

## Understanding teachers' experiences in teaching long division to grade seven learners

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### Abstract

*This study explored the experiences of teachers teaching long division to learners pursuing mathematics in grade seven in the Zambezi region, Namibia. The objective was to identify the challenges these teachers faced and propose ways to mitigate these constraints. The research question investigated was: What are the constraints or enablers that teachers encountered in teaching long division to grade seven learners in the Zambezi region, Namibia? To address this research question and to mitigate challenges, this qualitative intervention study employed interviews, document analysis, and observations. These data-generating tools were used with two teachers from two schools, who were conveniently sampled to participate in the study, allowing them to share their experiences. Their responses were categorised and then themes constructed. From the themes constructed, findings were that long division involves several other mathematical operations. The other operations were addition, subtraction and multiplication. These come as a hindrance. Also, it was revealed that the way symbols are presented to the learners to perform long division presents a constraint to understanding the procedures involved in long division.*

**Keywords:** long division, constraints, enablers, experiences, symbols, algorithm

### Background of the study

In upper primary, grade seven in particular, the expectations are that learners already know the strategies and the procedures involved when conducting operations related to long division. This expectation is not the case with learners who were observed in the Zambezi region when a teacher was teaching them long division. One would understand that, if deep learning, the ability to link existing knowledge to new knowledge, Liu (2022), of the concept of long division occurred in previous grades; learners could have excelled in operations related to long division. Linking prior knowledge, as Shing and Brod (2016) suggest, acquired previously could have enabled these learners to excel in long division, as this concept is linked to other mathematical operations learnt before. Kriek and Basson, (2008), support the idea that mathematics concepts are related, those learnt before and those to be learnt, as they bring the constructs of conceptual progression and cohesion. So, the anomalies observed triggered the need to understand the teachers' experiences in teaching long division to grade seven learners. To emerge these experiences, a research question, *what are the constraints or enablers teachers encountered in the teaching of long division to grade seven learners*, was used.

Long division is not akin to other mathematical operations, such as addition,

subtraction and multiplication. Other mathematical operations mentioned only have one symbol to represent them. For instance, the symbol for multiplication is  $\times$ , addition is  $+$ , subtraction is  $-$ , and division is  $\div$  or  $/$ . As seen, long division uses more than one symbol to represent or signal a long division activity. It is evident that for division, a number of symbols are in use. These symbols are part of the mathematics language that will make one have the numeracy skills useful in long division operations. Also, another deviation from other mathematical operations of long division noted in the study area is its lack of a specific word to explain it in the local languages of the learners. This might be a challenge that mathematics teachers experience when teaching long division to grade seven learners. The researchers see this as limiting the teachers with indigenous pedagogical content knowledge found in Ethnomathematics (Mukwambo, 2012). D' Ambrosio, (1980), considers that Ethnomathematics is important, as teachers require Ethnomathematics to extract indigenous pedagogical content knowledge in it and use it in their explanations to come up with a fruitful classroom talk (Lemke, 1990). Under such conditions, mathematics teachers teaching long division to grade seven learners experience difficulties in their teaching practice of long division.

In teaching and learning long division, one can use translanguaging and code switching to ensure learning takes place. Translanguaging is a pedagogical approach where different linguistic features are used (Creese & Blackledge, 2010). On the other hand, code switching is also another necessary mediating tool that facilitates deep learning. Biggs (1999) considers the use of the above mediating tools as important for learning the algorithm of long division, as it allows the teacher to be heard by the learners, as he will be communicating in a language the learners can understand. To ensure that deep learning occurs, when teaching long division to learners, teachers ensure that learners use higher-level mental skills. Examples of these are the skill to analyse, synthesise, relate to relevant prior knowledge to solve problems, and think meta-cognitively to construct a long-term understanding of the concept of long division.

