of 66. Interviews were also conducted with the mathematical teachers for selected grade 6 learners (n=4). The school was formerly known as a "former Group A school" in colonial times, whereby white students attended Group A schools, which had better facilities, highly qualified teachers, and more resources than Group B schools. Group B schools catered to black pupils and were mostly underfunded sometimes underfunded. These schools maintained their excellent standards, making them attractive to parents seeking quality education.

Research Instruments

In this study, a psychometric Wide Range Achievement Test - Expanded (WRAT-Expanded) and semi-structured interviews were used to collect data. WRAT-Expanded is an extended version of standard WRAT, designed to provide a more comprehensive assessment of academic skills. It includes additional subtests to offer a broader evaluation of a child's strengths and weaknesses in core academic areas of Word Reading, Sentence Comprehension, Spelling, Listening Comprehension, Oral Reading Fluency, Mathematics Computation and Mathematical Problem Solving. This test showed to be valid as it measures what it claims to measure, in this case mathematical achievement ability. More so, WRAT-Expanded accurately measures underlying academic skills and correlates well with other established academic achievement tests such as Woodcock-Johnson Tests; Wechsler Individual Achievement Test indicating strong construct validity. In this study WRAT-Expanded has demonstrated strong correlations with school performance supporting concurrent and predictive validity.

Data Collection Procedure

Data collection took place at the school during a pre-scheduled time. All the research participants in the school had their consent forms signed by their parents or guardians. The participants were then asked if they understood what the exercise was about and if they were willing to continue. They were asked to sign assent forms which were on the same sheet as the consent form. The researcher then collected the consent and assent forms ensuring all with both duly signed forms were given the psychometric tests. The participants were advised that, if they felt uncomfortable, they could withdraw from the study anytime. After the administration process was over, the researcher gathered the finished work for scoring and norming. On the other hand, arrangements were made between the researcher and the teachers who had given their consent to be interviewed. The semi-structured interviews were discussed freely, with no cohesion.

Data Analysis and Interpretation

Thematic narrative analysis was utilized to interpret lived experiences, while Statistical Package for Social Science (SPSS Version 16) was used to analyse quantitative data. Quantitative data were presented as graphs and tables, while qualitative data were presented in the form of emerging themes. The researcher computed the standard score derived from the raw score and percentile of a child's performance in mathematics.

Qualitative data were coded, divided into manageable text parts, giving each unit a label, and organized into themes (Creswell, 2014). The qualitative data analysis process began as soon as the data collection began. For instance, the semi-structured interview questions were continuously improved as the discussion moved along, and gaps that surfaced were addressed. To be able to paraphrase recurring themes and experiences, verbatim transcriptions of the semi-structured interviews were made into notes. The researcher explored the transcripts carefully by reading them several times and listening to the audio to have a general understanding of the material and time to consider the overall significance of the respondents' words as well as to understand the contents as described by Creswell (2014), Jackson, Lowton, and Griffiths (2014). Finally, the major themes were

identified by combining codes with similar meanings, and emerging patterns were compared with the data collected using quantitative.

Descriptive statistical analysis made up the majority of the study's quantitative analysis (McMillan & Schumacher, 2006). Techniques for univariate analysis included analysing test results as a whole as well as measures of central tendency (mean), standard deviation, range, and frequency. The quantitative data from the normed psychometric tests were tabulated and imported to the Statistical Package for Social Science (SPSS Version 16). To summarise and organize observations so that readers may visualize how the data relate to the phenomenon under research, descriptive statistics turn a series of observations into indices that characterize the data (McMillan & Schumacher, 2006).

