"WE DON'T UNDERSTAND ENGLISH THAT IS WHY WE PREFER ENGLISH": PRIMARY SCHOOL STUDENTS' PREFERENCE FOR THE LANGUAGE OF INSTRUCTION IN MATHEMATICS

Article *in* International Journal of Science and Mathematics Education · June 2013

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Received: 5 October 2011; Accepted: 14 November 2013

ABSTRACT. This paper reports on a study which sought to investigate how social and political influences affect students' preference for language of instruction in mathematics in Ghana, where the language of instruction from grade 4 onwards in school is not the students' main language. 4 focus group interviews were carried out with 16 primary school students, randomly selected from 4 primary schools, comprising a mix of average, above average and below average achieving schools in the Cape Coast metropolis of Ghana. Qualitative analysis of the results brought to light evidence of social and political influences on students' preference for English as the language of instruction in mathematics.

KEY WORDS: Ghana, influence, language preference, political, social, students

Introduction

In this article we argue that while the importance of English as a global language cannot be overemphasised, it is equally important for the Ghanaian school system to encourage the development and use of the local language as well, in order to enhance students' understanding of concepts and also change their perceptions about the use of local language in the classroom setting. Our main argument therefore is that the local languages need equivalent levels of political support as the English language. Researchers have shown that in bi/multilingual classrooms where the local/home language of students is used as additional resource, students learn concepts better (Adler, 1998, 2001; De Avilla, 1988; Setati & Adler, 2001).

Communication is very important in mathematics learning (Moschkovich, 2007; Steele, 2001). Relevant academic literature suggests that it enhances relational understanding among students (e.g. Steele, 2001). Language is a medium through which mathematical concepts are communicated to students. Thus, language plays a critical role in the process of mathematics teaching and learning. Charbonneau & John-Steiner (1988) assert that "language is the critical mediator of concept formation and concept development" (p. 95). Spanos, Rhodes, Dale & Crandall (1988) argue that "language skills are the vehicles through which students learn,

International Journal of Science and Mathematics Education (2015) 13: 583–604

apply, and are tested on mathematics concepts and skills" (p. 222). Similarly Durkin (1991) argues that "mathematics education begins in language, it advances and stumbles in language and its outcomes are often assessed in language" (p. 3). Language proficiency among language minority students in the USA has been found to be a far stronger predictor of academic performance than either cognitive style or intellectual development. Thus, language proficiency seems to be a strong predictor of cognitive functioning. However, linguistic proficiency in English, although necessary, was not found to be a sufficient condition for high academic performance (De Avilla, 1988); it is not clear, however, if this also applies to other languages and if this finding is regulated by the extent to which the language of instruction is part of a student's daily language(s).

An opportunity for bilinguals to study in their home language until they develop adequate knowledge of the language of instruction does enhance their learning outcomes in mathematics (Adler, 1998, 2001; De Avilla, 1988; Setati & Adler, 2001; Moschkovich, 2002). De Avilla (1988), for instance, asserts that:

> under classroom organisational condition where language minority students are provided with access to multiple resources including home language, peer consultation, and so on, they will acquire concepts as easily as main stream students while at the same time acquiring English language proficiency and basic skills. (p. 118)

Related to language of instruction is the issue of the language used in assessments. Researchers have shown that it is most appropriate to assess the cognitive ability of bilinguals in their most proficient language (Davis, 1991; De Avilla, 1988; Howie, 2002; Tsang, 1988). A study by Tsang (1988) on mathematics achievement characteristics of Asian–American students, using secondary data, revealed that the language of a test has impact on students' achievement, especially when the test is not conducted in the language the students are very proficient in.

Also, students' performance in problem solving is affected when the language of instruction is the students' weaker language (Davis & Hisashi, 2007; Mestre, 1988; Spanos et al., 1988). Spanos, Rhodes, Dale & Crandall (1988) found in their study on linguistic features of mathematical problem solving that "students who lack certain kinds of experience or whose experience has been different from or even contradictory to the experiences presupposed by certain word problems are apt to encounter difficulties" (p. 232). Mestre (1988) observed in his study on the role of language comprehension in mathematics problem solving that language deficiencies lead to misinterpretations of word problems; the resulting solutions may be

incorrect yet mathematically consistent with students' interpretation of the word problem. Clarkson (1983) also found a negative significant correlation between bilingual students' reading errors in English and their performance on mathematics test in Papua New Guinea. A more recent study in Malawi (in Africa) revealed "a significant correlation between mathematics word [problem] scores and measures of Chichewa [the national language] mastery" (Chilora, Jessee & Heyman, 2003, p. 12). Studies done in Ghana on mathematics achievement and the language of tests confirm the literature above (Davis & Hisashi, 2007).

