

What are Student Teachers' Perceptions in the Use of Home Languages in the Teaching and Learning of Mathematics?

Judah P. Makonye

*Marang Centre for Science and Mathematics Education, University of Witwatersrand,
Number, 27 St Andrews Road, Parktown, 2050, Johannesburg, South Africa
Telephone: +27117173206, Fax: +27862076533, E-mail: Judah.makonye@wits.ac.za*

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ABSTRACT The paper explores student teachers' perceptions on the use of learners' home languages in mathematics teaching and learning. Interview data from sixty student teachers from a university in South Africa was collected. Students' perceptions varied enormously. The supportive respondents argued that the use of home languages not only supported mathematics epistemic access, but also promoted cultural identity and lifted home languages to a position of prominence and prestige. Those who were against argued that the use of home languages proffered disadvantaged learners with inferior education. In this group, other respondents were of the view that the education system was logistically not ready for it. Yet still, some argued that use of home languages in education promoted tribalism and worked against national cohesion. Recommendations include calling for the deployment of resources to promote the teaching and learning of mathematics in home languages.

INTRODUCTION

This paper is about the perceptions of student teachers who train to teach mathematics at high school on the use of indigenous or home languages in the teaching and learning of mathematics in South African schools. The research was done at the School of Education, University of the Witwatersrand, Johannesburg, South Africa, where the researcher is a mathematics education lecturer helping to train these future teachers. The participants and respondents to this research are Bachelor of Education students, training to be high school mathematics teachers. They speak different home languages among them siPedi, isiNdebele, siSwati, seSotho, Setswana, chiTsonga, Tshivenda, siXosa and isiZulu which are official languages of South Africa in addition to English and Afrikaans. In their previous school lives these students learned mathematics in English, which is not their home language.

The underperformance in mathematics of South African learners over many years is well-documented in literature (see for example, Howie 2001, 2004; Makonye 2009; Makonye and Ramatlapana 2015; Mullis et al. 2012; Reddy 2006). Many hypotheses for this underperformance have been put forward, among teacher content knowledge (Carnoy et al. 2012), lack of resources, an ambiguous curriculum (Potenza and Monyokolo 1998) and so on. In this paper, the researcher problematises the case that most of

these learners do not do well in mathematics because of the language of teaching and learning they are not proficient at. This paper argues that since teachers are the implementers of the curriculum, it is crucial that their perceptions on the use of a teaching resource such as home language is important to begin to seek for holistic ways to begin to improve the teaching and learning of a key subject in the school curriculum. This is particularly so because many researchers argue that language is central to teaching and learning (Vygotsky 1986), that language communicates meaning and can make a difference in teaching and learning. There are many researchers advocating use of indigenous systems (Kaino 2013) and home language in teaching mathematics (for example Adler 2001; Setati et al. 2009; Mufanechiya and Mufanechiya 2011). The author argues that more needs to be done in order to understand this phenomenon in greater detail.

Globally, many children whose home language is not the language of teaching and learning in school are negatively affected in that struggle to learn mathematics without any success. Research shows that children's home language is the ideal language for learning particularly during the early years of education (UNESCO 2008). Thus the use of indigenous resources is seen as relevant in helping learners to connect school work with their home environments. Indeed the use of indigenous materials; even games (Nkopodi and Mosimege 2009) is seen as help-