Use of code switching and translanguaging promotes deep learning of long division as these promote classroom talk (Lemke, 1990). So, in a situation where long division is to be understood, it requires that code-switching and translanguaging be engaged. The presence of many symbols to represent long division may scare learners or make them see long division as difficult to understand. So, in the case that long division has several symbols used to communicate or signal the need to do long division activity, what do these teachers experience during their teaching practices? The observation and the analysis of teachers' teaching practices led us to come up with the objective. The objective is to find the challenges teachers experienced when teaching long division to grade seven learners and, thereafter, come up with recommendations on how these challenges can be mitigated. To further support the idea that teachers face challenges in teaching long division, studies carried out confirm this.

According to several studies, for instance, in South Africa, Daniyani (2015) reveals that some teachers struggle with teaching long division. This is not only because the process of long division is long and problematic, but also because it necessitates the knowledge and application of subtraction, multiplication, and occasionally addition (Back, 2012). Based on our observation, when trainee teachers were on school-based studies, some teachers were observed facing challenges when teaching long division to learners. Emerging these problems

will help come up with solutions and improve the teaching of long division. Some of these challenges might be from the failure to understand the mathematical concept itself, in this case, long division. Sometimes, to understand a mathematical concept, one needs to understand how that concept developed historically. It is for this reason that we bring the genesis of long division.

### ***Genesis of long division***

We include the history of the development of long division since many mathematics teachers do not value that a historical approach can enhance learning in learners (Windsor & Booker, 2005). Also, the historical approach can help in understanding the concept of long division as some of the challenges are revealed, and this prevents repeating the errors made before and also where it is applied in daily life. In doing so, this can motivate learners. It is for this reason that we consider this genesis of long division to be of importance. Like any other mathematical operation in use, long division came into use as a result of the need to solve daily human activities. In the region of Mesopotamia, followed by Ancient Egypt, people started using mathematical operations, including long division. The reason was to handle problems related to taxation, commerce, trade and also to understand patterns the natural world offers. From the view of Nadmi, (2019), Al-Samawal (1130 – 1180) is believed to have come up with the idea of long division.

Long division breaks down a Hindu-Arabic numeral into a series of steps. There is a part known as the dividend, and this is divided by a divisor, and the result is a quotient. For instance,  $a/b = c$ ,  $a$  is the dividend,  $b$  the divisor and  $c$  the quotient. In the case that the number fits properly into the dividend, there is no remainder. The word division was coined from certain roots, prefixes and suffixes of certain words, as these words from which the word division came convey the same idea. The word division shares a root with the word widow, meaning separate. On the other hand, *vidua* conveys the idea of separation that is *partir* in Spanish. The prefix *di-* in divide is a contraction of *dis-* a two-based word meaning apart or *partir*. That is equal parts are separated from each other. This is why division can also be defined from the idea that it is repeated subtraction. The divisor in such an instant is subtracted several

times from the dividend until the remainder equals zero. The researchers also bring the word individual which supports the idea that it cannot be further divided. Finally, the researchers also note that the vi- found in divide is part of *vidua*, derived from a two-word word. This is also seen in vigesimal, meaning two tens for numerals related to 20. So, with long division having such a background, to understand what it is, one would wonder if teachers, when teaching long division, think of exposing the learners to this. The genesis of long division might help teachers understand what the concept of long division means and then disseminate it to learners.

### ***Symbols to represent long division***

The symbols of division given above are now discussed in detail in this section. The reason behind discussing them is to improve the understanding of teachers' experience of the concept of long division. Since the time people started using long division, a number of symbols have been used to communicate long division. On account of the multiple existence of symbols representing division, a standard symbol has not been selected. So, when teachers are teaching long division to learners, do they point out to learners the multiple symbols so that they can become familiar with all of them in order for communication using mathematics symbols to occur? Unlike short division, which is suitable for dividing single Hindu-Arabic numerals, long division is suitable for dividing Hindu-Arabic numerals with multiple digits. The symbols used by Al-Samawal (1130 – 1180) are still in use.