The discussion so far supports Vygotsky's assertion of the interaction between language and cognition (Sutherland, 1992), bringing to focus the intersection of three major research areas, that is, mathematics pedagogy, language, and sociocultural context. While bilingual students who study in a classroom context in which the language of instruction is not their main language struggle to understand both mathematics and the language of instruction during mathematics lessons, their teachers usually face the onerous task of teaching both mathematics and the language of instruction at the same time (Setati, Adler, Reed & Bapoo, 2002).

Bilingual Education In Ghana. The research being reported in this article was conducted in Ghana. This West African nation practices 13 years of pre-tertiary education (excluding 2 years of pre-school education). This involves 6 years of primary education, 3 years of junior high school (JHS) education and 4 years of senior high school (SHS) education. The language of instruction from grades 1 to 3 is the local language of the community in which the school is located, whereas English is the language of instruction from grade 4 onwards. It is worth noting that even though local languages are supposed to be used as the medium of instruction at the lower primary levels, all books (textbooks, workbooks and teachers' handbooks) at these levels, with the exception of Ghanaian language books, are written in English.

English is the only official language of Ghana, although some 49 languages and dialects are spoken in the country. Nine of these languages (other than English) are government sponsored and are therefore studied in schools, these being Akan, Dagaare/Wale, Dagbane, Dangme, Ewe, Ga, Gonja, Kasem and Nzema. Hausa is the lingua franca spoken among the country's minority, especially in the north, while Twi is spoken by the Akans in the south. Fante is one of the dialects spoken by the Akans in the Central Region of Ghana. This is the language spoken in the research locale.

In Ghana, generally, public school children (mostly from families with middle- and low-income background) get the opportunity to use the English

language only at the school precinct, usually when the teacher or head teacher is around. They therefore have few opportunities to practice using English. Hence, they are able to express their ideas better in their local language than in English. A study in the research locale has shown that pupils perform better on mathematics test, if the questions are translated orally from English language to the local language (Davis & Hisashi, 2007).

From grades 1 to 3, pupils learn in the local language and also study it as a school subject. However, from grade 4 onwards, they learn in English and study the Ghanaian language as a school subject. The system does not encourage pupils to develop the ability to read and write in the local language since the official national timetable for primary schools allot more time to the study of English language than Ghanaian language. From grades 4 to 6 (upper primary level), pupils spend 5 h a week (ten periods), studying English language whereas they spend 3 h a week (six periods) studying Ghanaian language. The study of English is compulsory at pre-tertiary level and also at the first year of tertiary education. However, the same cannot be said about the Ghanaian languages. It is compulsory only from grades 1 to 9.

The importance of the English language in the school system specifically and in the formal sector of the economy of Ghana generally makes it an indispensable subject. The English language is a commodity (Bourdieu, 1991) which any Ghanaian who aspires to attain high social status must acquire. It is the legitimate language (in Bordieu's words) and just as Bordieu (op. cit.) describes the use of standard French after the revolution: "speakers lacking the legitimate competence are de facto excluded from social domains in which this competence is required" (p. 55). Students who fail to acquire a good mastery of the English language will eventually drop out of school and be unable to participate in social settings where competency in English is required, however well they may be able to express their ideas in the local language. It is therefore common to find notices such as the one shown in Fig. 1 written on walls of some schools to remind pupils of the need to speak English.

Bilingual education as it pertains in Ghana seems to be historical in its origin. Local languages were used at the lower primary level from 1529 to 1951, with the first legislation on the use of a Ghanaian language promulgated in 1925. From 1951 to 1973, the use of Ghanaian language as a medium of instruction had a chequered history until 1974, when Ghana reverted to the use of the old policy of using a Ghanaian language as a medium of instruction for the lower primary level (Owu-Ewie, 2006), a policy which is still in practice. An attempt was, however, made to change this policy in 2002, but this was met with resistance. From 1951 to 1955, Ghanaian language was used as a medium of instruction only at grade 1. From 1956 to 1966,

Figure 1. Notice reminding primary school pupils not to speak Fante in class

Ghanaian language was not used at all as a medium of instruction. However, from 1967 to 1969, the policy involving the use of Ghanaian language only at grade 1 (1951–1955 policy) was revisited. From 1970 to 1973, Ghanaian language was used from grades 1 to 4 (Owu-Ewie, op. cit.).

