Multiple Languages And The School Curriculum:
Experiences From Tanzania

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Abstract

This is a research report on children's use of multiple languages and the school curriculum. The study explored factors that trigger use of, and fluency in, multiple languages; and how fluency in multiple languages relates to thought processes and school performance. Advantages and disadvantages of using only one of the languages spoken were explored. Data were collected in five schools in three regions in Tanzania. This context provided multilingual children for the study. Data included faculty and parent questionnaires, parent interview notes, teacher observation notes on children's interactions, and performance scores as secondary data. The data were processed using the Statistical Package for the Social Sciences (SPSS 15.0) as well as content analysis. Results revealed school related and family related factors that trigger and support childhood multilingualism, as well as consistently high ranking of performance in math, science, and language assignments for the multilingual and bilingual children compared to their monolingual classmates. Implications for further, more controlled research are drawn on the basis of this study.

Key Words
Multilingualism
Bilingualism
Cultural Content and school curriculum
Language and Cognition
Language Attitudes

1. Introduction

Language and cognition are inextricably linked. From the time children begin to acquire language, predispositions of which are present by the 29th week of gestation (Eliot and Sharon, 2001), all aspects of their mental development are affected (Piper 1998). Language development is rooted in cognitive maturity; and a certain level of cognitive maturity has to be reached before the first word is uttered (Owens, Jr. 2008; McLean, and Snyder-McLean, 1978; Bowerman 1974). But it also happens that children with normal cognitive development may lack language; or children with less than normal cognitive development may acquire language, or multiple languages to a considerable extent. While cognitive maturity seems to be pre-requisite for verbal expression of language, it does not guarantee language development.

To express thought, a child needs to draw on the language faculty in the brain and project the intended or experienced thought onto someone else's attention by use of verbal production, physical reaction or gesture. This requires mental processing which depends on cognitive functioning. Language and thought support each other but cognitive abilities do not depend entirely on language. Perhaps the ability of children with autism to execute some logical functions intelligently tells us that a certain amount of cognitive functioning is not heavily dependent on language. However, in typically developing children, speech language is the primary mode of exchanging meanings and it shows the child's level of cognitive functioning. As reading and writing emerge at a later time, the child uses these abilities to absorb and express meanings. Ability to read and write is evidence of the child's advanced cognitive functioning. Language becomes an expanded medium for acquiring, embodying and expressing thought.

1.1 Language as an Important Part of Early Cognitive Capabilities

Paying attention to speech is a key cognitive capability. Infants are drawn to speech even though they do not understand what words are, or what they mean. Brain research has shown that even before birth a fetus develops experience with the voice of the mother-to-be (Eliot & Syc, 2008). As the pregnant mother speaks, sings, or uses her voice to meet her daily needs, she influences her baby in the womb (Eliot & Syc, 2008). The fetus may even react to the mother's voice. By the time babies are born, they have some experience with the human voice, so when they hear human voice in infancy, they are attracted to it, especially if it is the mother's voice. Another key cognitive capability is discriminating between speech sounds. Infants have been reported to have higher capability than adults to differentiate between foreign language and native language sounds in speech (Fledge, 1987, Fledge & Fletcher, 1992, Oyama 1976). By the age of one year infants tend to lose this sensitivity and they are no longer referred to as "citizens of the world" (Kuhl, 2000, 2004, Gopnik, Meltzof & Kuhl, 1999).

As young children begin to process language and use it for communication, they have to be able to remember speech sounds in correct order so that they can discern what is being said, and how to respond. Children compare speech sounds to models stored in memory so that they can relate to the meaning being conveyed. In addition, children have to be able to discriminate intonation patterns in order to cognitively process the exact meaning being created within the specific context. Research has shown infants' clear preference for motherese (Fernald & Kuhl, 1987) which exaggerates intonation and high pitch.

Speech is what draws the consciousness of the newborn baby to the people around. In many African cultures, grandparents and other older adults begin to speak to newborn babies immediately after birth. Grandparents have very special relationships with grandchildren right

from birth (Mosha, 2000). With time, speech helps the baby distinguish whose voice it is; and later, speech makes it possible for the baby to track human voice (a baby will turn to the direction of the speaker); and as the baby stores a repertoire of speech stimulants, the baby slowly learns how to separate them, signaling perceptions of different meanings in them. As the baby becomes more and more cognizant of the language, speech will trigger responses that prove that the baby is experiencing cognitive activity. It is therefore obvious that cognitive development at a young age is dominated by language. This in turn, forms a strong foundation for language development.

1. 2 Multiple Languages at a Young Age

Children growing up with multiple languages provide rich ground for neuroscientists to try to understand the role and place of language in the development of cognition. It is typical to hear questions on whether children's abilities to use language are related to their cognitive abilities. Classroom teachers may wonder if children who speak multiple languages at an early age use up a large portion of their brain on only language leaving *little space for other cognitive abilities.* Some worry that children who speak more than one language may be confused and may not be able to straighten out thought. In the past decades, it was typical to hear claims such as "Mrisho is not doing well in math; he speaks another language" (Mushi 1999:30). The phrase "speaks another language" (i.e. language other than English) was almost perceived as adequate explanation sufficing to justify a child's cognitive delays or low performance in school. Parents express concern as to whether their children will be cognitively delayed if they speak both the home language and English. In North America and the Western world, the home language is usually a language spoken among a minority group, such as native people's languages, African

languages, languages spoken in South America, and in other places such as South East Asia, the Middle East and some European countries.

Skepticism about indigenous languages is not limited to the Western world. In African countries, due to colonization, the colonizers' languages were valued more than the native people's languages. Even upon independence, the foreign language enjoyed much higher status and prestige than the local languages, thus gaining a special place in the school curriculum. In Tanzania for example, parents may assume that by sending their child to an English only preschool, the child is necessarily developing superior cognitive capabilities compared to children attending regular preschool where Kiswahili is the main medium of communication. The fact that parents are willing to pay very high fees to have their children attend English medium schools at a young age, and sometimes far away from home, thus denying the children a natural environment for growth and development within their own home contexts, indicates that parents expect returns for this sacrifice and for their money. The return expected is their child's high academic ability. Parents are shocked when they realize that their children may be fluent in the English language, but cannot necessarily perform complex cognitive tasks within their home environments better than children who attend regular Kiswahili medium schools. In addition, lack of fluency in the children's home languages does not seem to boost cognitive functioning and/or academic performance in school.

Is there justifiable evidence showing that multiple languages at an early age interferes with thought processes or delays learning in school? This study used the following questions to shed more light on multiple languages and cognition.

2. Research Questions

2.1 How Does Fluency in Multiple Languages Relate to Thought Processes in Children?

Children use language to absorb, develop and express ideas, needs, feelings, and to simply connect to the people around them. In contexts where children spontaneously acquire and use multiple languages, the children are typically conversant with the specific roles of the separate languages, and they are able to intuitively call into action the language that most fits the situation, often without help. The ability to learn, use, and switch as needed the languages a child is fluent in, necessarily influences the child's thought processes. The contextual factors that give rise to the need to learn and use multiple languages are likely to also challenge the child's thinking process in ways necessary to meet day to day needs.

