

# Use of multiple languages during engagement with mathematics: implications for learning and teaching

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## Abstract

This paper reports on the use multilingual mathematics learners who are competent in both mathematics and language of learning and teaching (LoLT) make of both their first language and the national language in tandem with LoLT during engagement with a mathematics task. The study draws from a wider study conducted in one public university in Kenya. Data was collected using questionnaires and individual interviews, and extracts from transcripts of two learners are presented for analysis. The analysis shows that the multilingual learners assessed in English use resources in their first languages and the national language in different ways and at different stages in order to understand mathematics task. While the languages are used for different though not distinct functions, the use of first languages in seeking conceptual understanding emerged as the dominant Discourse model. The findings provide some insightful feedback for learning and teaching.

**Key words:** Multilingual learners, undergraduates, language switching

## 1.0 Introduction

Studies on language facility among multilingual mathematics learners have focussed mainly on learners' use of language of school and one home language as resources in mathematics learning, teaching and performance (e.g. Bunyi, 1999; Cleghorn, Merrit & Abagi, 1989; Setati, 2005). These studies discuss the use of one home language that learners engage with in the course of learning and assessment that help to improve their mathematics performance while they are still learning the language of learning and teaching (LoLT). They offer research the opportunity to examine the bilingual language practices of multilingual learners. Further studies that have investigated bi/multilingual high achievers of mathematics have focused on learners who had limited proficiency in LoLT (e.g. Dlamini, 2008) or high proficiency in LoLT as well as in their home languages with a focus at primary level learners (e.g. Clarkson, 2007). However, there are no studies that have been found that have researched language practices among multilingual undergraduate learners. While the above studies have focused on learners' first language and LoLT as resources in mathematics performance, this paper argues that other languages that multilingual learners are exposed to are also put to use while learners engage with mathematics tasks. In particular, the language(s) in which thoughts of multilingual learners are articulated has received little attention and specifically those of undergraduate learners who are competent in mathematics as well as in LoLT during their individual engagement with mathematics tasks have not been addressed.

## 1.1 Aim of the Study

This paper reports on how and why some multilingual undergraduate mathematics learners use both their first language and the national language in tandem with the LoLT during engagement with mathematics tasks. The study was conducted in one public university in Kenya. The report is based on responses to the question;

*How and why do multilingual learners use their home languages in solving the given mathematics task?*

While the findings expose the different languages that were used in moment-to-moment engagement with the task, this study acknowledges that language is not the sole factor that can affect multilingual learners' mathematics performance. Other factors such as socioeconomic status and learners' mathematical ability also influence performance.

## **1.2 Background of Context**

Kenya is a multilingual country with about 40 indigenous languages. English and Kiswahili are the official and national languages. Kiswahili is an indigenous language of a minority group and has more use in social situations than English which is the language of school, albeit a foreign language. In school, Kiswahili and English together with particular indigenous languages depending on their predominance in a specific locality are used in the early grades of primary schooling. A shift to English, as LoLT, takes place from Standard 4, except in Kiswahili subject. From Standard 4 onwards English and Kiswahili are also taught as compulsory subjects, with mathematics examinations at all levels being presented in English. Hence English and Kiswahili languages are additional languages for the majority of learners in the Kenyan education system.

Although the language in education policy (LiEP) is silent on the use of other languages than English, code switching between English, Kiswahili and the indigenous languages in teaching and learning is a common practice in mathematics classrooms in the primary schools (e.g. Cleghorn et al., 1989). In secondary schools, where learners tend to be more linguistically diverse, anecdotal evidence shows that teachers code switch to break the monotony of using English in the classroom and not necessarily to facilitate content acquisition among the learners.

Given this linguistic background of the learners, this study like other studies (e.g. Moschkovich, 1996) regards the learners' home languages as resources that can be used during engagement with mathematics task. It reports on the use some undergraduate learners make of their first languages and Kiswahili during their engagement with mathematics. It is worth mentioning that initially the study focus was on the first languages as the home languages, but as the data collection proceeded, Kiswahili also emerged to be a language used by the learners in mathematics at individual levels. Learners also used it in their explanations or indicated directly that they used in tandem with their first languages. In that regard focus on its use then became unavoidable. Thus I refer to both first languages and Kiswahili as learners' home languages.

In the following section I present a review of relevant literature on how and why multilingual learners use languages in their thinking through mathematics tasks. The theory that informed the analysis, findings are then discussed, and finally implications for learning and teaching.