RESEARCH FINDINGS

Table 1. Mathematical achievement ability among primary school children

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
STAND_SCORE	66	82.00	110.00	90.0000	6.02339
% RANK	66	11.00	75.00	26.9231	13.73102

Table 1 illustrates the average mathematics achievement abilities and percentile ranks of primary school children in Harare based on the Wide Range Achievement Test -Expanded Edition (WRAT-Expanded). As illustrated in the table, the mathematical achievement abilities ranged from a standardized score of 82 to 110, a mean of 90 and a standard deviation of 6, at a level of the confidence interval of 82% to 100% and percentile mean of 26.9% with a standard deviation of 13.7%. A mean standardized score of (M=90, SD=6) suggests most students' achievement abilities were in the average range, but performing 10 standard deviations below the mean of all students in Grade 6 worldwide (M=100, SD=15). A mean percentile rank of (M=26.9, SD=13.7) indicates that most children performed better than 26% of other children in Grade 6 globally.

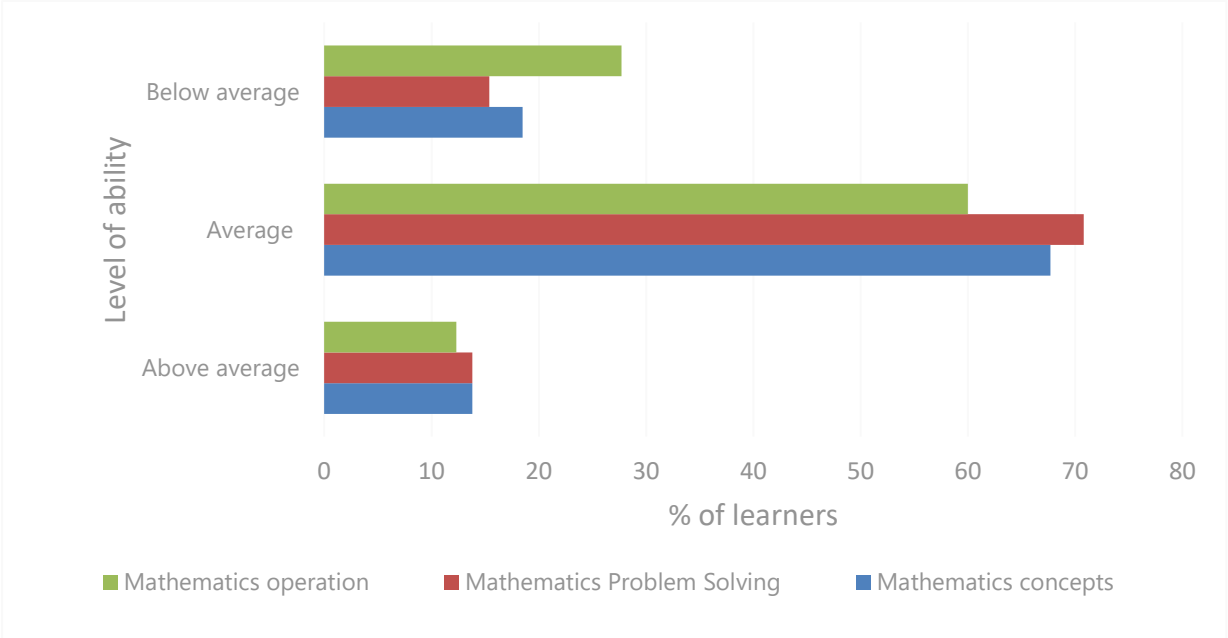

Figure 1. Mathematical content skill performance levels

The Figure 1 shows the Mathematical content skills performance levels of Grade 6 learners of the selected school in Harare Northern Central District. From Figure 1, it is apparent that the majority

of Grade 6 pupils in Zimbabwe have average mathematical skills performance levels; mathematics operations (59.8%), mathematics problem solving (70.6%), and mathematical concepts (67.7%). However, mathematics operations proved to be a challenge, as evidenced by 27.7% of the children scoring below average compared to 15.4% facing challenges in problem-solving and 18.5% experiencing difficulties in mathematical concepts.