2.2 How Does Fluency in Multiple Languages Relate to Performance in the School Curriculum?

The negative attitudes towards use of multiple languages are based on fear that children will use most of their time and cognitive functioning to try to learn the additional language rather than learning *school content*. In addition, there is probably fear that the child learning two or more languages will be confused and not be able to sort out the languages in trying to carry out cognitive tasks. Are multiple languages detrimental to learning the school curriculum? What aspects of children's learning are negatively affected by multiple languages as the child attempts to perform academic tasks in the school curriculum?

2.3 What Advantages and Disadvantages are Experienced by Multilingual Children Who Use

  Only One of Their Languages in the School Curriculum?

Multilingual children are children who are fluent in more than two languages. Is it

advantageous or disadvantageous for children to put to use only one of the languages they speak

fluently? What are the advantages and how can these advantages be sustained? What are the

disadvantages and how can they be alleviated or at least minimized?

3. Conceptual Framework

The theoretical base underlying language acquisition provides different perspectives to

understanding young children's early experiences with language. To practically focus the study

on multiple languages and learning, the researcher situated the study in a context where multiple

languages were typically acquired at a young age within the sociolinguistic context. This made it

possible to view language acquisition as a socio-cognitive process. Brain research literature,

which provides important information on early language development, was consulted to shed

light on the background guiding this study. Another important aspect of early language

acquisition has been observed to be spontaneous play. Children use spontaneous play as a

vehicle for experiencing the world around them. The role of language policy on medium of

instruction in schools bears relevance on if and how children utilize the languages they speak.

The following explication of the conceptual framework is guided by these tenets.

3.1 Language Acquisition as a Socio-Cognitive Process

The language learning theoretical base presents comprehensive analyses of approaches:

the Behaviorists approach (Skinner, 1957, Bandura 1977), Chomsky's *Nativist* approach

(Chomsky, 1978), Piaget's Constructivist approach (Piaget, 1926, 1930, 1951, 1952),

Vygotsky's *Social Interactionist* approach (Vygotsky, 1962) as well as Information Processing.

While these theoretical perspectives may sound contradictory, a closer look reveals otherwise.

Even though each theorist approached language acquisition from a distinctive theoretical

perspective, together, the perspectives provide a comprehensive understanding of the process of

language acquisition. For example, while Behaviorists focus on *stimulus-response* and reward

strategies, Chomsky's Nativist perspective addresses the *innate* capability to develop language,

without which the external stimulus-response mechanism would be useless. Piaget emphasizes

acting on the environment to construct knowledge. He considered language development as a by-

product of the development of the cognition. This means that children use some innate trigger to

act on the environment, and if the experience is rewarding, the child learns something that

becomes motivation to interact even more with the environment.

The Social Interactionist perspective highlights the role of parents, siblings and other

language models that the child may access. This perspective encourages scaffolding, mediation,

and providing good language models for the child to imitate. This does not rule out the other

approaches; rather, Vygotsky draws together the other theoretical approaches and puts them

together in the natural social environment where children learn and use language, thus making

irrefutable, practical sense. To reach the child's optimal level of learning, which Vygotsky

termed *Zone of Proximal Development,* imitation of good language models are necessary, and so

is scaffolding and mediation. *Private speech* is given meaning as verbalization of thought

processes. In addition, the Information Processing perspective, which likens human brain

functioning to computer processing, brings into focus the step-by-step nature of learning any new

skill or concept. To understand language acquisition comprehensively, it is important to

approach it from the different perspectives and get an elaborate picture of the process, rather than trying to figure out which theorist is wrong and which one is right. Language and thought processes work together in ways that reflect aspects of different theories at the same time.

Lessons from Brain Research

Neuroscience has demonstrated that young children need exposure to stimulating environments that help "wire" their brains (Berk 2005; Eliot 1999). As children interact with stimulating novelty, synaptic density increases. Moreover, *myelination* of axons which, in the early stages of development, is related to nutritional value; and *dendritic aborization* (related to exposure to new experiences, including linguistic experiences) facilitate faster, sharper learning of phenomena. As new material is effectively learned, the physical structure of the brain is changed, and the potential for even more effective learning is increased (Eliot 1999).

Access to brain research has made it clear that infants are communicators; receptive language develops ahead of expressive language; fine phoneme distinction is strong in infancy and lost with age (Fledge 1987; Fledge and Fletcher 1992; Oyama 1976); and windows of opportunity exist for certain aspects of language knowledge, namely phonemes and syntax (Elliott and Syc 2008). Brain research has also shown that the young brain is not yet fully specialized or organized for language; it is very *plastic*, and open to positive and negative stimulation (Elliott and Syc 2008). Plasticity of the brain refers to the ability of the brain to adapt to new learning.

However, this knowledge that infants are communicators and that they need language input is not totally new. In many African cultures, it is common for grand parents and other older adults to speak to infants as if the infants understood what was being said, and as if the infants could

verbally respond to utterances. It must have been known for a long time, though not written, that talking to infants activates their language faculty in the brain and provides them with speech sounds that will be necessary for them to imitate in order to communicate through speech, once they acquire appropriate physical and mental maturation.

Brain research has also demonstrated that acquisition of a second language is easier in early childhood than it is after seven years of age. Studies comparing age of entry into an English speaking country and acquisition of English grammar have shown that the older the individual at the time of immigration, the lower the score on English grammar competence (Elliott and Syc 2008; Johnson and Newport 1989). In addition, exposure to second language has revealed positive impact in infancy (Conboy & Kuhl. 2011).

Other key lessons from brain research (as cited in Eliott and Syc 2008:10-25 to 10-29) include the following:

(i) The quality and amount of language that children experience influence their language proficiency and verbal intelligence (Huttenlocher, 1998; Huttenlocher, Haight, Bryk, Seltzer and Lyons, 1991; Huttenlocher, Vasilyeva, Cynnerman and Levine, 2002; National research Council and Institute of Medicine 2000).

(ii) Language development and experiences with language also affect other abilities including social interaction, reading, school readiness, academic achievement (Morrison, Griffith, Williamson, and Hardaway 1995; National research Council and Institute of Medicine, 2000).

(iii) Learning multiple languages is influenced by the age of exposure to all languages, whether the languages are learned simultaneously or sequentially, motivation and

personality of the child, and also the amount of exposure the child has with each language (Tabors 1998).

(iv) Most children are capable of learning two languages at once with little or no delay in acquiring language skills (Petito et al. 2001).

(v) Children reared bilingually are not different from children reared monolingually in vocal performance during infancy (Oller, Eilers, Urbano and Cobo-Lewis 1997; receptive vocabulary (Umbel, Pearson, Fernandez, Oller 1992; and phonological awareness in early grade school (Bruck and Genesee 1995).