The symbols in use are:  $(/)$ ;  $(-)$ ;  $(\div)$ ,  $(\overline{\hspace{1cm}})$  and  $(\ )$ . In the first two cases, the dividend goes above the line, and the divisor comes under the line, and the quotient is separated from the two using an equal sign. In the third instance, the dividend is the first to be written before the symbol, and then the divisor follows and then after an equal sign to place the quotient. In the fourth case, the divisor comes before the right-hand parenthesis, and the dividend comes after with a vinculum, a bar on top of it. In the last case, division is represented using an opening bracket. This is the same scenario in another symbolic representation, only that the separator of the two, the dividend and the divisor, is a straight vertical line, but the vinculum remains in place. This multiple symbolic representation of

the concept of long division, as seen above, might be the reason in making the teachers' experiences unpleasant. It is for this reason that the researchers need to understand these experiences to come up with recommendations. When teachers are teaching long division, they should allow learners to interact with these symbols. Symbols are part of a language. The teachers' failure to allow learners to see and use these symbols will mean that learners might fail to acquire the mathematical language that might make them communicate effectively. Any of these symbols can be used to mean division. However, one needs to be selective on whether long division or short division is required. The guiding rule on which one to use, long or short division, depends on the digit the dividend has. That will help see whether the mathematical operation of long division is the one required or short division, and how to perform that is explained below under the meaning of division.

### ***Understanding division***

As mentioned previously, long division is a standard division method designed for dividing multiple Hindu-Arabic numerals. This technique involves breaking down a Hindu-Arabic numeral problem requiring long division into a sequence of more manageable steps. These steps include: a) division; b) multiplication; c) subtraction; d) bringing down the next digit, and e) repeating the process. The activities below show how the researchers engage in activity a) up to d) to get the quotient 125 when the dividend is 500 and the divisor is 4.

#### **125 Explanation of long division activities**

$$\begin{array}{r}
 4 \overline{)500} \\
 \underline{-4} \phantom{00} \\
 10 \phantom{0} \\
 \underline{(4 \times 2 = 8)} \phantom{0} \\
 20 \\
 \underline{(10 - 8 = 2)} \\
 -20 \\
 \underline{0} \\
 0
 \end{array}
 \begin{array}{l}
 (4 \times 1 = 4) \\
 (5 - 4 = 1) \\
 (4 \times 2 = 8) \\
 (10 - 8 = 2) \\
 (4 \times 5 = 20) \\
 (20 - 20 = 0)
 \end{array}$$

The listed activities under the explanation of long division activities are also used when one is dividing polynomials. This is where the researchers find the need to know long division to use it in other areas of learning, for instance, when an algebraic expression is divided by another algebraic expression, strategies and procedures used in long division of numbers

are required. So, failure to understand long division using Hindu–Arabic numerals will limit one to doing long division of algebraic expressions. In short, the researchers say, mathematical concepts at one level manifest conceptual cohesion and conceptual progression (Kriek & Basson, 2008). It is this nature of long division which led us to the stated research question: *What are the constraints or enablers teachers encountered in the teaching of long division to grade seven learners in the Zambezi region of Namibia?*

To get responses for this research question, a theoretical framework of the knowledge quartet, as described Rowland, (2014), was used. In this framework, there are four dimensions, namely: foundation, transformation, connection and contingency. In the foundation phase, when teaching, the teacher ensures that knowledge, beliefs and understanding acquired in the environment inform the pedagogy the teacher uses in his/her practice when teaching long division. This is possible when prior knowledge is related to what is in the curriculum. In this case, knowledge of long division is required. The teacher transforms this to come up with a hybrid suitable for his/her learners (Bhabha, 1994).