This bilingual education policy in Ghana, where a local language is used as a medium of instruction for the first 3 years, might have been informed by academic knowledge that student achievement is enhanced when bilinguals are given the opportunity to study in their local language during the first few years of their school education. Colin (2001), for instance, observed that "experiments in United States of America, Canada and Europe with minority language children who are allowed to use their minority language for part or much of their elementary schooling show that such children do not experience retardation in school achievement" (p. 175).

However, it seems that the implementation of bilingual education as it is currently practised in Ghana may not yield the expected learning outcomes (especially in mathematics), since communication plays a vital role in classroom discourse. Cummins (1981) asserted that there exists a minimal level of linguistic competence (a threshold) that a student must attain in order to function effectively in cognitively demanding academic tasks. This threshold of cognitive academic language proficiency (CALP) can take between 5 and 7 years to develop in a student's second language. Cummins explains that there are Basic Interpersonal Communication Skills (BICS) which take a relatively shorter time for bilinguals to acquire (2 years), but children who acquire only the BICS may fail to understand the content of school curriculum and fail to engage in higher-order cognitive processes in the classroom such as analysis, synthesis and

evaluation. These cognitive processes are very important in problem solving and therefore may affect the performance of students who possess only BICS in mathematics problem solving. Hakuta, Butler & Witt (2000) found that English proficiency for ordinary conversation takes 3 to 5 years to develop, while academic English takes 4 to 7 years. Shohamy (1999) found that heterogeneous immigrant students in Israel required 7 to 9 years in order to catch up with native speakers in Hebrew literacy. While the authors agree that some of the sources cited (e.g. Cummins) involved older students whose situation might be different from younger students, the findings appear to have relevance to the implementation of bilingual education in Ghana.

This study set out to explore how social and political influences affect students' preference for the language of instruction in mathematics by looking at the way the English language constrains students' ability to solve word problems and how political support for English, and the status of the English language as a social commodity (Bourdieu, 1991) in Ghana, influence students' preference for the language of instruction. The main research question that guided the study was how do the linguistic competencies of students reflect their preference for the language of instruction in mathematics?

Theoretical framework

Decisions about the choice of language of instruction in bi/multilingual mathematics classrooms are not only pedagogical but also political (Setati et al. 2002). This study draws its theoretical support from Setati's (2008) theory about the influence of the relationship between how students position themselves in relation to access to language of mathematics and access to mathematics, on their preference for language of instruction. Setati (2008) argues that

> Learners who position themselves in relation to English are concerned with access to social goods and positioned by the social and economic power of English. They do not focus on epistemological access but argue for English as the language of learning and teaching. In contrast, learners who position themselves in relation to mathematics and so epistemological access, reflect more contradictory discourses, including support for the use of the their home languages as languages of learning and teaching. (p. 103)

Setati's work provides support for this study because it points to the political and social aspect of choice of language of instruction in bi/multilingual mathematics classroom.

The Ghanaian primary school mathematics curriculum emphasises the need for students to communicate mathematically (Ministry of Education Science and Sports, MOESS 2007). Researchers have also emphasised the need for students (including language minority students and bi/multilinguals) to communicate mathematically. Moschkovich (2002), for example, argues that "students are now expected to communicate mathematically, both orally and in writing, and participate in mathematical practices such as explaining solution processes, describing conjectures, proving conclusions, and presenting arguments" (p. 190). Although communicating mathematically goes beyond the use of language (Moschkovich, 2007), however, access to mathematical knowledge requires a sound mastery of the language of instruction (Cummins, 1981). For students to be able to communicate mathematically, they need to develop a conceptual understanding of mathematics and be able to express their ideas in clear language. Therefore, access to mathematical knowledge is as equally important as access to the English language, especially at the grade 4 level, where most students are still at the formative stage of their development.

Methodology

In this study, focus group interviews were conducted to collect data from 16 grade 4 students, four each in a mix of above average (school W), average (schools C and X) and below average (school L) achieving schools in the Cape Coast Metropolis of Ghana. These schools were randomly chosen using the stratified random sampling procedure (Mertens, 2010). The school types formed a stratum from which the table of random numbers was used to randomly select the schools. In each of the schools, the first author gave a short presentation explaining the whole research project to the class before the students were invited to participate. The class teacher assisted the researcher to select two high achieving students in all subjects (including mathematics and English language) (HA) and two lower achieving students (LA) among the students who volunteered to participate in the study. In doing this, the teacher referred to the students' continuous assessment record in the school. Background information of the participants is provided in Table 1. Informed consent was sought from students who volunteered to participate in the study, as well as from their parents. Grade 4 students were chosen because this grade level constitutes a transition from lower primary to upper primary. Also, the students would have grappled with