## **2.0 Use of two languages during mathematics engagement**

Research acknowledges that language diversity facilitates different linguistic modes of thought (e.g. Orton, 1992). More particularly, Orton says that learners use language not only to think but also to examine their thoughts. He claims that the language used to think is most likely to be the first language. Orton's claim is in line with Kazima's (2007) finding that learners read probability tasks in English interpret and think in Chichewa, first language, and then translate back to English for reporting purposes. With the learners mostly learning English in school but not hearing it during their social interactions, Kazima argues that the meanings of English words do not come as naturally to them as for monolinguals English speakers.

Research on mathematics performance and language proficiency also shows that learners switch between home and school languages during assessment. Studies exploring the language practices of bilingual learners during assessment indicate that learners who are proficient in both first language and LoLT do better in mathematics than those not proficient in either or both languages (e.g. Clarkson, 2007). Reasons attributed to why and when learners switched languages while engaging with tasks individually were; when they encountered conceptual difficulties, due to the context in which the mathematics task was performed, and simply because it was easier to do a task in first language (e.g. Clarkson, 2007; Planas & Civil, 2010).

Apart from the first language, other languages are available for learners' use in multilingual environments. The use of such languages in assessment has not been explored, more particularly in the Kenyan context. It is worthwhile to note that such languages and language practices that learners bring to school affect not only how and what they learn (Gorgorio & Planas, 2001), but also how and why they respond to mathematics tasks as they do. While the studies on learner performance have been framed by a cognitive perspective (e.g. Clarkson, 2007), this study draws on a socio-cultural perspective based on Gee's (2005) theoretical construct of Discourse models to explain the language practice of multilingual undergraduate learners.

While Gee's theoretical construct does not explicitly apply to mathematics, it is illuminating of how and why language is used as it is in any context. In this particular study it helps to understand how and why different languages are used by individual learners in moment-to-moment engagement with a mathematical task.

## **3.0 Theoretical Framework**

Gee (2005) argues that when we write or speak, we use the resources of language to project ourselves as certain kinds of people or identities, engaged in certain kinds of activities. These activities and identities are continuously and actively rebuilt in the here-and-now. It is not just through language but by using language together with other non-language "stuff" that activities and identities are built. Gee refers to the use of language together with other non-language "stuff" as Discourse (capital D) which is:

ways of combining and integrating language, actions, interactions, ways of thinking, believing,

valuing, and using various symbols, tools, and objects to enact a particular sort of socially recognizable identity (2005, 21).

The key to Discourse is recognition. If you use language in such a way as to be recognised by others and yourself as a particular identity engaged in a certain activity, then you will have “pulled off” a Discourse of a sort (pp 27). Thus when mathematics learners communicate how and why they use language as they do, how they used it in thinking and how they privileged or valued one language over the other, they portray the activities they were engaged in and the kind of identities that they assume in moment-to-moment use of language.

Gee (2005) uses the theoretical construct of Discourse models to explore the identities and activities that people enact. Discourse models explain, relative to the standards of a socio-cultural group, why people speak, write and act as they do. The models are rooted in our experiences, and it is from these experiences that we learn them. Our experiences are shaped and normed by the social and cultural groups to which we belong. It can then be argued that our experience with, and ways of being in, mathematical knowledge and certain language backgrounds help us to enact certain mathematical Discourse models.

As learners responded to the mathematical task, they positioned themselves as acting from given perspectives. Understandings of the perspectives taken enable us to recognise the Discourse models enacted. In turn, the Discourse models help us to explain the situated meanings of various words and phrases. In this way we can understand the meanings attributed to words and phrases, actions, interactions, ways of being, thinking, believing and valuing within and across Discourses, thereby becoming informed of the kind of identities involved in different kinds of activities. In the light of these Discourse models, this study reports those models which multilingual undergraduate mathematics learners enacted in relation to language switching as they engaged with a given mathematical task.

#### **4.0 Method and Sampling Techniques**

This study draws from wider study which adopted a qualitative approach focusing on a case of a group of selected multilingual first year undergraduate learners from one public university in Kenya. Judgemental sampling (Patton, 2002) was applied for the choice of university as well as the programs that the learners were undertaking. The programs were related to mathematics as a prerequisite subject and also offered as a course within the programs. Engineering programs met these criteria and therefore the study focused on engineering learners. Further first year undergraduates learners were considered because the background of the study was based on high mathematics achievers in the national examination whose results led to their admission in the university. The learners had also succeeded in English, though it is not in the cluster of prerequisite subjects for engineering.