Table 2. Mathematical achievement ability among primary school learners by gender

Group Statistics					
	Gender	N	Mean	Std. Deviation	Std. Error Mean
STAND_SCORE	Male	35	87.5429	5.06628	.85636
	Female	31	92.8667	5.84709	1.06753
% RANK	Male	35	21.3714	11.39423	1.92598
	Female	31	33.4000	13.53820	2.47173

Table 2 illustrates children's mathematical achievement ability by gender. Results indicate that Grade 6 female children at this school have higher mathematics cognitive abilities than male children. Female children's standard mathematical ability scores (M=93, SD=5.8) were significantly higher than their male colleagues (M=88, SD=5.1), though they were both in the average ability range. Also, a percentile rank of 33.4 for female children indicates that learners in Grade 6 in Zimbabwe perform better than 33.3% of all Grade 6 students the world over. This can be compared to males who performed better than 21.4% of all Grade 6 children. The following data analysis is centred on the themes derived from the qualitative semi-structured interview questions.

Mathematical Achievement Ability among Primary School Children

Individual semi-structured interviews were used to gather qualitative information, which was then analyzed thematically. The themes derived from the research objectives are as follows:

Comprehension and grasping of mathematical concepts

The mathematical achievement ability of learners was perceived to align with comprehension and grasping of mathematical concepts. Response by teachers brings out several views that were reported in line with their experiences as primary teachers. One of the participants suggested that learners' achievement in mathematics depended on whether the learner had comprehended and grasped mathematical concepts or not. One participant said:

> *What I can say about the learners' level of achievement in mathematics is determined by how they have grasped the concepts. So, it's either they have grasped or not depending on their grade level and this usually happens a lot as they progress to the next grade level* (**Teacher 1**).

The participant's submission above correlates with the quantitative research findings on mathematical content skills performance. The performance of learners in mathematics is best determined by the way the learner grasps the concept. The level of ability on concepts for many learners should be at par with the age level. This would enable learners to grasp and comprehend the mathematical concepts. This showed that there is a strong relationship between mathematical achievement ability and concept grasping. To support this view, one participant said:

> *Mathematical achievement is also determined by the amount of work given and the complexity of the concept given (the work is easy or difficult)* **(Teacher 4)**.

Students who scored within the average range on the WRAT-Expanded Mathematics subtest displayed adequate foundational math skills. However, based on teacher evaluations, these students showed difficulty in fully grasping mathematical concepts in applied or problem-solving contexts. This suggests a discrepancy between standardized performance and classroom comprehension, indicating the need for targeted instructional strategies to reinforce conceptual understanding and application of mathematical knowledge.

Attitude towards mathematics

From the interviews, it emerged that mathematics achievement by learners depends on their attitude towards the subject. The common negative attitude reported was learners' perception of mathematics as a difficult subject. The negative attitude towards mathematics was said to be socially constructed. The socialization of learners at their early developmental stages influences their conceptions of mathematics. Three of the participants said:

> *I have noticed that Mathematics is a very difficult subject for learners; most learners do not like Mathematics because they perceive it as a difficult subject. Therefore, the level of achievement is all about learners' attitudes. Those who are good at mathematics it's because they like the subject* **(Teacher 2).**
>
> *The mathematical achievement for learners it's a challenge because most of them view it as a difficult subject. It's like they face difficulty in each area of mathematics. Starting from timetables, division, and multiplication, every mathematical concept is a challenge for learners these days* **(Teacher 4).**
>
> *The students have negative attitudes towards Mathematics and if you try to force them, they will become truant* **(Teacher 1).**

Conversely, an experienced school teacher had mixed feelings associated with his perception of learners' mathematical achievement. The interviewee said mathematics can be a very difficult subject for some students, especially those who do not grasp mathematics concepts, but those who grasp concepts faster, when given formulas, usually perform very well. In support of his view, he said:

> *In my twenty years as a primary teacher, mathematics sometimes is a very difficult subject for other learners. Let's say we have 50 learners in the classroom; you find that half of the class will be struggling with the subject and the other half will be doing extremely very well. Maybe what we must do is we must give learners the formulas. Those who have grasped the formulas do extremely very well and those who haven't grasped the formulas will find them struggling with the subject* **(Teacher 3).**

In this study, the researcher discovered that learners' unfavourable attitudes about mathematics play a significant role in determining mathematical achievement. While WRAT-Expanded results revealed varying levels of mathematical achievement. These outcomes were found to correspond closely with students' attitudes toward mathematics. Learners who viewed mathematics as enjoyable and manageable tended to perform above average, reflecting a strong grasp of concepts and a positive learning disposition. In contrast, those who perceived math as difficult often showed below-average scores and demonstrated avoidance behaviors and anxiety in the classroom. This suggests that both cognitive ability and affective attitude play critical roles in shaping mathematical achievement, indicating a need for instruction that simultaneously addresses skill development and mindset transformation.