the use of the English language as a medium of instruction for a whole year, given that the English language is used as a medium of instruction from grade 4. As compared to the lower primary students, grade 4 students are also quite matured in explaining their procedures clearly (in interviews). The interviews were made up of two parts. The first part required the student participants to answer practical questions on measurement, fractions as well as word problems involving addition and multiplication of fractions. For the purpose of this paper, only the word problems have been considered. This enabled the researchers to explore the linguistic difficulties students faced in solving the mathematics word problems. Also, the practical problems on fractions and measurement helped the students to distinguish among their general mathematics, fractions and measurement experiences, as the first author made reference to those categories during the interviews. The second part of the interviews elicited information about the student participants' preference for the language of instruction in mathematics. This was to help the researchers to explore how the student participants' language preference reflected the linguistic difficulties they faced in solving the word problem. All interviews were conducted through focus groups. In order to ensure that the word problems were within the experience of the student participants, the researchers consulted the Ghanaian grade 4 primary school mathematics curriculum and textbooks. The question was also validated with colleagues in teacher education and pilot tested in a school in the Elmina district in Ghana. The students were given the opportunity to choose the language they were comfortable with. All the interviews were conducted mostly in the Fante language, which is the first author's main language. However, the written items were presented in English for the students to solve. Throughout the interviews, students read the questions in English, discussed them in the local language and presented their results in English. This condition constitutes a normal classroom practice, where teachers and students would read text in English, discuss it in a mix of local language and English and present the main ideas in English. Fante constituted the main language of 14 (out of the 16 students). The remaining two (one each from school C and X) had Twi as their main language. Twi, like the Fante language, is a derivative of the Akan language. It can therefore be understood by Fante speakers. The two students were also very proficient in the Fante language and therefore used it throughout the interviews. Newman's 1977 hierarchy of steps for solving mathematical problems provided theoretical basis for analysis of students' performance on word problems. Newman identified five main steps such as reading, comprehension, transformation (planning

the solution), process skills (solving the problem) and encoding (producing the answer to the problem). Interviews with students on the word problem therefore focused on their ability to read the problem, explain the demands of the problem, decode the mathematics from the text read, solve the problem and come out with an answer and explain their process. The use of Newman's approach in investigating bilingual students' mathematical problems in developing context is not new. Clarkson (1983), for example, had used the same framework to analyse the types of errors made by grade 6 students in solving mathematics word problems in Papua New Guinea. His study found that the general trend of errors made by the students was the same as their peers in 'Western' nations. In the study reported in this paper, the authors acknowledge that the focus group context is different from the normal classroom context because students' behaviour in the focus group might not reflect what exactly pertains in the classroom. Notwithstanding, the results may give an insight into what might be happening in the mathematics classrooms in Ghana and other developing countries.

TABLE 1

Background of student participants

School	*Student*	*Gender*	*Age (years)*	*Level of achievement*
School C	SC41	Female	13	HA
	SC42	Female	15	HA
	SC43	Male	10	LA
	SC44	Female	10	LA
School L	SL41	Female	14	HA
	SL42	Male	10	LA
	SL43	Male	11	LA
	SL44	Male	13	HA
School X	SX41	Female	9	HA
	SX42	Male	12	HA
	SX43	Male	9	LA
	SX44	Male	10	LA
School W	SW41	Male	14	LA
	SW42	Female	9	HA
	SW43	Male	10	HA
	SW44	Female	9	LA

HA higher achiever, *LA* lower achiever (relative to the rest of the class)

Results

This section will be presented in two parts. The first part presents the linguistic difficulties students faced in solving the word problems while the second part presents their language preference. In order to allow for comparison amongst the school types, the results will be presented according to school type.

Performance in Word Problem Solving. Students across the four focus schools were requested to solve word problems in a focus group interview setting:

(1) Papa Kojo gave Abena one fourth of an orange and Ekua two fourths of an orange. How much orange did Papa Kojo give to Abena and Ekua altogether?
(2) Ama bought 5.5 kg of rice whilst Esi bought three times the quantity of rice Ama bought. What quantity of rice did Esi buy?

Students' performance on these items are summarised in this section of the article.