Data was collected using three instruments; questionnaires, clinical, and reflective interviews. A structured questionnaire was used to gather the baseline data, which was necessary for selecting interview participants. Analysis of the questionnaire data provided a sample of 15 learners selected on the basis of, highest score in mathematics and least in LoLT, the difference of which was presumed in part to be related to language, multiplicity of learners' first languages, and whether learners used other languages apart from English while responding to mathematics tasks. They stated that they commonly used their first languages together with Kiswahili outside classroom setting and all learnt English as their second or third language. Thus the sample was of 15 first year multilingual undergraduate learners who had succeeded in both mathematics and English, but had higher scores in mathematics and were undertaking three core units in mathematics.

Clinical interviews were used to establish how the learners' used languages and other non-language "stuff" in relation to the mathematics task that was given. The aim of reflective interviews was to identify, ascertain and confirm various actions and languages and that were used during the clinical interview most of which were not visible during the interviews. Semi-structured questions were used to enquire on some critical moments while the learners were engaged with the task. The reflective interviews also provided data on how and why the participants used certain language(s) while processing the task, in speech or in writing or other non-verbal means. Both interviews were video recorded and transcribed. Field notes, copies of students' worksheets and questionnaire details provided supplementary data. The transcripts formed the primary data for analysis.

The task that the learners responded to was adopted from the standardized Kenya Certificate of Secondary Education of 2010 and read as follows:

- Q. A hall can accommodate 600 chairs arranged in rows. Each row has the same number of chairs. The chairs are rearranged such that the number of rows is increased by 5 but the number of chairs per row is decreased by 6.*
- a) Find the original number of rows of chairs in the hall.*
  - b) After the re-arrangement 450 people were seated in the hall leaving the same number of empty chairs in each row. Calculate the number of empty chairs per row.*

The data analysed in this paper is from reflective interviews with two of the learners. Their data was used since it was rich in information pertaining to the different languages used during the clinical interviews. The two learners, S13 and S14, spoke Kikuyu and Dholuo as their first languages respectively. They both used their first languages and Kiswahili regularly outside the classroom, with S13 using Kikuyu more than Kiswahili and S14 using Kiswahili more than Dholuo. The two learners had earlier indicated that their preferred language for the interviews was English; however, they often switched to Kiswahili during the interviews. They did the task and got the expected solutions. The following questions were posed to the learners in order to elicit the required information: *as you read and interpreted the questions, which were written in English, did any other languages come into the process? If so, which languages, why and how were they used?*

The validity of study was granted by the reported process of methods of data collection, data analysis and the detailed explanation of concept understudy outlined above (e.g. Yin, 2003). Gee (2005, 113) notes that analysis of the same findings can yield different validity since validity is never “once and off all”, it is open to disputes and discussions, of which the findings of this study are also prone to. In such situations validity is guided by accepted realities in the particular domain of inquiry, here being the use of different languages in the domain of mathematics.

### **5.0 Learners’ use of three languages in a single mathematics task**

Generally, the switching to learners’ first languages dominated when seeking interpretation and understanding of the task. Kiswahili was used throughout though not necessarily for conceptual understanding. Where Kiswahili was used, the necessary translations have been provided.

The interviews revealed that the learners switched between English, their first languages and Kiswahili during the engagement with the problem for part of or the whole task. This happened without prior planning in the case of S13, who indicated that for him to proceed with the task he had to understand it in Kikuyu. On the other hand, S14 switched to Dholuo because of the perceived difficulty of the task. S14 used Kiswahili to read numbers because this was his habit in the home setting, while S13 used Kiswahili because of its close linguistic relationship to Kikuyu.

In the interview, the learners first responded to whether they used other languages during their engagement with the task.

#### **Extract 1**

*S13: ... I was trying to get is ‘what is the question trying to ask?’ and I could visualize it in my own language (Kikuyu)... Kiswahili I used it almost throughout...*

*S14: Yeah, there was Kiswahili, some mother tongue (Dholuo) [laughs]...*

S13 and S14 reveal that their first languages, Kikuyu and Dholuo respectively, and Kiswahili were used during the engagement. S13 remarked initially that he had used Kikuyu; the question about Kiswahili was asked because he used Kiswahili words and phrases in both interviews and the researcher wondered to what extent this language had been used implicitly. On questioning S14 about the languages, he indicated immediately that he had used two languages.