Slow progress in mathematics

Mathematical achievement of learners was also linked with their progress in this subject compared to other subjects. Mixed views emanated about how teachers perceive their learners` progress in mathematics compared to other subjects. However, more teachers suggested learners progressed more slowly compared to other subjects like Shona and English because children do know already. Languages are a means of communication at school and home. When asked why they find mathematics difficult, key informants reported that students failed to grasp the mathematical concepts despite understanding similar concepts in English and Shona or Ndebele. The interviewees suspected that the fear of mathematics causes underachievement in mathematics. The issue of attitude towards mathematics emerged once again as a key determinant of underperformance in the subject. In this regard, some interviewees explained:

> *I realized that learners progress slowly as compared to other subjects like Shona and English because of these languages they already know. They speak Shona and English every day. They can read Shona and English comprehension and they can understand it without struggle. But when it comes to understanding mathematics, it's a challenge* **(Teacher 2).**

> *"Teaching a big class of over 30 students leaves little room for individual attention, and some students struggle to keep up."* **(Teacher 3).**

> *"Many learners come to upper grades with weak foundations in basic math skills, which makes it hard for them to advance"* **(Teacher 4)**

The other participant pointed out that attitude to mathematics matters most to the performance of learners. The relationship of other science subjects had a fair impact on the performance of learners in mathematics. In support of this, one interviewee said:

> *The progression in mathematics is best determined by learners' attitudes toward other science subjects. This is also affected by the attitudes of teachers who teach those science subjects* **(Teacher 3).**

Classroom observations by teachers reveal that slow progress in mathematics occurs across all performance levels. That meant to say, some above-average students demonstrate stagnation due to lack of challenge, while average performers struggle with conceptual application, and below-average students face significant foundational gaps. On the other hand, WRAT-Expanded results provide a standardized measure of mathematical achievement. These findings underscore the importance of differentiated instruction tailored not just to test scores, but also to individual learning needs and observed progress rates in real-time classroom settings.

DISCUSSIONS OF FINDINGS

The study showed that mathematics is a difficult subject for most learners. However, the quantitative results of this study illustrate average performance in mathematics achievement abilities with mathematics operations proving to be a challenge. This is evidenced by 27.7% of the children scoring below average compared to 15.4% facing challenges in problem-solving and 18.5% experiencing difficulties in mathematical concepts. The average performance in this study is comparable to that in a study by Karthigeyan and Nirmala (2012) that looked at gender differences in

math success of students in the Grade 6 class in the Salem and Sankari educational districts of Tamil Nadu. The findings further revealed that for the past five years mathematics achievement of the students was average with girls showing higher academic performance in mathematics than boys. The idea that girls perform better in mathematics than boys in primary education is a trend observed in some studies, though results can vary by region and context. According to Else-Quest, Hyde, & Linn (2010) girls often develop cognitive and emotional skills earlier than boys during primary years. Tend to be more focused, organized, and compliant with classroom routines, which supports steady learning and task completion, key to success in math at early levels. These global comparative studies agree with this study's findings on the achievement range of mathematical abilities in primary-based curriculum-based materials.

The data solicited from both psychometric test and semi-structured interviews showed that learners encountered varying experiences in their mathematics achievement. The psychometric demonstrated average mathematics achievement abilities whereby mathematics operations proved to be a challenge. This was evidenced by 27.7% of the children scoring below average compared to 15.4% facing challenges in problem-solving and 18.5% experiencing difficulties in mathematical concepts. Concerning gender, the study established that some female learners had higher cognitive abilities in mathematics than male learners though they were both in the average ability range. Female learners` standard mathematical ability score (M=93, SD=5.8) was significantly higher than their male counterparts (M=88, SD=5.1). Aligning with qualitative information obtained through semi-structured teacher interviews, it can be noted that girls are the ones with good comprehension and grasping of mathematical concepts which give them an advantage to perform better.