The third level is when he connects these two dimensions to where they are applied in daily life. That is, learners need to know where long division is applied in real life. In doing so, it prevents that knowledge from being inert (Hale, 2013). Finally, the contingency level is when the teacher would have prepared in such a way that those challenges which might emerge are solved without difficulties. Using this framework, the responses to the research question can be obtained. To answer this research question, a methodology was constructed. This methodology will point out the participants of the study and the instruments. All of this helped to generate data that emerged responses to see constraints teachers manifest when teaching long division to grade seven learners,

### **Methodology**

The procedure used to generate data, process, and analyse the same data is referred to as research methodology (LibGuides, 2022). A qualitative method was used. McMillan and Schumacher (2010) describe qualitative research as a method to examine how people ascribe meaning to their experiences in natural

settings. McMillan and Schumacher (2006) say qualitative research investigates how researchers collect data in person by engaging with people in their surroundings, for instance, those in schools, in the case of this study. According to Akyıldız and Ahmed, (2021), the qualitative method is utilised to uncover underlying causes, attitudes, and motives. It is also utilised to figure out what is going on with people's minds and ideas, as well as to go deeper into a situation (Akyıldız & Ahmed, 2021). An approach of this nature in research allows the participants to completely describe, clarify, and provide detailed insights regarding the situation.

The qualitative approach has its origins in qualitative interactions such as meanings and experiences, investigating issues, understanding phenomena, and answering questions through the analysis and interpretation of unstructured data. The researchers chose this approach since it does not seek to regulate the study's setting, and it was best for this research since it is classified as investigative, and it aided the researchers in determining and understanding the obstacles teachers experienced when teaching long division in mathematics in grade seven. This method also allowed the researchers to have a better understanding of the participants' contextual perspectives (Daniyani, 2015). Furthermore, the qualitative method has an advantage, such as providing insights into the problem (Oranga & Matere, 2023). Data was generated through interviews, which the researchers conducted face-to-face with two teachers, purposefully and conveniently selected, who teach mathematics in grade 7 at two different schools, as well as observations, in which the researchers observed lessons of the two teachers teaching long division to grade 7 learners at schools in the Zambezi region.

### **Research design**

A case study was used. A case study is an ideal research design when you need concrete, contextual, in-depth knowledge about a specific real-world subject (McCombes, 2019). Ellet (cited in Tracy, 2012) maintained that the first part of a case study entails a descriptive narrative that discusses issues and possible solutions. A case study allows the researchers to select the case and formulate questions that are specific to that situation, to gather data that allows for a more comprehensive

understanding (McMillan & Schumacher, 2010). The researchers used a case study to find out the challenges the mathematics teachers faced when teaching long division to grade 7 learners and the factors that contributed to those challenges.

### **Population**

A population is a core group of people that the researcher is interested in. It describes a group of people who have similar features (Creswell, 2012). This study's target population included teachers who taught long division to Grade 7 learners in the Zambezi region. From the population, a sample of two mathematics teachers was selected. A sample is a group of objects or people from which data is generated (McMillan & Schumacher, 2006). The study's sample consisted of two grade 7 mathematics teachers. Sampling is the process of picking units (people, organisations) from a population. For this study, convenience sampling was used. Convenience sampling is a non-probability sampling strategy in which the researchers choose sample members from just those who are readily available (Blog, 2021). Tracy (2012) defines convenience sampling as opportunistic sampling or a sample plan that is simple, quick, and inexpensive to generate data. The reason the researchers used convenience sampling to choose teachers who took part in this study was that it speeds up the research, it is less expensive (Gaille, 2020), saves time (McMillan & Schumacher, 2010), and provides easy access to participants or chooses participants from those who are readily available. As a result, only two teachers were involved in the study because only two teachers taught mathematics in grade 7 at the two study schools in the Zambezi region. These teachers were engaged with the research instruments.

### **Research instrument**

A research instrument is a tool used to collect, measure, and analyse data related to a specific research topic (Library, 2022). The researchers through interviews and observations gathered data. The research instruments used were interviews, observation and analysis of learners' work to see if the challenges these teachers have triggered an influence on the learners' understanding. For this research, face-to-face interviews were conducted with two teachers who were teaching long division to grade 7 learners. This also provided further

explanations when the participants did not fully comprehend the question.