ing learners to learn mathematics better. Despite this finding many parents are reluctant for their children to use their home language in learning because they fear that they will somehow lose out (Setati 2008). This result in learners whose home language is not used as a medium for teaching and learning failing to obtain epistemic access to literacy and numeracy leading to dropping out of school altogether (Arnold et al. 2006). Language is important in mathematics education because concepts are embodied in language. Also, language is important in that mathematical concepts are communicated in the medium of language (Vygotsky 1986). Vygotsky (1986) argued that learning is mediated through signs and symbols. He argued that language is a very crucial in semiotic mediation of learning. Some people even regard mathematics as a language on its own (Ellerton and Clements 1991). Mathematical language can use common English words to mean exactly the same for instance subtract or add. However, often mathematical language is highly specialised, such as terms like rectangle, matrix, identity, inverse or field; which terms may not exist outside mathematics or would not mean exactly the same idea in English. Often mathematics uses specialised symbols. Diagrams are also used. Sometimes symbols are read from left to right, from right to left, from top to bottom, or from the bottom upwards, sometimes its front then back, for example $\log_a b$ (Adams 2003). Understanding mathematics involves understanding what ideas these notations represent (Makonye and Luneta 2014). Further it means being able to record mathematical ideas in this way so as to communicate them in a community of practice. Yet these ideas are not English per se. However even though they are not English, learners learn those using English as the medium in the classroom.

In order for a learner to be proficient in mathematics, they need to be familiar with the registers of mathematics. Knowing mathematics is linked to knowing the mathematical register. Mathematical notation is key to the power of mathematics (Makonye 2014). Mathematical formula can be quite compact and it can be very difficult to use words to unpack it without losing its essence. Such is the power of mathematical symbolism. A simple formula with few symbols can represent a long paragraph explanation.

Objectives

The research intends to explore the perceptions of mathematics major student teachers on the use of home languages in the teaching and learning of mathematics and the reasons for their perceptions thereof.

Research Questions

1. What are the perceptions of mathematics major student teachers to the teaching and learning of mathematics using home languages?
2. What reasons do the students give for the perceptions they have?

Theoretical Framework and Literature Review

The research hinges on two main ideas. The first one is a mathematical theory of communication (Shannon 1949) and the second one is the theory of social reproduction (Bowles and Gintis 1976) together with the notion of symbolic violence (Bourdieu 1990). According to Shannon's theory, what comes first is how the symbols of communication are transmitted, then how the transmitted symbols convey meaning; the message, and lastly the effect of the received meaning. In this case the language is the means of communicating the mathematical idea. The idea is transmitted by spoken word, or written word or symbol from the teacher. Then the learner is the receiver, the destination of the message. The learner needs to understand the medium of communication in order to understand the message; the mathematics concept that the teachers wants to convey. Problems occur if the learner cannot understand the medium of communication, the transmitter in this case which is the language used to teach mathematics.

Shannon (1949) introduced the term bit, now widespread in computers use. He defined it as a unit of information that is transmitted. In mathematics teaching and learning situations, the teacher is the source who produces the message which is meant for the receiver who is the mathematics learner. The message could be a mathematical concept or some instructions towards its learning. These are carried in the channel of language to the learner. So if the learner cannot transform the message because he/she cannot understand the channel, the medium then

there are difficulties in the learning of mathematics. The learner cannot decode the message encoded in the language. This is the reason why advocates for the use of the mother tongue urge for its adoption in mathematics education so that learners can more easily decode the mathematical message.

Another important assumption to this research is the notion of social reproduction (Bowles and Gintis 1976). According to Doob (2013: 43) social reproduction “refers to the emphasis on the structures and activities that transmit social inequality from one generation to the next”. Doob (2013) argues that there are four types of capital that contributes to social reproduction. These he says are financial capital which is the income and wealth of a person; cultural capital which is the shared outlook, beliefs, knowledge and skills passed from one generation to the next; human capital which is the education and job training a person receives; and social capital which refers to the network which one belongs enabling people to get discretion from others. According to Bourdieu and Wacquant (1992: 167) symbolic violence is “the violence which is exercised upon a social agent with his or her complicity.” In other words when people accept injustice heaped upon them as merited then they are victims of symbolic violence. People who do not accept that their language cannot be used to teach maths accept symbolic violence.