(vi) Children who are bilingual, i.e., children who speak two languages fluently have an advantage over monolingual children with regard to cognitive processing and attention (Bialystok 1991; Galambos and Goldin-Meadow 1990).

   a. One study found out that bilingual 4-year olds developed the ability to focus attention and ignore distractions, while monolingual children were not able to do this until age 5 (Bialystok 1991).

   b. Another study found that bilingual children had better understanding of the general symbolic representation of print compared to monolingual children (Bialystok 1997).

   c. A study of bilingual and monolingual children aged 4-8 found that children who experienced learning two languages were quicker than monolingual children to develop certain metalinguistic skills, such as identifying and correcting grammatical errors, even though the bilinguals made less effort to explain why they were errors (Galambos & Goldin-Meadow, 1990).

Mushi (2002a) found that children who were learning English as a second language between ages 18 months and 5 years attempted to use both languages, especially while they were engaged in an interesting activity that did not focus on the language itself. This means that language was used as *a natural tool to get things done.* English was (or was becoming) dominant as a school language, while the first language was used more at home. In addition, children tended to associate English with their employed fathers and the mother tongue with their stay-home mothers. Mushi (2002b) differentiates between cultural context within micro cultures and school content within global macro culture, and asserts that educators should ensure that learners have access to the languages they need to experience and monitor human development processes in rewarding ways. While it is obvious that language is culturally bound (Piper, 1998), research has not shown how *the language of the home* works with the *language of the school* to make early school learning effective. After about age 7, the ability to develop certain language skills decreases steadily and reaches a low point at about the end of puberty (Elliott and Syc 2008). This means young children can acquire a new language very well provided it is learned by the time they reach puberty.

Children acquiring multiple languages at an early age learn the rules of both, and spontaneously learn to decide which language to use when, with whom, in what circumstances, and for what purpose. These processes necessarily involve the children's cognition. A child's use of multiple languages most likely influences how the child learns school content, because of the two complete language systems that operate as the child engages in processes of learning. Sometimes the language systems will compete, and sometimes they will complement each other, depending on the child's proficiency in each (Baker 2006) and also depending on the type of content being tackled.

3.2 Spontaneous Play as an Important Vehicle for Young Children to Experience the World

In all cultures, children engage in some kind of play activities using the languages mastered (Mushi and Adeodu 2004). It has also been demonstrated that children tend to learn language more effectively when using it as a tool (Mushi, 2002a). Although *Comprehensible Input* (Krashen 1981, 1982, 1985) as a necessary ingredient makes it logical that receptive language develops ahead of expressive language, it is the actual need to use the language that makes language production appropriate to the context at hand, facilitating practical, experiential learning.

Brain research has certainly shed considerable light on the importance of intellectually stimulating environments in early learning (Eliot, 1999; Eliot & Syc, 2008, Kuhl, 2004, Gopnik, Meltzof & Kuhl, 1999). However, the research has not explored links that bring together context-specific linguistic demands that bear influence on early awareness, motivation and support or lack thereof, for learning in school contexts as well as in the child's daily functioning environment outside school. Stimulating environments for young children involve play. In other words, play is the way children "read" and express the world around them. By examining children's play educators can begin to link the language(s) of play and the language(s) of classroom learning.

In many African cultures, young children's play activities involve mainly creative play such as number games, sound-word games, traditional songs, spatial games like hop-and-jump on shapes and figures that children draw on the ground, probability games of hide-seek-catch, making wooden bicycles (teenage boys), plaiting each other's hair, making dolls and their clothes, making mats and baskets from palm leaves or banana leaves, pretend cooking of different dishes (girls), making "cars" from mud and straw (Mushi and Adeodu 2004).

Commercially produced learning materials are rarely available in many traditional African households. In addition, children may be involved in supporting their families in different ways. Tanzanian children for example, may participate actively in small businesses that support the welfare of their families (Mushi 1999), thus being an important partner in linguistic interaction within the family and the community. Children's engagement in these activities utilize their multiple languages spontaneously.

3.3 The Role of Language Policy on Medium of Instruction and Performance in the School Curriculum

How are multilingual children affected by language policy that clearly separates the school language and the home language? Logically speaking, consistency between home and school makes it easier for children to have consistency in what they are learning, since what is learned in school can easily be continued, reinforced or practiced at home. The practice of having children complete assignments with the help of parents at home is becoming more and more prevalent. Parent involvement in their children's education is encouraged if not required in many places and many cultures around the world (Mierzwik, 2004; McNerney, 2011; McLaughlin & McLaughlin, 1998; Askew & Eastaway, 2010)). The old days when parents would only provide necessities such as a desk to work at, time away from house chores and writing materials seem to be changing in many households. Parents wanted their children to *do it on their own* so that they would master the task. However, it is becoming more and more acceptable that parents need to help out with the homework and even in some cases, children take back to the teacher a perfectly done project, and the teacher is happy to give the child a

perfect grade on it. The feeling that the teacher might be grading the parent's work does not seem to matter much.

This evolution in homework has many sides, one of them being that if the parents do not speak the language of classroom instruction, their children will seem to lag behind in school learning, since the children will be *doing it on their own*. In competitive education systems where performance is determined by timed exams administered uniformly under the supervision of strict invigilators, the children who do it on their own might do okay since they would be performing at their actual ability level. However, in education systems where the child's path to higher grades is not dependent on national competitive exams, children who are used to doing it their own will falsely be seen as lagging behind because there will not be any objective measure of each child's actual abilities.

As language policy decides on the medium of instruction, the same language policy necessarily decides who does well in school and who does not. This is because, unless all the children are fluent in the language of instruction, there is little chance that the classroom teacher will teach all children effectively. In the case of Tanzania for example, at primary school level, *all* children speak Kiswahili fluently, and *all* children are learning to speak English as well. The teacher can plan instruction to meet the needs of *all* children. Such is not the case in many other countries.

3.3.1 Tanzanian Language Policy

The Tanzanian language policy has not changed much in more than 30 years. As cited in Rubagumya (1990: 143-144), the Tanzanian language policy involves the following:

a. Teaching Kiswahili as a subject to all pupils at primary and secondary school levels

b. Teaching all subjects (except English) in Kiswahili at primary school level

c. Teaching "Siasa"(Political Education) in Kiswahili at secondary school level

d. Teaching all other subjects in English at secondary and tertiary levels of education

There is no mention of other indigenous/native languages. Upon independence, led by the first President of Tanzania, Mwalimu Julius Kambarage Nyerere (1922-1999) Tanzanians wanted unity above all else, and focusing on Kiswahili as the native language of all Tanzanians was considered the best way to unite the nation. This must have worked as expected because typically all Tanzanians speak Kiswahili in addition to at least one other native language. Relatively speaking, even though there are over 123 different cultural groups with different languages in Tanzania, serious cultural conflict is unheard of. However, inadequate and/or ineffective teaching of English at primary and secondary school levels and the focus on English as the medium of teaching in secondary schools, have been widely documented as barriers to effective learning (Rubagumya, 2008; Mushi, 1996; Rubagumya, 1990; Rubagumya & Lwaitama, 1990; Yahya-Othman, 1990).

3.4 Summary of Literature Review

The preceding review of literature expands the conceptual framework in which the three research questions are contextualized. Expansion of the concept of language acquisition as a socio-cognitive process, analyses of the role of spontaneous play in children's language development and the role of language policy on medium of instruction and school performance provide an elaborate context for answering the research questions. It is important to understand the contextual factors which trigger learning of, and support for fluency in multiple languages in order to enrich children's language learning environments.