### **Observation**

The observational technique involved the researchers observing and recording what they saw in the classrooms, where the teachers were teaching and heard (McMillan & Schumacher, 2006). While observing the teachers, the works of learners were observed to see how they were progressing. The researchers used a non-participant observation to observe lessons on how teachers taught long division to grade 7 learners. These two instruments and the analysis of learners' work generated data, which were then analysed.

### **Data collection procedures**

The order of data collection was first observations. The two teachers were observed as they were teaching long division to grade seven learners. Data generated from this instrument allowed us to understand the experiences of the teachers. Later on, the analysis of teachers' work was done. This was to see whether there were challenges they experienced that could be attributed to strategies and procedures not translated to the learners' context. There was a need to see if the teachers had presented exactly what is in the recommended textbook (Hambata et al., 2015). Thereafter, the teachers were interviewed for roughly an hour.

### **Data analysis**

De Vos et al. (2011) define qualitative data analysis as the process that provides an order, structure, and significance to the collected data. To investigate qualitative data, the inductive technique of categorising data and detecting patterns among categories was used (McMillan & Schumacher, 2006). Data from interviews and observations were categorised, and responses were grouped in response to the study's question and aligned to themes to respond to the research question: *What are the constraints or enablers teachers encounter in the teaching of long division to grade seven learners in the Zambezi region of Namibia?* The facts had then been thoroughly read to become familiar with them. Following that, the data was thoroughly examined. This helped with data categorisation, allowing categories and themes to be identified. Finally, the data was analysed to make sense of the findings of the study and also take into account some

ethical considerations, as revealed in the section below.

### **Ethical consideration**

The ethical considerations in research refer to a set of principles that impact study designs and procedures (Bhandari, 2021). In this particular study, the researchers submitted a letter of introduction to the principals, seeking permission to conduct their research. Before the participants were interviewed, a consent letter was given to them, informing the participants, Teacher A and Teacher B, that any information they were providing would be kept strictly confidential and that neither their names nor their schools would be mentioned in the study. Participants were also informed of their choice to participate or not, as well as the fact that they could withdraw at any time without any penalty. Participants were also asked to permit the recording of the interview on a phone and monitor their lessons.

### **Presenting data**

The data is presented in this section. The data to be first presented is that for biographical data from participants, then the data generated during the time the two teachers, Teacher A

and Teacher B, were observed. This is followed by data generated during interviewing Teacher A and B. Then finally, was followed by presenting data generated from analysing what the learners presented in their exercise book when they were tasked to do classwork and homework related to long division and also analysis of Hambata et al. (2015) textbook in use page 79 to 88 where the concept of long division is discussed. The last data to be presented will be from the interviews of Teacher A and Teacher B. Table 2 reveals how the participants taught long division to the selected two grade seven classes. The observation was done in the two classrooms separately. Two frameworks were under scrutiny: the knowledge quartet and historical frameworks. The observation based on the stated frameworks is believed to reveal challenges these teachers experienced when teaching long division to grade seven learners.

Table 1 presents data related to the biographical information of the participants. This data is important as it establishes whether challenges experienced by teachers are attributed to qualification, lack of experience or the number of learners handled in a class.

**Table 1: Biographical data from participants**

Respondents	Qualifications	Years of teaching experience	Number of learners in a class	The age range of respondents	Gender	Grades
Teacher A	Bed Hons	10	42/ 45	32	Female	7A + B
Teacher B	BETD and Bed	15	38/ 46	36	Female	6 & 7

The data generated from one observation per teacher served as baseline data so that they could complement data from interviews, as well as for triangulation purposes. The generated data responded to the research question: *What are the constraints or enablers*

*teachers encounter in the teaching of long division to grade seven learners?* So, to generate more data to fully answer this research question, data from interviews are presented in Table 2.

**Table 2: Data from observation**

Framework observed	Participant	View of participant	Conformity to standard	Theme extracted
Knowledge quartet	Teacher A	The dimension of the foundation of the lesson is not supported by prior knowledge.	Partially conforms	Constrained knowledge quartet dimension
	Teacher B	The connection dimension is not properly related to everyday practices.		