When people view the message; the mathematical objects; as not only the important aspect in its teaching and learning, they may equally be concerned with the channel which transmits it. Some authors strongly view the channel as very important in that they believe that it involves issues of power, politics and social reproduction (Cummins 2000; Setati 2008). They would argue that certain channels such as the language used to teach and learn mathematics is a form of human capital that would empower or disempower learners to navigate other capitals in order to raise their status in society (Webb et al. 2005). Thus the language learners are exposed to in their learning is seen as increasing or actually reducing their chances to have a better life. On the other hand, if not carefully regarded, the language used in education can result not in equitable outcomes of education, but can be misogyny for social reproduction perpetuating inequality; thereby undermining the

parents’ long-term aspirations for their children, through insidiously preserving the interests of upper classes one generation after another. It could be argued that use of English, an international language rather than the mother tongue, would enhance learners’ human and social capital and increase learners’ access to social goods (Setati 2008). On this basis, the use of home language in the teaching of mathematics may be regarded as fostering the isolation of black people and preventing them from competing successfully with other people on the national and global arena. This is a different position from thinking that what is important in the mathematical message, and not the language through which it is taught.

The two positions outlined above of mathematical theory of communication (Shannon 1949), and the theory of social reproduction (Bowles and Gintis 1976) informed this research.

MATERIAL AND METHODS

The research done was qualitative. In the paradigm under which qualitative research falls, new knowledge is generated inductively through grounded theory (Strauss and Corbin 1990). Reflective insights emerge when one collects data on a research question and analyses the data (Creswell 2008). The researcher aimed to interpret phenomenon in terms of the worldview of respondents (Denzin and Lincoln 2000); on the issue of the use of learners’ home languages in the teaching of mathematics. Qualitative research enables the researcher to discover what people regard as important on a phenomenon from their point of view and the reasons why they hold those views.

The methodology consisted of interviewing mathematics major students on their perceptions on the use of learners’ mother tongues in teaching of mathematics in South African primary and secondary schools and beyond. There were sixty fourth year Bachelor of Education students in the sample in which thirty-eight were female and twenty-two were male. Students’ ages ranged from nineteen to twenty-five years old. The students’ home languages were Sepedi, isiNdebele, siSwati, seSotho, Setswana, chiTsonga, Tshivenda, siXosa and isiZulu. There were roughly about the same number of students in each language group. The students were informed that they were free to air their views on

the use of home language in the teaching and learning of mathematics. They were assured that their responses would be confidential and anonymous. The researcher personally assured them that there were no rights or wrong answers and that the researcher wanted to learn from them. The researcher informed them that for accuracy the interviews would be video-taped. The students gave informed consent to be participants of the research. Student's interesting responses were noted in verbatim using pseudonyms. After the transcripts were done, the researcher called the students to read and indicate if there had been misquoted. All the students indicated that the transcripts were correct and in the main, recorded what they had said and what they really thought.

The researcher probed student's responses on their perceptions on the use of home languages in order to elicit off-the-cuff responses on what they really felt deep down concerning the teaching of mathematics using the medium of home languages as well as the reason that may underlie their positions.

RESULTS

Verbatim statements on students' interview responses on how they perceive the use of home language in mathematics education and their possible reasons are recorded below.

Most of the statements were shortened and edited to transcribe the essence of what the students said. The students' extracts below are chosen from what the researcher considers being the most succinct and representative of what the participants felt in general. They represent the divergent views expressed by the students in the interviews.

Verbatim Responses of Students

In the following the researcher records what some students actually said on the use of home languages for teaching and learning mathematics. The names provided are not the actual students' names.

Themba: Hi Dr For me, languages have always been my weakest academic subjects, but I always excelled at math. I was always, without exception, the weakest student in Zulu and English but was the best student in Maths.... So I do not understand...language has no role in learning maths.

Raymond: Such a naïve effort will give ... a high standard of mathematics education to other people at the expense of others for political expediency. Who will employ a bank manager whose mathematics qualification is in Ndebele. How will he/she communicate with others globally?