In summary, the literature cited brings to attention some key points for this study. Language acquisition theories and literature, brain research literature and the practical examples of the role of play in young children's development converge to highlight the following:

a. Young children are pre-disposed to develop language and are quite capable of absorbing language from infancy

b. Linguistically stimulating environments attract children to learn language effectively as a tool for exploration

c. Children are quite capable of learning multiple languages given rich linguistic environments and a practical purpose for each language

d. Growing up multilingual does not necessarily undermine the child's academic ability and performance

e. Children who are multilingual have shown cognitive and linguistic advantages over their monolingual peers

f. Play, a serious engagement for young children, is the primary mode of experiencing the world from their own perspectives

g. Language policy determines the medium of instruction and affects learning effectiveness in the school curriculum

Establishing how fluency in multiple languages relates to performance in the school curriculum sheds more light on how to work with multilingual children as they learn the school curriculum. Using only one of the languages a child is fluent in can have advantages or disadvantages in learning; which this study sought to find out.

Highlighting these advantages and/or disadvantages will provide parents with important additional tools to use in preparing their children to succeed in the school system; and also

inform teachers, curriculum developers and educational policy makers in planning, executing and assessing the curriculum process.

4. Method

The study was conducted in Tanzania, a context which provided the opportunity to study children who were fluent in the languages they spoke as mother tongue, that is, languages acquired naturally within the sociolinguistic context. The data collection period lasted for three weeks in each school, overlapping to a total of five weeks of field research.

4.1 The Study Sample and Sampling

Children aged 5-12 were studied in 5 selected schools in Tanzania, two of which were located in a large city and the other three in two small towns. Schools were selected on the basis of ease of accessibility. A total of 91 children in 25 classrooms were studied through observation and parent questionnaires. Twenty-five teachers participated as classroom observers – 10 of whom were also interviewees, 20 parents as interviewees and 5 college/university faculty responded to questionnaires. The socio-economic backgrounds of the children studied did not differ much from one another. The children from the large city came from Tanzanian typical working parents or families engaged in small family-owned businesses. The children from the two small towns also came from families of employed workers and/or farmers who farmed on their own land. Tanzanian social classes are not as clearly obvious as in the case of Western countries. In addition, schools are not necessarily organized by neighborhoods. Any child can attend any school as long as the child can afford the commute.

4.2 Data Collected

As shown in Table 1, the data collected included 91 parent questionnaires, five college/university faculty questionnaires, parent interview notes (20 selected parents) teacher observation notes of children's spontaneous outdoor play and classroom interaction, ten sets of teacher interview notes and performance test scores as secondary data.

Insert Table 1 about here

4.3 Data Organization and Analysis

The Statistical Package for the Social Sciences (SPSS 15.0) was used to organize the parent questionnaire data. Content analyses of interview and observation data was performed. Parents' ratings of their children's school performance were correlated to determine linear relationships between selected variables, including number of languages spoken and rating of performance. Content analysis was also used to organize and analyze data from the college/university faculty. The test scores were tabulated and compared. Rather than reporting the quantitative scores, the ranks (position according to score) within each specific group (class) were used as indicators of multilingual children's overall performance in math science, Kiswahili and English.

5. Research Findings

Sets of school related and home related factors were revealed as triggering and supporting use of multiple languages in children. The factors included, in order of frequency, were: having multilingual parents, engaging in play activities with multilingual peers, interacting with grand parents, getting involved in cultural activities, reading materials (English), writing

games and songs, singing, school requirements (Kiswahili and English), having a role model

who uses multiple languages, and having friends who speak the languages. However, further

discussion of these factors is beyond the scope of this research report. The rest of the research

findings are organized around the research questions that guided the study. The first part of this

section provides findings on how fluency in multiple languages relates to thought processes in

children. The second part presents findings on how fluency in multiple languages relate to

performance in the school curriculum. The third part presents advantages ad disadvantages

experienced by multilingual children when they use only one of the languages they speak

fluently.

5.1 How Does Fluency in Multiple Languages Relate to Thought Processes in Children?

(i) Multiple languages broadened children's world outlook and enhanced classroom learning.

      Parent questionnaire items targeted parents' perceptions of their multilingual children's

thought processes. A high percentage of parent responses (67%) revealed that their children's use

of multiple languages broadened the children's world outlook and enhanced classroom learning.

Table 2 shows a summary of parent's responses to whether use of multiple languages supported

or undermined their children's school performance.

Insert Table 2 about here

(ii) Use of multiple languages enabled children to think clearly and express their thought

processes with precision.

Interviews based on two-week classroom observation by teachers revealed that the multilingual children observed demonstrated clarity in expressing ideas in Kiswahili (96% of the time), in English (51% of the time) and in native languages (73% of the time). Observation by teachers, which included categorizing children's utterances as "clear" or "not clear" as children expressed their thoughts in class, showed that children were clearly understood better when they used Kiswahili than when they used English or mother tongue. Although the children were considered multilingual, they were comfortably fluent in Kiswahili, the national language, and in one or two other native languages but not fluent in English. They could convey and receive messages in English but they often needed the help Kiswahili or another mother tongue to clarify the messages. It was obvious from the teacher interviews that the children used all the languages as need would arise to communicate effectively. "The children use all their languages to try to be precise in the meaning they are putting across," said one teacher. Another teacher said: "When forced to communicate only in one language, especially English, children tend to use words that blur the intended meaning, because focus is on the language and not on the message".

Code switching was perceived as a way to capture meaning. The following examples were reported by the teachers interviewed:

a. "Bibi kasema njooni muonje *kitalolo*". The closest English translation is: 'Grandma said come and taste *kitalolo. Kitalolo* is a traditional kind of food made from bananas, vegetables, and sour milk – depending on the specific culture in Kilimanjaro or Arusha. In some places kitalolo is also made from maize. As such there is no exact translation, not only in English but even in Kiswahili. Typically names of traditional foods are not easy to translate from one culture to another; they are culture bound. When children code-switch to insert words as they come

from their original contexts, they send the exact message intended. A listener would then have to find out what the term means within its context, before trying to translate it into another language.

b. 'I like the story because Ndewuya decided to stay with her *mama mdogo* and not her *shangazi*.' A story had just been told in class by a classmate. The teacher then asked the fourth graders to discuss it in English. This sentence was uttered by a student who was considered to be more fluent in English than most of his classmates, and also who happened to be multilingual. He spoke four languages, *Kipare,* (language of the Upare people) *Kichaga,* (language of the Kilimanjaro people who are not from Upare), Kiswahili and English. As is obvious from the sentence, Ndewuya is a name of a child in the story. 'Mama mdogo' means a younger sister of the mother, and *shangazi* means a sister of the father. In this case the student probably could have used 'aunt' but that would not have distinguished between the two sides of the family – the mother's side and the father's side. So, by inserting Kiswahili words 'mama mdogo' and 'shangazi', the exact meaning was achieved, i.e., specifying the side of the family and order of birth of the relative.