Furthermore, the study indicated that mathematics achievement by learners depends on their attitude towards the subject. This finding agrees with what Mukerezi (2013) said when he highlighted that compared to other subjects, mathematics is thought to be more challenging as it correlates with low pass rates in mathematics at grade seven in Zimbabwe. The common negative attitude was reported in this study as learners perceived mathematics as a difficult subject. Conversely, the study established that those who grasped concepts faster, when given formulas, usually performed very well. Integrating this qualitative narrative to quantitative results, girls can be said to have positive attitude towards the subject as they showed higher mathematical achievement abilities to boys.

CONCLUSIONS AND RECOMMENDATIONS

Mathematical achievement ability among learners ranks in the average range compared to the similar age group in the world. The study further concludes that girls` mathematic cognitive ability supersedes their counterparts.

Negative perception of the subject by learners, lack of motivation among teachers, and lack of resources contribute to low mathematical ability among learners. Therefore, to enhance mathematical achievement ability, learners need to be taught to have a positive attitude towards mathematics and teachers to continue using participatory approaches such as interactive activities or peer group work in teaching Mathematics.

Recommendations

The study recommends that: teachers play an important role in the mathematical achievement of learners, Ministry of Primary and Secondary Education ought to conduct more regular in-service training and refresher courses in the teaching and learning of mathematics.

REFERENCES

Arnold, D. H., & Doctoroff, G. L. (2003). The early education of socioeconomically disadvantaged children. *Annual Review of Psychology, 54*, 517–545.

Blume, F., Dresler, T., Gawrilow, C., Ehlis, A. C., Goellner, R., & Moeller, K. (2021). Examining the relevance of basic numerical skills for mathematical achievement in secondary school using a within-task assessment approach. *Acta Psychological, 215*, 103289.

Chinamasa, E. (2008). The effects of using a standardized marking scheme in teaching mathematics. *Zimbabwe Journal of Educational Research, 20(2),* 199–227

Claesens, A., & Engel, M. (2013). How important is where you start? Early mathematics knowledge and later school success. *Teachers College Record, 115*(6), 1-29.

Creswell, J. W. (2013). *Qualitative inquiry and research design: Choosing among five approaches* (3rd ed.). Thousand Oaks: Sage.

Creswell, J. W. (2014). *Research design: Qualitative, quantitative, and mixed methods approach* (4th ed.). Thousand Oaks, CA: Sage publications.

Creswell, J. W., & Plano Clark, V. L. (2011). *Designing and conducting mixed methods research* (2nd ed.). Thousand Oaks: Sage

Creswell, J. W., & Plano Clark, V. L. (2011). *Designing and conducting mixed methods research* (2nd ed.). Thousand Oaks: Sage.

De Smedt, B., Noël, M. P., Gilmore, C., & Ansari, D. (2013). How do symbolic and non-symbolic numerical magnitude processing skills relate to individual differences in children's mathematical skills? A review of evidence from brain and behavior. *Trends Neurosci. Educ. 2*(2), 48–55.

Elliott, S. N., Kratochwill, T. R., Littlefield Cook, J., & Travers, J. F. (2000). *Educational psychology: Effective teaching, effective learning* (2nd ed.). Boston, MA: McGraw-Hill.

Garon-Carrier, G., Boivin, M., Guay, F., Kovas, Y., Dionne, G., Lemelin, J.-P., Séguin, J.R., Vitaro, F. and Tremblay, R.E. (2016), Intrinsic Motivation and Achievement in Mathematics in Elementary School: A Longitudinal Investigation of Their Association. *Child Dev, 87:* 165-175.