School C students read word problem (1) with some level of difficulty. The difficult word was "altogether". However, they were able to interpret the demands of the word problem. Student SC41 verbalised the answer as "it is three-quarters; he [Papa Kojo] gave a quarter to Abena and two-quarters to Akua". However, SC42 disagreed, saying that "it is three-eighths". They, however, had difficulty reading and understanding word problem (2). The students could not attempt the problem at all. Some of the difficult words for the students included "quantity" and "times". They read "times" as "types", so they interpreted the question (in Fante language) to mean "Esi bought three types of rice". They were not sure whether it was a mathematics problem or an essay; "it must be an essay question", commented student SC42. Student SC42's comment "we do not understand the question" was also echoed by his peers. However, when the first author wrote 5.5 kg times 3 on a sheet of paper, the students were able to solve the problem to arrive at the correct answer, as shown in Fig. 2. This shows that these students had the concept of multiplication of whole numbers by decimal fractions, but the English language was a barrier in helping them arrive at this mathematical processing stage. Thus, "extracting" the mathematics from the word problem was a barrier for the students.

Students in School L also had difficulty reading word problem (1). Some of the difficult words were "gave", "much" and "did". They were,

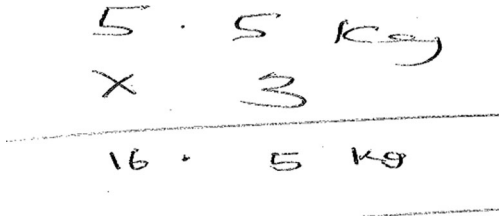

Figure 2. School C students' presentation on word problem involving 5.5 kg times 3

however, able to interpret the demands of the question as "Papa Kojo gave Abena one over four of an orange and Ekua too one over half of an orange". Student SL44 verbalised the group answer as "three-eighths". As with the students in school C, students in school L also had difficulty reading and understanding word problem (2). Some of the difficult words for the students included "quantity" and "whilst". They read "quantity" as "canteen", so student SL42 interpreted the question to mean, "Esi bought three times canteen of rice" (in Fante language) but finally presented their solution as shown in Fig. 3. A look at school L students' presentation shows clearly that as with the students in school C, they did not understand the question. Unlike students in school C, these students had problems with place values and operations (subtraction of) on numbers. Thus, apart from linguistic difficulties, they also had problems with understanding mathematics content.

School X students were able to read and interpret the demands of word problem (1) correctly but also ended up with the wrong answer as "three over eight". As with the students in schools C and L, students in school X were also not able to solve the word problem involving 5.5 kg times 3 correctly. They read the question with a lot of difficulty. Some of the difficult words included "quantity" and "whilst". They interpreted the demands of the question as, "Ama bought 5.5 kg of rice and Esi bought three times of the rice, so how much did Esi buy?" (SX41). They presented their solution in prose based on their interpretation of the question, as shown in Fig. 4.

Unlike the students from school C, the students in school X could not solve the problem correctly when the first author wrote 5.5 times 3 on a sheet of paper for them to solve, as shown in Fig. 5. This is an indication that like the students in school L, students in school X also had a problem with both the content and the English language.

School W students were able to read, interpret the demands of word problem (1) and solve to get the correct answer as three quarters. Student SW43 explained the group's answer as "I added one to two [referring to

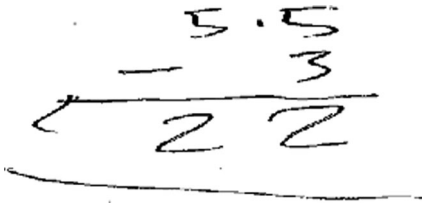

Figure 3. School L students' presentation on word problem involving 5.5 times 3

the numerators] to get three, and there are two fours [referring to the denominators] so I took one of them." They presented their answer as shown in Fig. 6.

As with the students in the previous three schools, students in school W had difficulty reading word problem (2). Some of the difficult words included "quantity" and "5.5 kg" (which they read as 55 kg) and "whilst". They read "quantity" as "quinty". They indicated that they did not understand "quantity". They interpreted the demands of the question as involving 55 plus three and presented their solution as shown in Fig. 7.

It is evident from the results presented so far that students had difficulty with the English language, especially with word problem (2). None of the four focus groups was able to read and understand the demands of this word problem. While we acknowledge that word problem (2) was a bit more difficult than word problem (1), we wish to emphasise that we consulted curriculum materials in Ghana to ensure that both questions were within the experience of the students.