(iii) A sense of flexibility in the choice of language to use in discussing classroom content freed up children's thought processes and ways to express those thought processes without constraint

It was extracted from teacher interviews that children needed flexibility in thinking about and expressing their thoughts and reasoning processes. All the teachers interviewed stated categorically that they would allow the children to verbally express themselves in any

language they were comfortable speaking in, but then guide the children to repeat the same in

Kiswahili or English depending on the subject area and content. Children would not be

allowed to write class assignments in any language other than Kiswahili or English. The

Tanzanian schooling policy requires all primary school learning to be done in Kiswahili

and/or English. This policy is easily reinforced since all children speak Kiswahili and learn

English in school. However, in circumstances where the children also speak a third language

regularly at home and/or with peers, it becomes inevitable that the children will need that

language in their spontaneous thought processes.

As argued by the teachers, when children discuss classroom content they are not limited

to their classroom experiences. In the course of discussion they bring in their experiences

from home, from playing with peers, from interaction with family members, friends, several

generations within the extended family. It was obvious that children depended on all their

languages to process thought in their daily interaction with their environments.

(iv) Unrestricted Use of Multiple Languages Allowed for Creativity and Encouraged Inquisitive
Minds.

Teachers in the third and fourth grades emphasized that using multiple languages was

advantageous in many ways, including giving children scenarios to grapple with, compare and

contrast, ask questions about, and try to find answers on their own. Some of the scenarios cited

included situations where translation was needed from a parent to child or vice versa; from

teacher to child or vice versa; and even among children themselves during free play outside

class. "The best time to learn something is when the mind is ready for it" said one fourth grade

teacher. The teacher gave examples of concepts he taught in the classroom and usually took a

while for the children to catch on, compared to concepts that children brought to class from their outdoor games that immediately caught everyone's attention and interest in the class. "It does not matter what language the concept is in, I have to use the concept to drive my point home', said the teacher. Such concepts included *kipa* which refers to 'goal keeper' in a soccer game; *majuu* a slang used to refer to 'abroad'; *kupanda pipa* which referred to traveling by air plane; *msosi* which was used to refer to 'delicious food"; *nkaa mbariko* a term in *Kimeru* (language of the Meru people) that caused some heated discussion in class as to why the term would only refer to women and not to men who do not marry and start their own families early enough, according to Meru cultures.

Nurturing inquisitive minds is one of the most important roles of teachers. Since language and thought go hand in hand, it follows that in order for teachers to not interfere with children's inquisitive minds, the teachers should not interfere with the most important aspect of that inquisitiveness, the child's most comfortable language. The teacher needs to redirect the child's quest for knowledge in ways that allow the thinking process to flow, not in ways that restrict the thinking process itself.

This finding was both surprising and encouraging at the same time. For many post independence decades the Tanzanian education system prepared teachers by placing emphasis on what was being done elsewhere in the industrialized world, thus overlooking learners' immediate contexts which would encourage creativity. The lack of, or non-use of, Tanzania's internally oriented literature and practical situations as the basis for the school curriculum resulted in a vicious cycle where poorly prepared teachers would in turn use the same rigid methods through which they were prepared. Awareness-raising and reflecting on classroom practice have been suggested as ways to break the vicious cycle (Mushi 1996:143 – 144).

5.2 *How Does Fluency in Multiple Languages Relate to Performance in the School*

Curriculum?

This research question was answered by data from two sources, parent questionnaires and

test scores in the form of secondary data. Parent responses on their perceptions of their children's

performance in selected school subjects were correlated by use of the Statistical Package for the

Social Sciences (SPSS 15.0). The correlation matrix in Figure 1A shows correlation coefficients

of the selected variables, while Figure 1B shows the variables that correlated significantly.

(i)   Correlations of Background Variables

As shown in Figure 1A some background variables were selected which were age,

gender, grade level, location of school, number of languages spoken, as well as performance in

Math, Science, Kiswahili and English. The background variables helped provide some useful

information such as how age of child, gender and grade level correlated with number of

languages spoken and performance. Age of child correlated positively at.222 (significant at.05)

with number of languages spoken. This makes sense since children learn the languages exposed

to them as they grow up and interact more with their caregivers, and also as they learn additional

languages in school, i.e. English. The positive correlation between age of child and grade level

(.727, significant at .000) is commonsense since the younger children are in the lower grades.

Grade level correlated positively with number of languages spoken(r=.361, significant at .000),

for the same reason, that is, children learned more languages or became more fluent (in English

and Kiswahili) as they went up the grade levels. The positive correlation between location of

school and grade level simply means that there were more children of older age in some of the

schools than in others. The lack of positive correlation between location of school and number of languages spoken was a little surprising since three of the schools were either in small towns or in rural areas, while the other two were in a large city. The researcher expected that children in rural areas would speak more languages than children in the city centers. This was not necessarily the case.

Insert Figure 1A about here

Insert Figure 1B about here

(ii)   Correlations of Performance Ratings from Parent Questionnaires

As shown in Figure 1B, the number of languages spoken correlated positively with performance in Math (r=.355, significant at 0.043), Science (r=.307, significant at .029) and Kiswahili (r=.251, significant at .016). The number of languages spoken did not significantly correlate with performance in English. The greater the number of languages a child spoke, (3, 4 or 5) the higher the performance in Math, Science and Kiswahili. Performance in English did not rise or fall with number of languages spoken. This could be because most children begin to learn English in school, unlike Math, Science and Kiswahili which are areas to which children get exposed from a very early age. Performance in Math also correlated with performance in Science (r=.304, significant at .003) and Kiswahili (r=.298, significant at .006). A relatively stronger correlation was noted between performance in math and performance in both English (r=.411, significant at .000) and Kiswahili (r=.412, significant at .000). Performance in Kiswahili also correlated with performance in English (r=.342, significant at .001).

Raging from .0251 to 412, the significant correlation coefficients were not strong, however, they provide an indication that there were significant positive relationships between the variables. It is important to keep in mind *what positive correlations mean*. Often times correlation are mistakenly interpreted as causalities. The positive correlations observed in this study between the variables do not mean that use of multiple languages caused high performance in math, science and Kiswahili. Neither can we say performance at a certain level in math caused performance at a similar level in any other subject, or vice versa. *Positive correlations between variables mean that the variables tend to fall and rise together in a similar fashion.* Causality has to be established through experimentation where only the *dependent variable* (variable under

study, e.g. performance in specific school subjects) is observed as the *independent variable* (the suspected causal variable, e.g. number of languages learned) is manipulated while all other variables are considered extraneous and therefore controlled. *What the positive correlations mean in this case is that the children who spoke multiple languages also did well in math, science and Kiswahili.* There could be a third variable, such as eagerness to learn, or parental guidance on what is learned, that caused children to both learn multiple languages as well as do well in math, science and Kiswahili, as perceived by their parents.