Why did they use the languages as they did? Different reasons were provided. I first explore S13’s account:

#### **Extract 2**

*S13: ...because / this language (English) is not so...is not haikuangi ati common kwa kila mtu [(English) it’s not common to everyone]. So at a certain point I could read the question if I have not understood then I try to figure out, ‘what does it mean?’ If am given about this information, now I have to digest this information bit by bit in my own language. Then / from*

*there after I have understood now the question, I could now be able in a position to write or answer the question.*

S13 attributes his use of Kikuyu to the fact that the English language is not “*haikuangi ati common kwa kila mtu*”, which in this context means that it is not commonly used. In this way he recognizes the inability to use English to visualize not just as at individual level, but as a problem of some others as well. The use of Kiswahili in the statement and its meaning, positions S13 as a learner who distances himself from English by using Kikuyu to visualize the task. Where understanding the task in English poses a problem, he draws on Kikuyu. He uses it to process task information in bits, and once understood he proceeds to answer the question. Thus Kikuyu was privileged more than English in seeking understanding. He proceeded to explain how and why he used Kiswahili;

### **Extract 3**

*S13: This one [Kiswahili] maybe after understanding it in this way [in the Kikuyu translation he had made of the task], because Kiswahili is the language which is closer to my language, now I come to use it severally...If it's come on mathematics or may be sciences, I will have to think in those two languages, I read in this one [English], then in the process I will come now to use this Kiswahili in the meanwhile.*

He uses Kiswahili only after he has gained understanding in Kikuyu because Kiswahili is close to Kikuyu. Although his initial statement on the use of Kiswahili indicates uncertainty, subsequent utterances make it clear that it is not only in mathematics that he switches languages but also in science. So if initial understanding in Kikuyu precedes the use of Kiswahili, then it is clear that the Kikuyu language was privileged more than Kiswahili in seeking understanding.

S13 positions himself as a learner who uses three languages in responding to tasks. He does this not only in mathematics but also in science. We see some complexity in how he uses both Kikuyu and Kiswahili after understanding the task in Kikuyu in his statement “*I will have to think in those two languages*”. It is not clear whether this happens in a mixture of Kiswahili and Kikuyu or whether there is distinction between their functions prior to translating back to English for reporting purposes. The way he distances himself from English by using Kikuyu to visualize the task and privileging of Kikuyu over Kiswahili, makes him to be recognized as a learner who reads the task in English, interprets it in Kikuyu, and then probably uses Kiswahili before translating back to English for reporting purposes. So far, switching to Kikuyu to seek conceptual understanding is the dominant Discourse model that shapes S13's understanding of the task while switching to Kiswahili is less dominant

In order to form a better understanding of how switching occurs and how often, I examined S13's accounts more deeply. He explained that it was a common practice;

### **Extract 4**

*S13: Most of the time, if for example you can give me a question I lack to understand in a way that I can speak it in my own language (Kikuyu), most of the time I will not be able to answer that question properly... For example in this part, I could read this one [referring to the first sentence in the question] I know what is talking about in my own language. Then after the*

*first sentence then I continue [with all other sentences] then I can get the real picture of what the question is talking about...Now I could ask I could visualize in my mother tongue, "this is 600 / how could they be arranged? Yes, they are in a room but how could they be arranged?"*

From the above extract it is clear that S13 switches to Kikuyu commonly when he needs to understand a task, implying that there are times when he does understand the task in English. In this particular case he translated the whole task before responding to it. The translation enabled him to form a mental picture of the task. The translation of the whole task into Kikuyu shows that this task is not one of those that he understands the underlying concepts in English. However, the understanding that he got in English before translating to Kikuyu and back cannot be assumed. It played a role in facilitating his success in mathematics. Although how Kiswahili is used is not very clear, S13 uses three languages in the whole task. The use of first language again emerged as the dominant Discourse model.

The process of thinking, understanding, and forming a mental picture of the situation in the task show that the switch to Kikuyu greatly influences this learner's mathematical performance. This is because his solution of the problem depends largely on his understanding of the task in Kikuyu. S14 switched to Dholuo when he was faced with difficulties or confusion in understanding the task, and to Kiswahili to read numbers.