Genesis of division	Teacher A	Does not mention long division genesis	Absent	Dismiss the genesis of long division
	Teacher B	Does not mention long division genesis		
Language used	Teacher A	Sometimes $\sqrt{\quad}$ a sign is used instead of the proper signs of division,	Does not conform to standards	Language standardization
	Teacher B	A similar situation was seen in teacher A above.		

Table 3 presents data generated from interviewing the two teachers. The interview, as said before, was aimed at coming up with responses to answer the research question. In

Table 3, the interview question is in column one, the response in column two and the theme derived in column three.

**Table 3: Interview question, response and theme derived**

Interview question	Participants	Response	Theme derived
Do you experience problems when teaching long division?	Teacher A	Yes	Constrained knowledge quartet dimension
	Teacher B	Yes	
What challenges do you encounter when teaching long division?	Teacher A	Difficult, long division requires learners to know other mathematical operations.	Knowledge content
	Teacher B	Cannot recognise multiplication and division	
What are the contributing factors to the challenges?	Teacher A	The teacher lacked a good foundation in long division, so they could not motivate learners.	Knowledge content
	Teacher A	The teacher lacks deep knowledge about long division.	
How do you overcome the challenges?	Teacher A	Reteach the other mathematical operations that challenge learners.	Prior knowledge consideration
	Teacher B	Teach multiplication, addition and subtraction first before long division.	
What kind of teaching methods do you use	Teacher A	Discussion and practice	Knowledge quartet
	Teacher B	Exposition, discussion and practice	
Besides the prescribed textbooks, what other teaching materials do you use?	Teacher A	Personal Computer (PC) to display videos on performing long division to my learners and other resources from the school library.	Knowledge quartet
	Teacher B	Use of posters where I write examples of long division and solve, then present to learners. Also, I use library resources.	

Finally, Table 4 presents data generated from analysing work learners wrote after being taught a lesson in long division. Also, in the table is the data generated when the recommended textbook for teaching and

learning mathematics was analysed. The section analysed in the book, *Platinum mathematics* from Hambata et al. (2015), is related to long division.

**Table 4: Data from learners' work and that from the textbook**

Item analysed	Use of the division sign	Errors in presenting	Theme
Learners' work	Only used one type, but the other symbol was a square root	Some errors were seen where a square root sign was used instead of the real symbol of division	Language
Textbook	Used only two strands	No errors seen	

The data allowed for the analysis of the generated data and aligning with themes, which helped answer the research question. What follows is the analysis of this data to answer the research question. The responses that were close together were analysed under the same heading to answer the research question. The themes that emerged were: constrained knowledge quartet dimension, knowledge content, prior knowledge and dismissing genesis of long division as themes generated from lesson observations. From the interviews, the themes identified were: constrained knowledge quartet dimension, knowledge quartet, knowledge content and prior knowledge. In the two instruments, the themes overlapped but were different, with data generated from analysis of learners' work and the textbook. However, the theme of language in the last instrument is also embedded in the other themes since these themes are linked with language. Below is an analysis of each theme about the research question.

#### ***Knowledge content and language standardisation of the long division symbol***

Despite the long years of teaching experience, Teacher A and Teacher B (see Table 1) still had challenges in teaching long division. For instance, why and how long division developed was never discussed. This made the two teachers fail to motivate the learners. It is interesting to know a concept is made high if one knows where the concept is applied in daily life. A learner will get motivated if she/he see that long division is useful in sharing items and other activities stated in the genesis of long division. Also, despite the fact that they were all university graduates (Table 1), they still did not have sufficient experience in handling long division. The researchers concluded that one of the experiences of these teachers is that they do not have sufficient content knowledge, and this constrained the way they handled questions related to long

division, which they taught to grade seven learners. This lack of content knowledge is also revealed in Table 2 and 4, where the symbol of long division is presented as an  $n$  root sign. Instead, it must be any of these symbols:  $(/)$ ;  $(-)$ ;  $(\div)$ ; and  $(\sqrt{\quad})$ . Teachers lack of understanding of symbols of long division is reflected in learners' work, see Table 4. The lack of language standardisation, whereby the symbol for long division comes in many formats, cannot sanction these teachers to present symbols incorrectly to learners. This experience makes these teachers have constraints in their teaching of long division to grade seven learners.