(iii)   Test Scores

Test scores were used as secondary data to further examine performance in multiple languages and in the selected school subjects, Math, Science, Kiswahili and English. Classroom teachers provided scores of entire classes, including children who are monolingual, bilingual and those who were the focus of the study, the multilinguals. It was noted by several of the teachers that most children would be speakers of two languages, that is, Kiswahili and a native language. For the purpose of the study teachers were asked to find out if any of their children spoke a third language reasonably well. Most of the children in this study spoke Kiswahili fluently and were also reasonably fluent in their native languages. A few of them were fluent in two native languages in addition to Kiswahili, and a smaller number was considered (by their teachers) fluent enough to communicate ideas in English. Only seventeen students out of the 91 studied were reported as being fluent in five languages (Kiswahili, three native languages and English).

Classroom teachers were requested to identify on the score sheets of previous exams in Math, Science, Kiswahili and English, the children they considered fluent in three or more languages. The scores of those children were compared to the score of their classmates in all

four subjects. To avoid complex calculations of large class sizes to compare with a few students in the class, only the overall class rankings of the multilingual children's performance were extracted. Table 3A- 3C show multilingual children's classroom performance on tests in Math, Science, Kiswahili and English, for three of the five schools studied. Two of the schools did not provide test scores.

Insert Tables 3A-C about here

The test scores provided were from Schools 3, 4, and 5. As shown in Table 3A, in School 3, the performance rankings of the multilingual children within their classes fell between 2nd and 6th in a group of 46 children in the first grade; between 2nd and 7th out of 40 children in another first grade; between 3rd and 21st out of 35 children in the second grade; between 3rd and 18.5th out of 62 children in the third grade; and between 2nd and 24.5th out of 91 children in fourth grade. In general, *all* multilingual children studied in School 3 performed within the upper 30% of their respective classes (groups), except for the second grade in which one multilingual child ranked 21st out of 35 children.

In School 4, as shown in Table 3B, the second graders studied totaled 15 in number, with 9 of them ranking between 4th and 17th out of a group of 89 children. Fifteen out of 22 multilingual third graders studied ranked between 1st and 21st out of a total of 75 children in the class. About three quarters of the multilingual children in this group ranked in the upper 30% of their class while a third of this group performed in the upper 10 percent of their entire class.

In School 5 (See Table 3C) fourteen multilingual second graders were studied. About a third of them performed in the upper 26 percent of the entire group of 65 children. As for the 15 third graders studied, nine of them ranked between 3rd and 18th out of the entire group of 75 children, putting them in the upper 24 percent. Twenty three multilingual children were studied in the fourth grade. Of these, ten children ranked between 1st and 13th putting them in the upper 14 percent of the entire group of 90 children. Almost three quarters of the multilingual group ranked between 1st and 26th, performing in the upper 29 percent.

5.3 Advantages/Disadvantages Faced by Multilingual Children When They Use Only One of Their Languages in the School Curriculum

Questionnaire responses from college and university faculty, as well as responses from parent questionnaires and interviews helped answer this question. Ratings ranged from "serious disadvantages (64 out of 96 respondents) to "somewhat advantaged" (5 out of 96 respondents). Seven respondents were neutral, and none of the respondents thought children would be advantaged by using only one of their languages in the school curriculum. A summary of the findings are provided in Table 4.

Insert Table 4 about here

(iv)   *Follow-up Interview Responses*

Follow-up interviews on this research question revealed that multilingual children faced the following disadvantages when they used only one of their languages in the school curriculum:

a. Child's learning potential is lowered

- The child cannot function fully, i.e. the child is denied opportunity to think clearly and comprehensively in one of the languages spoken. Since the language fulfilled a certain function, that function is suppressed.

- Loosing language is loosing content – every language has content embedded in it, that keeps the language from dying. If the language is suppressed the content is lost.

- The child is deprived of opportunities to connect learning in the family (and with peers) to learning in the school setting

- Child's learning is narrowed to school content only

- The child's cognition is deprived of an important tool for thinking

- Spontaneity in thinking and thought expression is reduced

- The child's ability to create original knowledge is interfered with

b. Child's self esteem is lowered

- The child's uniqueness is reduced

- If the child is not fluent in the medium of instruction she/he feels left out

- The child feels that she/he speaks a language that is not "valuable, respected or even welcome in the school environment

- The child's creativity may be undermined

c. Child's connection to the extended family is limited

- Child's valuable learning experiences are limited and/or overlooked

- The role of elders in the child's life is diminished as the child loses the connecting language

- The child may begin to lose knowledge of traditions of the respective cultural group

- The child potentially loses the ability to be a link within the traditional fiber that holds generations in the cultural group together

d. Child may focus on school requirements/competition, but in a narrow way

- The need to pass competitive national exams pushes the child to concentrate on the medium of instruction as the only venue to competing academically. This was seen as an advantage but also as a disadvantage.

- Kiswahili and English are important in higher education, so the child should not lose any of them. This statement seemed to indicate that it was okay to lose the native languages but not Kiswahili or English since they are both important internationally

- Traditional languages can complement Kiswahili and English as media for learning school content. This statement indicated that all languages could enrich school learning, but if not utilized, the child's academic learning would be jeopardized

- Ethnic languages are not typically used in print for learning science and technology, so children should learn to speak them in order to keep using them in the future. This statement meant that efforts should be made to

include ethnic languages as an additional resource to enrich the learning

process, especially in science and application of science concepts. The

assumption was that if the ethnic languages are used in speech to learn

science and technology, they might appear in print at a later time.

- Since teachers speak different ethnic languages the school system should

take advantage of those languages and start with allowing teachers to

bring in knowledge embedded in their own cultural groups and teach it in

the classroom through writing. This statement implied that the writing of

native languages should begin with teachers in the classroom writing the

languages they themselves speak.

6. Summary and Synthesis of Findings

Throughout this study, the researcher examined early acquisition of multiple languages and

children's cognitive abilities as perceived by parents and as observed through actual classroom

learning and performance. The study examined how fluency in multiple languages related to

thought processes in children; how fluency in multiple languages related to school performance;

and whether multilingual children are advantaged or disadvantaged when they use only one of

the languages they speak fluently. The study reveals sets of school related and home related

factors that trigger and support use of multiple languages among children. The factors, in order

of frequency include: having multilingual parents, engaging in play activities, playing with

multilingual peers, interacting with grand parents, being involved in cultural activities reading

materials, writing games and songs, singing, school requirements, having a role model who uses the languages, and having friends who spoke one or more of the languages spoken by the child.

Sixty seven percent of parents believed that multiple languages broadened their children's world outlook. Teacher interviews based on two-week classroom observation of multilingual children showed that the children demonstrated clarity in expressing ideas in three languages, Kiswahili (96% of the time) English (51 % of the time) and native languages (73% of the time). Clarity in thought process and expression of thought was perceived as a central cognitive skill utilized in learning. Multiple languages facilitated precision in expression of concepts by allowing for code-switching as was necessary to capture the exact thought being put across. A sense of flexibility in the choice of language to be used in a context was another key finding from teacher interviews. Children were less constrained to use the formal medium of communication even when the thought or concept being expressed did not have a linguistic equivalent in Kiswahili or English. It was also revealed that unrestricted use of multiple languages allowed for creativity and encouraged inquisitive minds. Using examples from native languages, teachers demonstrated how the children studied, remembered more, and retained more of what was learned. Remembering and retaining what had been learned in class, expressing thought with clarity, and being precise, inquisitive and creative were important cognitive skills that were observed to be enriched by use of multiple languages.