Language Preference and Reasons. Students were requested to indicate the language they preferred their teachers to use in teaching mathematics generally, and fractions and measurement specifically. They were also expected to provide reasons for their responses. Fractions and measurement were chosen because these two concepts have often been cited as being difficult for students to learn (e.g. Davis & Hisashi, 2007) and for teachers to teach in Ghana (e.g. Davis & Takuya, 2005). The authors wish to emphasise here that although students were requested to indicate their preferred language(s) of instruction, it was not their intention to portray the picture that students will use one or the other language in classroom. This question was posed to help the authors explore how social and political influence of the day reflects students' language preference.

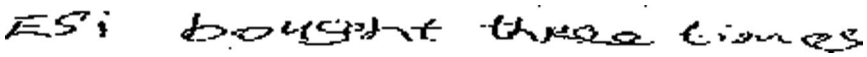

Figure 4. School X students' presentation on word problem involving 5.5 times 3

Figure 5. School X students' presentation of 5.5 times 3

Findings from students' preferred language of instruction in mathematics showed that the majority (three out of four) of the students in school C said they preferred to learn mathematics in English because, "we want to understand and speak English well" (SC42); "Fante [the local language] wouldn't take us anywhere, except English" (SC41). Only student SC43 preferred to study mathematics in Fante because, "I don't understand lessons in English" (SC43). This student (SC43) was identified by the class teacher as a weak student. His confession "I don't understand lessons in English", the language his teacher uses in class, might explain why he was branded as a weak student. Students SC41 and SC42 want to study fractions and measurement in English, because they want to understand and speak English well, whilst students SC43 and SC44 preferred the use of the local language, because they do not understand lessons in English.

As with the students in school C, the majority (three out of four) of the students in school L said they preferred to learn mathematics generally in English because, "we want to speak English" (SL42), "to be able to speak English well" (SL44). Student SL41 preferred to learn mathematics in Fante because, "I want to understand the lesson." The majority (three out of four) preferred to study fractions in Fante, "for everybody to understand" (SL42). Only student SL44 preferred to study fractions in English, "to enable me to speak English." All students preferred to study measurement in Fante, "to enable us to understand" (SL43).

All the students in school X also said they preferred to learn mathematics in English, "to be able to communicate in English when we grow [up]"

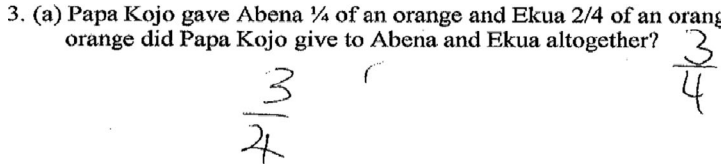

Figure 6. School W students' presentation on word problem involving a quarter plus two quarters

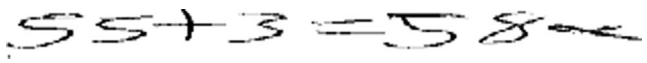

Figure 7. School W students' presentation on word problem involving 5.5 times 3

(SX41). All of them, however, preferred to study fractions in Fante because, "when he [the teacher] uses English we don't understand it" (SX44). They also preferred to learn measurement in English and Fante, "for us to understand the lesson and also to learn English" (SX43).

As with the students in school X, all grade 4 students in school W said they preferred to study mathematics generally in English because, "… we don't understand English, that is why we prefer English" (SW41), "sir, by so doing we will be learning it [English]" (SW43). They preferred to learn fractions and measurement also in English, "in order to understand English." (SW42).

Table 2 presents the summary of results from all the school types. Results from the table show some mismatch between students' ability to read, understand and correctly solve mathematics word problems in English and their preference for English as the language of mathematics.

Discussion

Almost all students from the four focus schools said they preferred to learn mathematics generally in the English language. All the students preferred to learn mathematics in the English language because they either want to learn English, e.g. "we don't understand English that is why we prefer English …" (SW41) or because they want to learn to communicate well in English, e.g. "we want to speak English" (SL42). The response of grade four students in school W as to why they prefer to learn measurement and fractions in English ("in order to understand English") may summarise the main reason why the majority of the students may prefer to learn mathematics in English. Thus, some of these students prefer to learn mathematics in English not necessarily to understand or enjoy the learning of mathematics in English but to gain an additional advantage of learning the English language.