Gasva, D., & Phiri, (2020). Interrogating the adoption of the updated primary school curriculum in Zimbabwe: Implications for staff development and quality education. *International Journal of Education and Learning. 2. 86-95. 10.31763/ijele.v2i2.99.*

Gibson, J. E. (2012). Interviews and focus groups with children: Methods that match children's developing competencies. *Journal of Family Theory & Review, 4,* 148–159.

Hall, R. F. (2013). Mixed methods: In search of a paradigm. In T. Le, & Q. Le (Eds.), *Conducting research in a changing and challenging world* (pp. 71-78). New York: Nova Science Publishers Inc.

Hart, S. A., Petrill, S. A., Thompson, L. A., & Plomin, R. (2009). The ABCs of math: A genetic analysis of mathematics and its links with reading ability and general cognitive ability. *J. Educ. Psychol., 101*(2), 388.

Huijsmans, M. D. E., Kleemans, T., van der Ven, S. H. G., & Kroesbergen, E. H. (2020). The relevance of subtyping children with mathematical learning disabilities. *Research in Developmental Disabilities, 104,* Article 103704.

Huitt, W., & Hummel, J. (2003). Cognitive development and its implications for learning. Educational Psychology Interactive. Valdosta, GA: Valdosta State University. Retrieved from http://www.edpsycinteractive.org/topics/cognition/cogdev.html

Jackson, L. E., Lawton, L. J., & Griffith, C. A. (2014). Factors associated with non-visitation by area residents to Congaree National Park, South Carolina. *Journal of Park & Recreation Administration, 32(1)*, 1–19

Jansen, B. R. J., Louwerse, J., Straatemeier, M., Van der Ven, S. H. G., Klinkenberg, S., & Van der Maas, H. L. J. (2013). The influence of experiencing success in math-on-math anxiety: Perceived math competence, and math performance. *Learn. Individ. Differ., 24*, 190–197.

Karthigeyan, K., & Nirmala, K. (2012). Academic achievement in mathematics: An analysis through gender lens. *MIER Journal of Educational Studies, Trends & Practices, 2*(2), 144-157.

Kelley, B., Hosp, J. L., & Howell, K. W. (2008). Curriculum-based evaluation and math: An overview. *Assessment for Effective Intervention, 33*(4), 250-256.

Kliziene, Irina & Emeljanovas, Arunas & Dubosas, Mindaugas. (2023). School Physical Education Program Impact on Psychological Well-Being and Cognitive Ability of Primary School Children. Physical Education Theory and Methodology. *23. 290-298. 10.17309/tmfv.2023.2.19*.

Kovas, Y., Haworth, C., Dale, P.S., & Plomin R. (2007). The genetic and environmental origins of learning abilities and disabilities in the early school years. *Monographs of the Society for Research in Child Development*, *72*(3), 1-160.

Kusure, L. M., & Basira, C. M. (2012). Teaching practice and pre-service mathematics teachers' teaching knowledge in Zimbabwe: A mixed methods study. *International Journal of Educational Research, 53*, 1–12.

Lyons, I. M., Price, G. R., Vaessen, A., Blomert, L., & Ansari, D. (2014). Numerical predictors of arithmetic success in grades 1–6. *Developmental Science, 17*(5), 714-726.

Mabena, N., Mokgosi, P. N., & Ramapela, S. S. (2021). Factors contributing to poor learner performance in mathematics: A case of selected schools in Mpumalanga province, South Africa. *Problems of Education in the 21st Century, 79*(3), 451-466.

Makopa Z (2011). *The provision of the basic classroom teaching and learning resources in Zimbabwe primary schools and their relationship with the grade 6 pupils" achievements in the SACMEQ III project*. Memoir presented within the framework of the IIEP 2010/2011 Advanced Training Programme in Educational Planning and Management, UNESCO/IIEP

McMillan, J. H., & Schumacher, S. (2006). *Research in education: Evidence-based inquiry* (6th ed.). Boston, MA: Pearson Education.

Memisevic, H., & Biscevic, I. (2018). Exploring the link between inhibitory control and cognitive flexibility in preschool children. *Cognition, Brain, Behavior, 22*, 1-11.