The different sets of data converged to produce evidence of effective learning among multilingual children. Data from the parent questionnaires indicated that parents' perception of their children's learning was consistently positive. Parents' ratings of their children's school performance correlated positively with the number of languages spoken, supporting the notion that multiple languages were perceived to be a non-issue at the least and a positive catalyst at the

most, in children's thought processes. Comparisons of test scores revealed that the multilingual children studied performed highly in their respective classes. Almost all the children studied performed in the upper 30 percent of their classes. Scores of a total of 107 multilingual children were studied in three schools, and 32 of them performed within the top 10 percent of their respective groups, while the rest performed at least within the top 30 percent of their classes. Only 34 multilingual children ranked lower than the top 30% of their respective classes. The class sizes ranged from 35 to 91 children.

Majority of the parents and college/university faculty in the study (67%) acknowledged that children who used only one of the languages they were fluent in were highly disadvantaged. Twenty percent indicated such children would be disadvantaged; seven parents were neutral, and none of the 91 parents studied thought a multilingual child would be highly advantaged by using only one of the acquired languages. Follow-up interviews with teachers revealed that when multilingual children were forced to use only the language designated for school curriculum, the children's learning potential was lowered; children's self esteem was lowered; children's connection to the extended family was weakened; and although the child might focus on learning the school content in order to pass the competitive national examinations, the learning itself would be narrower, thus reflecting only part of the child's abilities and experiences. Teachers indicated that ethnic languages and Kiswahili have an important role to play in enriching school learning even if the formal media for classroom instruction are Kiswahili and English.

In light of these findings, children's holistic learning, the role of parents and the extended family, the nature of the school curriculum as well as multiple languages as an asset for effective comprehensive learning and development of cognition are further discussed.

6.1 Holistic Learning by Use of all Tools Available to the Child

The human brain thrives through learning. Learning is spontaneous from a young age, and learning language forms a significant part of early cognitive growth. Cultural and linguistic contexts provide rich environments for learning, both structured and unstructured. In unstructured language learning opportunities children pick up language in its natural use. Language in natural use carries within it content appropriate to the context and the particular situation at hand. A child picking up a language this way picks up both the content and the context in which the content is embedded. This constitutes holistic learning. Upon immersing totally within the linguistic conversation and the exchange of contextual meanings the child becomes part of the knowledge creation process and acquires the knowledge as well as its function. In many African contexts for example, children get exposure to the seasons, when crops are planted, how, by whom, when they are harvested, the tools used, and how the entire process of handling the crop is carried out. Children are exposed to natural colors of plants and flowers, the wonders of plant life, insects, small and large animals. In families that keep animals, children get opportunities to see different processes and learn different concepts that are used in animal husbandry. The drive to explore within the child's environment is so strong that a child will always find something fascinating to interact with or to observe.

I remember very clearly when I was a little girl of about 4 or 5 years, how fascinated I was by the process of seed germination. It had always seemed as a miracle to me that my mother, Oliver Maswai, would put bean seeds in the ground and after a few days a bean plant would emerge. I still remember how keen I would be to catch the moment the *ndolhuo* (the Kichaga name for the young shoot still bent, hiding the two first leaves underground) as it broke the ground. I had planted my own bean seed very close to the house, and was sure to see how it

began to grow. One evening, I went to check as usual, and found that there were *mtangua* (the

Kichaga word for the cracks in the soil), indicating that the bean shoot was about to come up. I

watched it till darkness but nothing seemed to happen, so I left and was sure to come back at day

break to catch the moment of wonder. To my disappointment as always, when I came back early

the next morning, the young shoot was already up – so I had missed it again! I remember asking

my mother whether the young shoots only came up during the night, to which she answered in

the affirmative. This practical experience prepared me in significantly effective ways to process

theoretical knowledge and concepts about seed germination in science lessons at school.

Although the learning in school was conducted in Kiswahili, I did not face any problem in

learning the germination concept in school since I spoke both Kichaga and Kiswahili fluently as

mother tongue. Having and using both languages was hence a tremendous advantage for me.

As little girls my younger sisters and I would make clothes for our mud dolls; we would

help out with cooking; we would fetch firewood and water, and we would play all kinds of

interactive games. These experiences required math skills and concepts (such as using

measurements in making dresses for dolls, measuring cups of flower or rice for cooking,

counting the number of pieces of firewood as mom said, estimating cooking time, estimating

equal areas of the home compound to sweep, etc). The games we played involved a lot of

counting, geometry (as in drawing squares on the ground to play a game we called *tikri* (the

game involved jumping from square to square on one leg while pushing a small flat object by

foot) and estimating (*yamkini* - the Kiswahili word for 'probability') as in hide-seek-catch.

It is this process of language acquisition that comes with knowledge embedded within

that serves as a strong foundation for later learning in both school setting and elsewhere. The

child naturally uses all tools readily available to become an enlightened individual within that

context. Transfer of learning from one context to another happens naturally and painlessly when languages in the contexts are mastered fluently.

This transfer of knowledge from one context to another may not happen in situations where the first language is neglected, ignored or suppressed. As the child sets off to formal schooling at about age 5 or 6, structured learning environments occupy most of the child's interactions in the classroom. As if this is not enough change, the child may be forced to use a totally new language without paying keen attention to the language and knowledge the child brings to the classroom. Here looms the danger of overlooking what has already been learned during the most rapid growth time of the child's life. Overlooking the language(s) the child brings to school, is essentially overlooking the background knowledge the child brings to school as foundation for further learning and the building of cognitive abilities.

6.2 The Role of Parents and the Extended Family in the Child's Holistic Learning

The child's holistic learning needs support from the immediate family as well as the extended family. Urie Bronfebrenner's Ecological Systems Theory (Bronfebrenner, 1989, 1979) organizes the contexts which affect the child directly and indirectly into subsystems, and the first one is the *microsystem*, which is the child's immediate environment, According to this theory, the child is first exposed to the family (and extended family in some cultures) before being exposed to the other subsystems. In other words, it is this microsystem that introduces the child to the world, and begins to teach the child how to learn to interact with the other systems, i.e., the *mesosytem* (connecting home to school) *exosystem* (contexts that are not directly related to the child, but can affect the child, e.g., parents work place or type of employment) and *macrosystem* (the wider context having to do with laws, legislation, etc).

The significance of the immediate family is recognized and appreciated in many cultures. It is this subsystem that teaches the child how to speak, how many languages to speak and the use for each language. This subsystem does not typically teach a child to speak a language just for the sake of it. Language is learned and used for a purpose, because language carries cultural content that has a role in the child's life. By observing and relating to the people within the family the child absorbs the culture, which includes all the languages spoken and the use for each.