Clement: Using home language in teaching and learning promotes tribalism just as during apartheid era. The best ... to use a common national language so that we do not promote tribalism that is divisive. I never subscribe to this policy. Mother tongue together with one's culture should be used at home with parents, relatives and neighbours not in school. Using home language was happening during apartheid era to keep blacks subjugated with an inferior type of education. We can't do that in a democratic country now. No, No!!!

Lebogang: Teachers have a lot on their lap and asking them to teach mathematics in mother tongue is unwarranted broadening the teacher load.

James: Hehehehe!! What Dr...? I see this as a political ploy (that means plot) just as in the past. A subversive plot to keep the dominated... denying them the only thing that can really free people; a standard education carried out properly in English.

Lauren: ...have you noted how sweet a story told in your mother tongue. What makes it different if mathematics is taught in the mother tongue... it will be much more understandable than now? So we must start with mathematics books written in home language.

Makhosi: Children have a double duty to learn the English and after learning the English then they have to learn mathematics... Introducing the home language is a third factor that complicates an already complicated situation. So it is better to continue struggling to learn (mathematics) in the English medium.

Nomathemba: It is important for children to understand English and be able to use it as a language of learning. English just as the mathematics itself opens up many new opportunities for them. They will be able to travel and work in other countries and be able to communicate with different people of the world. Whom will you speak your mother tongue except with just a few people from your village.

Refilwe:...the use of foreign languages as languages of teaching and learning is not nec-

essarily linked to education. It is meant for foreign domination. Rather it is very wise as much as possible to teach maths and science in the vernacular languages so that people are free from foreign domination that comes under the cover of an educated person's language.

Salome: Learning mathematics in the home language should occur at the same time that learners learn it in English. This will give a balanced student who honours their roots and also realise the importance of interacting with the outside world that English provides.

Daphney: The best way to learn Maths is to have a home language as language of teaching and learning... this must not only be in the first years of schooling but up to high school and beyond... Students must also learn English to supplement their understanding. Learning maths with home language domesticates the subject.

Moloko: Teaching mathematics in the mother tongue at primary school level provides a vital basis for sound understanding at higher levels. The problem is that parents do not support those ideas as they see them as ways of excluding and delaying their children from accessing a socially important language... Parents see children being taught in their home language as retrogressive rather than progressive. Parents would not send their children at schools where they are taught mathematics in Tswana or Tshivenda for example.

Sepelong: The language used in school to communicate mathematical knowledge needs to be understandable by the learners, so I wholly support the use of home language in teaching mathematics.

Elizabeth: Any language is versatile you can do whatever you want with it, such as in the teaching and learning of maths— through practise, languages even home languages can grow when used, and be dysfunctional if they are neglected.

Aarifah: The problem is that at the moment there isn't any training of teachers in the use of home languages in the teaching of mathematics. If this program is done on an ad hoc basis, there will be disaster instead of progress in the learning of mathematics. I think use of home language (in the teaching of mathematics) has potential but the country is not yet ready as a lot of resources need to be deployed there and research and pilot studies actually done to see

how it may work well. There is no training for teachers to conduct instructions in local languages.

Megan: If a teacher from Eastern Cape (a Xhosa speaking Province) is sent upcountry Limpopo (a Venda, Pedi and Tsonga speaking Province), for instance, how will you expect him or her to teach in a local language he or she does not understand? Even in the same province a teacher will not be able to speak all learners' home languages. What about in Johannesburg where there is potential that all eleven official languages are spoken in class if we are not to add foreign learners? It would appear that such a policy has so many impractical implications. Better use the common denominator that is English!!!

Nkosilathi: Home languages are important, but should not be used for mathematics instruction. That is not their domain.

Mandy: Learning mother tongue at school is retrogressive. It means the Tsonga teacher will not give lessons to lower primary because he does not understand isiZulu and vice versa. The mother tongue must be learnt in the home village; because that is the only place you will use it! Learning mathematics, Nadir!!! (Nadir means down to imply no!)