#### ***Knowledge quartet and dismissing some of its dimensions***

The lack of understanding of the theoretical framework of the knowledge quartet, (Rowland, 2014) suggests it is important in mathematics teaching. This lack made these two teachers experience difficulties as they agreed in Table 3 that they had challenges in teaching long division to grade seven learners. A proper foundation, transformation, connection and contingency, (Rowland, 2014) is vital to eliminate these challenges, and the learners themselves might undergo deep learning as the concept learnt is connected to what they see at home. Some of the dimensions of the knowledge quartet were dismissed. For instance, the connection dimension where the teacher needs to link the concept of long division to other concepts was not done. This explains why learners were failing to do multiplication, addition and subtraction linked to long division. The implication is that these teachers, when teaching long division, were constrained in that they failed to embrace all the content knowledge that could have made learners accommodated in a community of practice that performs long division successfully. Lack of the use of the framework of the knowledge quartet comes as an answer to what teachers

experience when they teach long division to grade seven learners.

### ***Prior knowledge and dismissing genesis of long division***

Failure to consider the prior knowledge required before teaching long division made these teachers experience, that long division as a mathematical operation, cannot be taught successfully before the learners' prior knowledge is revisited. That is, the basis of understanding long division is for one to first master addition, subtraction and multiplication as these are involved in the stages to perform long division: a) divide; b) multiply; c) subtract; d) bring the next digit down, and e) repeat the activity. Also, what made these teachers experience challenges in their teaching was that there was no inclusion of the historical approach in teaching long division, and teachers' failure to do translanguaging and code switching. Such an approach shows how the concept of long division developed. Only *exposition, discussion and practice* were used as methods of teaching long division, as seen from Table 2. This made them leave some languages related to long division, which might have helped learners understand what long division is and how to do it.

The researchers presented the genesis of long division, and through it, they found that this was where the meaning of what long division is all about. So, one can say teachers were selective in the methods they selected to teach long division. Also, it was observed that they were selective when they chose prior knowledge to teach long division. As a result, this made them appear as if they did not have the content knowledge to teach long division, and this responded to our research question:

### **Conclusion**

Long division is difficult to teach since it requires English and mathematics, which learners lacked. So, to avoid constraints, teachers need to embrace the prior knowledge of learners using translanguaging and code switching. This allows teachers to be closer to the learners as they will be well understood. Learners should have good knowledge of subtraction, multiplication, and place value of numbers, as long division builds on that knowledge. Therefore, the study concluded that failure to employ the proper foundation, transformation, connection and contingency, as suggested by Rowland (2014), may contribute

to the barriers to good performance in long division. Teachers had to control long division difficulties, assess difficulties, teach the parts included in the examples just before long division examples are assigned, establish concepts, and develop knowledge of relationships.

### **Recommendations**

Based on the findings, the study recommends that these two teachers and any other teachers experiencing challenges in long division should:

- Teach first the other mathematical operations, namely, addition, subtraction and multiplication, before introducing long division. Other concepts to deal with in the foundation are developing decimal notation concepts and the place value of numbers. To understand long division, one must see that it comes at the climax and must be treated as the last. Also, the relationships between the divisor, dividend, and quotient, plus remainder, must not be left out in each encounter, where long division is being taught.
- Ensure that the dimensions found in the knowledge quartet framework (foundation, transformation, connection & contingency) are treated carefully, as these aid understanding. In the process of engaging with the dimension, one needs to bring the genesis of division, as this equips the teacher with skills, which might be erroneous and seen in previous generations. This is so since it allows the teacher to be innovative as he presents the idea of long division.

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