#### **Extract 5**

*S14: I involved it [Dholuo] at the stages where I was not able to interpret in terms of English...In part (b) I had to involve, I was a bit confused in terms of these people (450) and the number of seats here. I had to involve Dholuo and Kiswahili so that I interpret that each chair was supposed to accommodate an individual.*

S14 had some initial difficulties with (a); he reworked the task to completion and arrived at the expected solution. But it seems the difficulties in (a) did not require him to switch languages as he did in (b), where there were difficulties in interpretation and some confusion. He needed to link the solutions arrived at in (a) to the requirements of (b). In order to do so, S14 resorted to Dholuo as a language resource and translated part (b) into Dholuo. The translation assisted him in linking (a) to (b) and arriving at the solution for (b). From S14's account, it is clear that Dholuo was used as a linguistic resource when he faced challenges while attempting interpretation in English. Meanwhile, the numbers of chairs, rows and people were read in Kiswahili.

#### **Extract 7**

*S14: Kiswahili I used it almost throughout...I used it when I was referring to the numbers here like 600, like 6, like 5.*

*R: Why?*

*S14: That one I'm not able to explain but... I always tend to read them [in Kiswahili].*

*R: So even when you are reading this [quadratic] formula here, that 4... (S14, interjected)*

*S14: ...But not such cases only at times ndio natumia [it's what I use], and I actually think maybe because I'm living with people... [Inaudible] so most of the time we speak Kiswahili*

These utterances imply that even where there were no interpretation challenges, he read the figures in Kiswahili. He thought he did so because in his home environment Kiswahili was the everyday language and hence numbers of things were expressed in Kiswahili. The switch to Kiswahili in this way does not seem to imply that he used it to derive the meaning of numbers; rather, it is the way his cultural environment at home has socialized him. It then seems that in (a) he used two languages while he used three languages in (b). It is interesting that S14 used Kiswahili more at home but in mathematics he used it only in reading some numbers, while using his first language when faced with interpretation problems.

S14's language practices of switching suggests that he is a learner who, when faced with interpretations challenges of conceptual nature, he switches to his first language but always reads numbers of items in Kiswahili. The use of Dholuo emerged as the dominant Discourse model that shaped his understanding when faced with interpretation difficulties. While Dholuo is his first language, it is not his language of common use, but it emerges as a more reliable resource than Kiswahili which he uses more frequently outside the classroom environment.

## **6.0 Discussion**

The findings of this study show that multilingual learners' language switching practices are based on different factors and the languages switched to have different functions within a single mathematics task. Such use of language shows how the learners interviewed here were able to draw on languages in their linguistic repertoire as resources in the mathematics task. While the findings have similarities with earlier studies of bi/multilingual learners switching from the language of the test to the home language, this study also provides some new insights.

One of them is that learners presented with a written mathematics task in a language which is not their first language switch from the language of the test to their first languages in search of conceptual understanding similar to earlier research findings (e.g. Clarkson, 2007; Planas & Civil, 2010). The present study goes further to show that individual multilingual learners switched from English to their first languages and Kiswahili. In essence, the learners used these languages which are more commonly used in social scenarios outside the classroom as resources during their engagement with the task.

It is observed that the three languages play different roles; English is used read the task and report back in writing and partly for conceptual understanding, first languages are used for conceptual understanding while Kiswahili was seemingly used procedurally. The use of Kiswahili is evidenced by the fact that S13's switch to Kiswahili came when he had adequately understood the task in Kikuyu while S14 used Kiswahili to read numbers of things and people because of how he has been socialized by his social and cultural environment at home. This finding cannot be conclusive at this

point; more needs to be done on roles that certain languages play while learners engage with mathematics.

Another important finding from this study borders on linguistic distance. S13 creates this distance by indicating that he does not often use English to visualize tasks but instead uses Kikuyu because English is not in his common use. In the light of learners' languages being resources in mathematics (e.g. Moschkovich, 1996), S13 can be viewed as a learner whose ability to visualize the task in Kikuyu rather than in English provides the better option. He also draws attention to a close linguistic distance between Kiswahili and Kikuyu, where he uses Kiswahili after he has acquired understanding in Kikuyu. These position him as a learner who in most instances privileges Kikuyu as his first language of thinking through the task, which is in line with the findings discussed in literature (Orton, 1992; Kazima, 2007).