Mbali: How many teachers will we have in a class to teach the same subject in each student's language if like in Gauteng we have at least eleven languages?

Nqobile: The world becoming a global village. The quicker students become used to using English the better. This is no time to promote languages with no further practical usage beyond the familiar neighbourhood.

Muhangane: Global economic and political leaders have dominated us in every way. Why not emulate them as we have done in everything else by learning mathematics in their languages?

Duma: Remember those who encourage other people's children to learn mathematics in their mother tongue... their kids will never learn it in their mother tongue, they send them to English medium schools.

Thabang: How can teaching mathematics in children's mother tongue be retrogressive? We cannot abandon our identity. Our language defines us, a link to our ancestors. This will promote mother languages to respectability.

Amanda: Using home languages in teaching and learning mathematics means we have arrived as this elevates our languages and promotes our culture...it brings in unity in diversity.

Walter: Children need to be familiar with English that gives them a competitive edge in life.

Annekah: How many home languages are needed to be able to teach mathematics in this way in the towns? They must learn mathematics in English and that not only unifies the nation, but also gives learners international education they can depend on in the future.

Ernie: I totally dislike this idea... children must familiarise themselves when they are still young. Remember the adage... catch them young.

Chido: It is tribalisation of the education, teachers will only work where their language is spoken.

Hilda: Such will enhance the cognitive development of the children, creating a sense of pride and self-worth necessary in the formation of balanced citizen. This will improve performance in maths.

Farai: It plants seeds of tribalism from school.

John: It is not new that teachers may explain difficult concepts in learners' language, however to make it a policy is harder.

Sam: Language is a known barrier to learning, mathematics. Children must study maths in any language they understand. What is important understands and not the language used to understand.

Thokozani: Apartheid education was meant to keep the South African people apart from one another, to breed mistrust, animosity and viciousness, and above all to keep us ignorant. Use of home language brings us back to those days.

Monica: Use of English makes mathematics highly inaccessible to many learners who do not understand English.

Faith: Cognitively, the mother language is necessary to develop a learners' mind.

Nokukhanya: Teaching maths in home language helps learners to become friendlier to mathematics.

Shanley: Bilingual teaching and learning of maths makes learners more secure in learning mathematics.

Ntombifuthi: Mother tongue education will hold this country back. We must use English as our language of education if we hope to be competitive.

Sarah: Allow people to choose themselves. Research supports mother tongue education as best practice.

Husna: What good would it do to any student who only learnt Zulu, or Xhosa for example? I hated the fact that the very leaders who advocate for vernacular send their own children to the schools who teach in English.

Nhlakanipho: Yes mother tongue is fine as the aim is to understand the mathematics; however there are technical terms which do not exist in the mother tongue. How do you deal with that?

Tshepiso: Mother tongue disrupts the smoothness of communication

Nonthethelelo: The Chinese learn it in Chinese, the German in German, the Italian in Italian so why can't we do it in our mother tongue. We must start from somewhere...

Rachel: Teach it is vernacular at primary but switch to English at high school and beyond. Learning it with English at primary school inhibits development!!!

Zandile: To scaffold one to a higher order academic language there is need to build language to build on one's home language. So teach maths with home language first and then later English.

Descriptive Statistical Analysis

Learners support for use of home languages in the teaching of mathematics or lack of it was statistically noted from the sixty students and is shown in the Table 1.

Table 1: Analysis of participants' views on the use of home language in teaching and learning mathematics

	<i>Support for use of home languages</i>	<i>Support for both home language and English</i>	<i>Technically difficult to do it</i>	<i>Against use of home languages</i>
No. of participants	14	12	9	25
Percentage	23	20	15	42

The researcher now discusses the results in the light of the theoretical frameworks which were Shannon's (1949) mathematical theory of communication and social reproduction (Bowles and Gintis 1976) and symbolic violence (Bourdieu 1990).