Students' preference for English language as their preferred language of instruction in mathematics is surprising to the researchers, as one would hardly expect students to opt to study mathematics in English. One would have expected most students to say they preferred Fante since English was a barrier in the solution of the word problem given,

TABLE 2

Summary of results from all the schools

School	*Ability to read, understand and solve mathematics word problem in English*	*Language preference for mathematics*
School C	(1) Read with some amount of difficulty but were able to interpret the demands of the question. They were divided over what the correct answer was. (2) Not able to read and understand the question but were able to solve the problem when it was written for them as mathematical sentence.	Prefer to study mathematics generally in English
School L	(1) Had difficulty reading but were able to interpret the demands of the question. They were not able to solve the problem correctly. (2) Not able to read and understand, and not able to solve the problem	Prefer to study mathematics generally in English but measurement particularly in Fante [local language]
School X	(1) Were able to read and interpret the demands of the questions correctly. They were not able to solve the problem correctly. (2) Not able to read and understand and not able to solve the problem	Prefer to study mathematics generally in English, measurement in both English and Fante, and fractions in Fante
School W	(1) Were able to read and interpret the demands of the questions correctly. They were able to solve the problem correctly. (2) Not able to read and understand and not able to solve the problem	Prefer to study mathematics generally in English

especially (2). In this task, both students who had the concept of multiplication of decimals and those who did not have this concept could not interpret the demands of the question correctly. The finding of this study supports those of Setati (2008) that "the language choices of learners who prefer English are informed by the political nature of language" (p. 114).

The importance of English language in the Ghanaian school system (and beyond) seems to influence students' language preference. Student SC41's reason for her preference for English as the language of instruction as "Fante wouldn't take us anywhere except English" confirms

this. English language continues to remain the only official and national language in Ghana. It is also the medium of instruction from grade 4 onwards (MOESS, 2008).

In Ghana, a students' ability to succeed academically depends so much on the students' English language proficiency. This is because all textbooks are written in English. All examinations are also taken in English, even from grades 1 to 3 where the local language is supposed to be used as the medium of instruction. All the textbooks except the Ghanaian language books are written in English. Students are therefore expected to read and answer examination questions in the English language. As already noted in the "INTRODUCTION", students who fail to master the English language will eventually drop out of school and be unable to participate in the formal sector where competency in English is required, however well they may be able to express their ideas in the local language. This shows the fate of students like SC43 who said "I don't understand lessons in English" and is already branded as weak by the teacher. Such a student may eventually drop out of the school system, unfortunately. Student SC43's preference for Fante as language of instruction in mathematics also confirms the observation by Setati (2008) that "learners who position themselves in relation to mathematics work with conflicting cultural models—one that is mathematical understanding and one that is English fluency" (p. 114).

In Ghana, the school system appears to remain the main means through which the people access administrative positions and other attractive jobs. Students who fail to acquire adequate competencies in English would be powerless and handicapped. They are rendered handicapped not only in terms of job opportunities but also in their living conditions as well. All notices (including road signs), for example, in the Ghanaian society are written in English. This might explain the reason why students like SX43 would prefer to learn measurement in English and Fante, "for us to understand the lesson and also to learn English". Thus, this student would prefer the use of English in order to study English but not mathematics, and the use of Fante in order to understand mathematics. Student SX43's response shows that learners who position themselves in relation to English and mathematics in a bi/multilingual classroom prefer the use of both English and Fante as the language of instruction. Student SX43's response also shows clearly the need to encourage code switching, which has been found to promote cognitive pay-off for bi/multilingual students (see Muke & Clarkson, 2011, for example). This provides students with the opportunity to simultaneously acquire the language of instruction and mathematical concepts.

Teachers/head teachers are empowered by the state to ensure that students acquire adequate mastery of the English language. The Ghanaian student is therefore usually under pressure to speak English in school. Mastery of the English language is an indication of academic success and also accords the student some respect or social status within the classroom, the school premises and the society at large. Students are usually punished (i.e. fined or caned) for speaking the local language. The first author could recount his experience as a grade 7 student in Ghana where students who disturbed the class using the local language were given double punishments, one for disturbing the class and two for using the local language. Students who disturbed the class using English language were given only one punishment (for disturbing the class). This trend has not changed, as shown in Fig. 1. All these show the political support and power English commands in the Ghanaian society as compared to the local language.

The practice of embarrassing students who use the local language appears not to be peculiar in Ghana alone but also in other African countries that still maintain the colonial master's language as the language of instruction. Chitera (2011) describes the experience as a teacher of mathematics in a bi/multilingual class where " … using English as LoLT [language of learning and teaching] prevents most of the learners from being active in class for fear of being embarrassed by the teacher or their fellow learners when they fail to speak in English" (p. 235). All these social and political pressures appear to influence the students' preference for the language of instruction.