Ministry of Primary and Secondary Education (Zimbabwe). (2018). *National Mathematics Policy Framework 2019-2023*. Harare: Ministry of Primary and Secondary Education.

Mukeredzi, T. (2013). Mathematics Anxiety and Achievement Among Primary School Pupils in Zimbabwe. *International Journal of Educational Research & Review, 4(5), 1-7*.

Mullis, I. V. S., Martin, M. O., Foy, P., Kelly, D. L., & Fishbein, B. (2020). *TIMSS 2019 International results in mathematics and science*. Retrieved from Boston College, TIMSS & PIRLS International Study Center.

Mupa, P. (2015). Foundations for success in the teaching of O-Level mathematics in rural day secondary schools in Masvingo district. *Journal of Education and Practice, 6(19)*, 133–139

Namkung, J. M., Peng, P., and Lin, X. (2019). The relation between mathematics anxiety and mathematics performance among school-aged students: a meta-analysis. *Rev. Educ. Res., 89*, 459–496.

Ndlovu, T. (2017). Mathematics Education in Zimbabwe: Challenges and Prospects. *Journal of Education and Learning, 8(1),* 35-46.

Nkoma, E., Zirima, H., & Chimunhu, J. (2013). Girls on the frontline: Gender Differences in mathematics achievement in Manicaland Province, Zimbabwe. *Wudpecker Journal of Educational Research, 2*(1), 1-8.

Nyagura LM, Riddell A (1993). *Primary school achievement in English and Mathematics in Zimbabwe: A multilevel analysis*. Education and Social Policy Department Human Resources Development and Operations Policy. The World Bank

OECD (2019). PISA 2018 results *What students know and can do* (Volume I). Paris: PISA, OECD Publishing.

Passolunghi, M. C., & Lanfranchi, S. (2012). Domain-specific and domain-general precursors of mathematical achievement: A longitudinal study from kindergarten to first grade. *British Journal of Educational Psychology, 82*(1), 42-63.

Piaget, J. (1971). *The theory of stages in cognitive development*. McGraw-Hill.

Räsänen, P., Laurillard, D., Käser, T., & von Aster, M. (2019). Perspectives to technology: Enhanced learning and teaching in mathematical learning difficulties. In V. Haase, & P. Räsänen (Eds.), *International handbook of mathematical learning difficulties: From lab to classroom* (733–754). Fritz, Cham: Springer International Publishing.

Reilly, D., Neumann, D. L., & Andrews, G. (2017). Gender differences in mathematics and science achievement: The role of achievement, self-concept, and motivation. *International Journal of Science and Mathematics Education, 17(8),* 1463–1488

Smith, P. (2004). *Making mathematics count: The report of Professor Sir Peter Smith's inquiry into post-14 mathematics education*. London: Department for Education and Skills.

Stevens, C., & Bavelier, D. (2012). The role of selective attention on academic foundations: a cognitive neuroscience perspective. *Developmental Cognitive Neuroscience, 2*, S30-S48.

Tshabalala, T. & Ncube, A. C. (2013). *Causes of poor performance of ordinary level pupils in mathematics in rural secondary schools in Nkayi District*: *Learner's attributions*. Harare: Nova Explore Publications.

Vygotsky, L. S. (1978). Mind in society: *The development of higher psychological processes*. Cambridge, MA: Harvard University Press.

Wass, R., & Golding, C. (2014). Sharpening a tool for teaching: The zone of proximal development. *Teaching in Higher Education, 19(6),* 671–684.

Zhang, X., Räsänen, P., Koponen, T., Aunola, K., Lerkkanen, M. K., and Nurmi, J. E. (2017). Knowing, applying, and reasoning about arithmetic: Roles of domain-general and numerical skills in multiple domains of arithmetic learning. *Develop. Psychol. 53* (12), 2304–2318.

Zirima, H., Chimunhu, J. & Nkoma, E, 2020, Gender differences in mathematics achievement among learners in Chipinge secondary schools, Zimbabwe. *Psychol Psychology Res Int J 5*(3), 000244.