DISCUSSION

The above data draws some themes on students' perceptions on the use of home languages in teaching and learning mathematics. These themes can all be regarded in the lens of social and cultural capital as well as reproduction theory (see Bowles and Gintis 1976; Giddens 1991) and that of utility, of the mathematics communication model (Shannon 1949). This is so in that on opposite ends of the spectrum other participants strongly argue that mathematics must be taught in the learners' home language so that it is comprehensible. It appears that to them the medium that is the language is of no consequence so long the message encoded in the language is decoded by the learners. On the other end of the spectrum respondents seemed to feel that language used to teach and learn mathematics is very important in that if mathematics is taught in home language, the end result is that learners' life chances will be negatively affected. Thus both groups on opposite ends of the spectrum emphasise the primacy of language used for instructing mathematics, but seem to have opposing reasons. Proponents for the latter hold political stances on the teaching and learning of mathematics; a key subject in social mobility particularly among historically disadvantaged children. To them English is the appropriate language of power (Setati 2008). One participant, James, was highly suspicious of the use of home language in teaching maths as she reasoned that it was an elaborate plot by the government to attack at the most portent resource that could liberate people. For example Raymond, Lebo, Makhosi and others argued that the procedure for instructing mathematics needs to be the correct one. Proponents for use of home language, such as Lauren, Mbali and others, the researcher will call them the relational ones, care about whether the mathematics is understood that is why they prefer students be taught in the home language the language they understand better.

In between the polar ends lie participants who hold moderated views. These participants argue that learners can learn mathematics in a home language when they are still young but must change over to English as they grow older, for example Salome. Some of the participants hold reasons related to national cohesion and unity. Such participants argue that use of home languages in teaching learners promotes tribalism right from school which is anathema to principle of the modern nation state. For them English language is the medium that divides people least.

Other participants were more pragmatic in that they argued that in towns, it is possible that in one school learners could speak many home languages so how can that be implemented say if a class of forty learners have speakers of seven home languages. Would that need seven mathematics teachers who can speak those home languages?

Theme 1. Mathematics Must be Taught at any Level in the Home Language

Twenty-three percent (23%) of the participants who held these perceptions argued that use of home language in mathematics helped learners to understand mathematics. So these ascribed to Shannon's (1949) theory of mathematical communication. For example, Lauren said "...have you noted how sweet a story told in your mother tongue. What makes it different if mathematics is taught in the mother tongue"; and Daphney said "*Learning maths with home language domesticates the subject*". These participants argued that such teaching and learning in the home language helps learners to develop identity with their roots and develop self-worth. So these respondents see use of their home language in teaching mathematics as raising the prestige of their language to the status of English. For example, Nonthethelelo argued that the Chinese do it (teaching and learning mathematics) in Chinese, the German in German so why can't we in our home languages?

Theme 2. Mathematics Must Be Taught in Home Language Only At Primary School

In this group of students, Rachel said "*Teach it is vernacular at primary but switch to English at high school and beyond... learning it with English at primary school inhibits devel-*

opment". Such respondents indicated the limits of both home language and English in the teaching and learning of mathematics. They felt that young learners might not comprehend mathematical concepts if they are taught in English, so it would make sense to teach them in a language they understood. However they felt that at upper levels of the primary school they needed to be gradually weaned of home language and begin to learn in English so that they get used to using an important language. So such respondents ascribed to both mathematics theory of communication (Shannon 1949) and the issues of human, social, economic and cultural capital (Bowles and Gintis 1976; Giddens 1991).