Other findings that emerged from the study as the learners used the two languages, is that the learners switched languages for the whole task or for part of it. For S13, who switched for the whole task, it seemed the natural thing to do since as a learner for who English is an additional language, the meaning of the task in English did not seem to come naturally to him, rather it came in his first language (Kazima, 2007). S14 switched to Dholuo for part of the task when he was faced with interpretation difficulties. These findings are similar to findings of Clarkson (2007) that showed learners switched languages in whole or part of question.

The analysis shows that the first languages are privileged for thinking as the learners explore meaning and understanding of the task. Thus the use of first languages emerged as the dominant Discourse model either all the time or when faced with interpretation challenges. One of them was actually used to link a part that had been responded to in English to one that was posing interpretation challenges, before solving it. Kiswahili was less dominant and did not seem to contribute to the understanding of the task. The peculiarity on how S14 used Dholuo and Kiswahili is notable. Kiswahili, the language of common use outside classroom was only used to read numbers while he banked on Dholuo to access the meaning of the task when faced with interpretation difficulties. I would have expected that, as in the case of S13, the language of common use would be used more as a resource, but the language practices of S14 show that it's not always the case. From the language practices of these two learners, the complexity of how they use the three languages English, Kiswahili and the first languages is clear.

According to Gee (2005), the two learners enacted different identities as they engaged with the task. S13 may be recognized as learner who in most cases gains initial understanding of the task through Kikuyu language rather than through LoLT or Kiswahili. S14 can be recognized as a learner who makes effort to understand the task in the LoLT while reading numbers of things and people in Kiswahili but in times of difficulties with interpretation, he resorts to Dholuo. Both learners can be recognized as

learners whose ways of being in mathematics and their experience with languages used outside school, shape their use of languages during mathematics engagement.

The fact that these undergraduates switch to their first languages to seek conceptual understanding of the task calls for attention, particularly because these learners are not formally exposed to their first languages after Standard 3. This is in contrast with Clarkson's (2007) findings that showed that two years after he had recorded learners in Grade 4 who switched to their home languages while solving a mathematics task, the level and frequency of switching had fallen to a point where the learners could hardly differentiate between the languages used. The switch to home languages at undergraduate level may reflect the influence that the uses of these languages outside school have on the learners' processing of mathematical tasks.

My argument that those other languages that multilingual learners are exposed to are also put to use while learners engage with mathematics tasks holds in this context albeit for a small sample. The findings provide some insight for LiEP makers in Kenya which could add substance to the debate of rethinking the place of indigenous languages in the context of African education (e.g. Bunyi, 1999) and help to seek to support learners' mathematical understanding not only in examinations but also in learning and teaching process.

### **7.0 Implications for learning and teaching**

One way of knowing whether teaching and learning has taken place is through assessment. Since the learners in this study had succeeded in mathematics and English language, it can be claimed that they had learned both subjects. The success indicated in their grades does not however, show some critical aspects of learning and how success is achieved. By focusing on the language switching practices that have been discussed in the Kenyan context, this study provides insights into how learners use language during engagements in order to succeed in mathematics. Though the analysis has focused on two learners, the findings have possible implications for learning and teaching in the Kenyan context and elsewhere.

The study reveals that learners' first languages and the national language are valuable language resources in individual learners' engagement with mathematics despite the fact that the learners had succeeded in the LoLT in which the task was presented. In this case a relevant question to ask is: if the learners in this study drew on the languages used in their social setups as resources for effective engagement with a mathematics task, how do they engage resourcefully with other languages during learning and teaching processes where they interact with other learners and teachers who may use other languages apart from the LoLT? Some findings from a learning and teaching point of view show that code switching between LoLT and learners home languages happens (e.g. Setati, 2005). It is important that the insights from this study taken from an assessment perspective and findings from learning and teaching perspective concur that learners' first languages are resources in mathematics and that learners performances are influenced by these languages. It could be that other languages besides the first languages are also used by learners in classrooms which should be investigated.

Given that the first languages, except Kiswahili, are completely prohibited beyond Standard 3 in the school environment in Kenya, further investigation into multilingual learners' language practices beyond Standard 3 would inform policy makers on the need (or not) of considering these languages as resources that can support learners' exploration and communication of mathematics meaning. This is because if languages and language practices that learners bring from home to school are harnessed, they can support learning and teaching. In this way, the home languages could be used to supplement exploration and communication of mathematical meaning in English. Further the fact that the use of Kiswahili by the learners interviewed was not associated with its use in the classrooms as a subject raises some concern.

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