Some of the students' language preference for mathematics differed from their language preference for the various topics (i.e. measurement and fractions). Student SC44 from school C, for instance, preferred to study mathematics generally in English but preferred to study fractions and measurement in Fante (the local language). The majority (three out of four) of students in school L preferred to study mathematics generally in English; however, all of them preferred to study fractions in Fante whilst the majority (three out of four) would want to study measurement in Fante. They preferred to study fractions in Fante "for everybody to understand" (SL42). All students in school X also preferred to study mathematics generally in English but preferred to study fractions in Fante because "when he [the teacher] uses English we don't understand it" (SX44). They also preferred to learn measurement in a mix of English and Fante, "for us to understand the lesson and also to learn English" (SX43). This shows that students appear to be aware that they can learn mathematics better in Fante. However, their language preferences appear to be influenced by their future needs including the need to acquire a

good mastery of the English language, the language through which the mathematics curriculum is delivered and also the language for examinations. Progression from one level in the academic ladder to another depends on performance in examinations, which are conducted in the English language but not Fante. Students' language preference appears to show that they are aware of the danger of exclusion if they fail to attain good mastery of the "legitimate" language [English].

Conclusion and implication

Students' difficulty with the English language in solving the mathematical word problem did not reflect their language preference for mathematics learning. As the title of this paper suggests, the students appear to have difficulty understanding the English language well, yet they prefer this very same language as the medium of instruction (in schools). This preferred language of instruction—the English language—is the language that is officially supported as the language of instruction and also the only national and official language in Ghana. The majority of the students' preference to study mathematics in the English language, not necessarily to understand mathematics but to be able to learn English, is an evidence of social and political influences on their preference for the language of instruction. This finding is also similar to those of Planas and Setati (2009) whose study with bilinguals in Spain revealed that students used their first language in communicating their mathematical processes clearly and fluently but preferred to use the teaching language (which they were not proficient in) in communicating their mathematical processes in the whole class discussion. This resulted in these students appearing to be passive learners in whole class discussions.

However, some of the lower achieving students preferred to learn mathematics in the local language because of the difficulty in understanding lessons conducted in the English language. This shows how the use of English as a medium of instruction might have contributed to their situation (as lower achieving students in mathematics). If a student does not understand the language of instruction, then it follows that this student will not be able to interact with the concept being taught in mathematics, as the language is the medium through which concepts are communicated to students, as well as being the medium through which students are assessed. However, students generally seemed to prefer to study their perceived difficult topics such as fractions in the local language for better understanding.

It appears from this study that instruction in the local language only for the first 3 years (grades 1 to 3) as it is done presently in Ghana may not be good enough, in the sense that at the end of grade 3 students may not have acquired the cognitive academic language proficiency (CALP) to be able to understand the content of the school mathematics curriculum in English. This was evident in the fact that all the grade 4 students from all three school types (average, above average and below average achieving schools) had difficulty reading word problem (2) with understanding. It was evident that these students appeared not to be ready for lessons conducted in only the English language.

Pressure on Ghanaian students to be proficient in the language of instruction (the English language) appears to influence their language preference. Students appeared to be aware that the English language is important for them not only for schooling but also for their future. Indeed the perception of the English language as a global language has led to countries like Malaysia (which used to deliver school mathematics and science in the local language) to consider the use of English as a medium of instruction (Heng & Tan, 2006). However, the need for students to be proficient in the English language, a language which many Ghanaian public school children get the opportunity to speak only in the school premises because of social and political pressures, should not disadvantage the learning of any group of students. The questions here, therefore, are: are the independent voices of primary school students (especially low achieving students) heard in the issues relating to bilingual education which is being implemented currently in Ghana (as students remain the final "consumers" of the school curriculum)? Has the plight of low achieving Ghanaian students such as SC43 who does not understand lessons carried out in English been well catered for in the school language policy which stipulates the use of English from grade 4 onwards?

This study provides pointers to what should be researched further in Ghana and in other developing countries which share similar conditions (as in Ghana). This is because the sample used in the study was not large enough to make any major claim. It is clear from the results of the study that support for the use of the local language in mathematics in the participating classes was not encouraging. If we agree with Durkin (1991) that "mathematics education begins in a language, it advances and stumbles because of language, and its outcomes are often assessed in language" (p. 3), then teachers who embarrass students for using the local language in class should be encouraged to stop. The local language should rather be used as an additional resource to help students understand mathematics while at the same time develop their competency

in the English language. The role of code switching—and its encouragement in schools—is certainly significant. Researchers have shown that it is an important communication resource and also useful for motivating students to learn mathematics (see Setati, 2005, for example).

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