Theme 3. Mathematics Should Never be Taught in Home Language at any Level

This was the most popular stance with forty two percent (42%) vouching for it. A representative of this group was Duma who said "*Remember those who encourage other people's children to learn mathematics in their mother tongue... their kids will never learn it in their mother tongue, they send them to English medium schools*". These participants argued that teaching mathematics in home language denies learners quality education. They equate instruction in English to quality education. These participants fear that use of home languages will promote social reproduction of inequality (Bowles and Gintis 1976). One participant raised the issue that politicians who propose that mathematics should be taught in home language never send their children to such schools. Such respondents argued that what is good for the goose is good for the gander. Such participants thus see English helping learners to access human capital that would lead them to obtain economic capital and other capitals in the long term. They are sceptical of anything which they regard as a proxy to keep them down-trodden through social reproduction (Bowles and Gintis 1976). They regard English as an important means of communication, a ladder to raise them to higher echelons of society. To them English is the language of the successful. That the use of English may make mathematical concepts difficult to access for learners is not important for them. As one participant argued 'would parents spend their hard earned cash to learn home language, which language they can learn at home

and in the village'? English to them is the language of sophistication, the language of the successful, those who can go places.

Theme 4. The Technicality of Using Home Language is too Bothersome for Teachers

Representatives of this group of respondents were Makhosi, Aarifa and Megan. Makhosi said "*Children have a double duty to learn the English and after learning the English then they have to learn mathematics... introducing the home language is a third factor that complicates an already complicated situation.... so it is better to continue struggling to learn (mathematics) in the English medium*". These participants argued that while it might be good to teach mathematics in the learners' home language, on the ground it would be difficult to implement it because resources such as the home language maths registers or trained teachers are not available. They argue that training for teachers to use home language is not available. Therefore their stance is that it would be quite risky to experiment with learners' lives in a subject that has so much high stakes as mathematics. Ngobile is support of this said "*The world becoming a global village. The quicker students become used to using English the better. This is no time to promote languages with no further practical usage beyond the familiar neighbourhood*".

Theme 5. The Language Used in Teaching Mathematics is not Important

A respondent in this theme illustrates that he was never good in languages either home language or English. Themba said, "*...for me, languages have always been my weakest academic subjects, but I always excelled at math. I was always, without exception, the weakest student in Zulu and English but was the best student in Maths.... so I do not understand... language has no role in learning mathematics*". Such respondents show that to them the language used is of no consequence, they receive the message no matter the communication medium. Such is to be expected because in all cases there are always exceptions. Such respondents fall under some researchers, for example Setati et al. (2009) who argue that the issue is not 'either-or' English. But rather what is pedagogical-

ly sound; what makes learners actually learn mathematics. Also such students see themselves as agents of their own success (Giddens 1991) and feel that they can succeed as teachers of mathematics no matter the language that is used.

CONCLUSION

The research questions for this paper were on the perceptions mathematics major students had on the use of home languages in the teaching and learning of mathematics and their reasons thereof. Data analysis show that student teachers hold varying perceptions on this issue. Some regard the use of home languages in education as political rather than pedagogical. Others see the use of home language in teaching mathematics as empowering while some see it as disempowering. Those who say home language is empowering say it enables learners to obtain epistemic access encumbered when a foreign language is used in mathematics teaching contexts. Other respondents see use of home language as retrogressive, harbouring seeds for failure in a competitive modern world. They regard use of home language with suspicion and would not like it in a mathematics teaching and learning context. Yet other respondents would not support home language use because they believe such an approach has not been adequately resourced, and that teachers have not been sufficiently trained for that. Another surprising reason given is that use of home language in teaching would sow seeds of tribalism and national disunity; a plot used by some politicians to keep people divided and therefore easy to manipulate. Thus indeed respondents' perceptions on this important and interesting current issue in mathematics education vary.

RECOMMENDATIONS

Given the above findings, the following recommendations on the use of home language in mathematics instruction are put forward that;

- ♦ National education departments and others, should do research on resources; mathematical registers, dictionaries and textbooks written in home language that learners can access in schools, libraries and the internet. These resources can be used as back up for English taught mathematics lessons.

LIMITATIONS OF THE STUDY

This methodology of the paper was mainly based on interviews with student teachers. It could have been corroborated by mathematics classroom observations to measure the use of home language in actual teaching and learning of mathematics, and how students being taught perceive this phenomenon.

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