Children as young as four years know how to manipulate their way through requests. They know for example, who and how to ask for permission to play with a certain toy, or to go out to play, or to watch a certain program, or to have a certain book read to them. The four year old will go to grandma to ask to be held because he knows mom won't do it (she is busy or she tells him to behave like a big boy); the child will go to dad to request him to read a book on Power Rangers because he knows mom would want to read him a different book; the little boy will ask for permission from the babysitter to go out to play because he knows the babysitter is busy writing text messages to her friends and she is either not paying keen attention to what he is actually requesting, or she does not want to be bothered at that time. In cases where the four year old speaks multiple languages, he would even know what language to use with whom. These choices involve the child's cognitive abilities. The child utilizes complex processes of comparison, evaluation, timing and decision making. If this complexity of the child's cognition is not utilized in school, opportunities for meaningful learning are lost.

While the role of parents and the extended family is to introduce the child to the world their responsibility continues for the entire time the child is in school and in some cultures,

responsibility never really ends. Even adult children have to listen to, and in most cases obey what the immediate family and the extended family require of them. A strong connection is necessary between the child, the family and the school. The unspoken message of the family to the school as their child starts formal education is synonymous to:

> Here is our child; this is how we have introduced our child
>
> to the world; and please let us work together to build on this
>
> foundation to enable our child to explore the wider world
>
> in ways that enable the child to become a responsible and
>
> productive member of society.

The school does not "takeover" the total responsibility of educating the child, because the school simply cannot do that alone. While parents may assume that their role is diminished after the child starts schooling, they might also be quick to complain that the child is losing the mother tongue after starting formal schooling. Losing the mother tongue means also losing the knowledge learned through the mother tongue. In the family-community-school triad, the parents/guardians have to be overseers to ensure a strong connection at all times in order to preserve and use the child's home-acquired foundation for learning.

6.3 Segmenting Content for School Curriculum Purposes

The school curriculum cannot include everything. The pre-determined curriculum has pre-selected topics and concepts to be included in classroom learning. The content is structured, the topics are sequenced, modes of presentation of concepts are sometimes pre-determined. Due to limited time, equipment, learning materials etc on the one hand, coupled with the need to meet pre-set standards, high stakes assessments and academic upward mobility on the other, the

language of instruction seems to be set on stone. Making connections between the languages that embody the child's foundation for learning and the subsequent school learning using a new language seems very important, but not a priority. This is a clear contradiction.

It is important to note that classroom learning is much narrower than spontaneous learning acquired in naturally occurring opportunities in the child's home and in the community. By the time the child starts schooling the child has acquired a broad base of knowledge and experiences though unstructured in the same way as the school learning. Children who use multiple languages to build this broad base prior to starting school have to narrow down significantly to match the school requirement of *everyone learning the same content through the same language and at the same time*. Individualized instruction quickly comes to mind as a teacher thinks of this situation, but again, resources are limited, including time, materials, equipment, and even the teacher's expertise in effectively teaching children who speak multiple languages.

This study has confirmed that children who speak multiple languages have above average or higher cognitive abilities compared to their bilingual or monolingual peers. These findings support earlier brain research results (Petito et al. 2001; Bialystok, 1997; Galambos and Goldin-Meadow 1990). It is important to capture and positively utilize windows of opportunity for language learning. The young brain is plastic (flexible) for language learning and open to positive and negative stimulation (Eliot and Syc 2008). The remedial approach typically taken to teach children who are not fluent in the language of instruction needs a second look. Remedial instruction tends to help children "catch up" to their peers in learning the required curriculum. But multilingual children may have a broader base from which to draw as they learn specific concepts. So what they need is actually not remedial, but rather, expanded and challenging learning of the same concepts. For example, a Chagga child from Kilimanjaro who is fluent in

English hears the word "banana" the child has to narrow down significantly to focus only on one meaning to serve the purpose of that particular time – may be yellow/ripe bananas. There are more than twenty different types of bananas – some eaten ripe, some for making local beer, some for roasting, some for feeding animals, and some for cooking. Cooked differently, the name would also change, for example *machalari, mtori, ngande, kyimbo*, etc. And the names would differ from sub-culture to sub-culture, in Kilimanjaro alone. It is obvious that in most cultures around the world, concepts introduced to young children holistically are much broader than the narrowed-down content included in the school curriculum.

The school system therefore, narrows down concepts for children who have acquired a broad base of knowledge relating to that concept. Focusing only on narrow meanings of concepts deprives children of effective and meaningful learning to continue building their cognition. Additional effort is necessary to make learning more comprehensive and challenging and therefore interesting to such children.

6.4 Multiple Languages as an Asset in Learning and Effective Functioning in Society

Functioning in the 21st century requires multiplicity of skills and knowledge so diversified that an individual can change careers several times during the working years. Technological advancements are changing the work environment very fast and significantly. Creativity is necessary in keeping oneself at par with the job market. While school learning will provide the formally structured knowledge and concepts to prepare the individual for entry to the work force, it is the individual's creativity that will help that person to survive as an employee in a business or professional firm, or as a business owner/employer as demands and contexts change. Schools cannot facilitate learners' creativity by derailing the children's foundation for learning acquired

at a young age. The broad base of knowledge and experiences multilingual children bring to the classroom need to be built upon, not terminated in order to accommodate a narrower learning of concepts in the school curriculum.

Effective functioning in society is heavily dependent on learning outside the classroom. Learning outside the classroom which utilizes all tools available within the learner's environment is heavily dependent on language. In cases where learning through multiple languages is a natural process, the learning acquired cannot be sustained if any of the languages is lost. When language is lost, content is lost. If this loss happens at an early age in development, then the child not only loses language, but also loses an important foundation for learning.

7. Concluding Remarks

All the sets of data collected and analyzed in this study converge to demonstrate that children who had acquired multiple languages at an early age were not necessarily disadvantaged in learning the school curriculum. Quite to the contrary, the multilingual children studied performed above average or better in math, science Kiswahili and English, compared to their bilingual and monolingual peers, in classrooms where the official medium of instruction was spoken fluently by all children. One school related factor that featured clearly as support for the multilingual children's broadened perception of concepts and ways of approaching new learning was *teacher flexibility* and *willingness to tap into the multilingual children's broadness of mind* and *ways of thinking.*

Children tend to spontaneously react to their surrounding environments to grasp what changing contexts offer. Spontaneous learning is relaxed, child motivated, attractive to the child, and utilizes one of the most important cognitive tools of the child, language. If prior learning has

necessitated acquisition and use of multiple languages, the child has acquired a broad lens to read and relate to the context, to the child's satisfaction. The child's broad lens should not be shrunk by the school system by blocking out most of the child's acquired learning, just because the learning acquired happens to be embedded in different languages.

The responsibility to keep the child's acquired broad foundation for learning lies in three key entities: the family, the community and the school. If this triad is broken, the witch hunt begins, to find out who is responsible for the child's "poor performance" in school, and typically, the blame may fall on the parents/guardians within the family. Multilingual children's communities provided natural contexts for acquiring and using the multiple languages; and their parents were part of those contexts. In contexts where multilingual children are consistently under-performing in school, who is breaking the triad?

7.1 Implications for Further Research

This study involved 91multilingual children (primarily studied) in five schools in three regions in the Tanzanian context. The data sets clearly converged to demonstrate that multilingual children's school performance ranked above average or better compared to their bilingual and monolingual peers. However, the researcher would have wanted to collect more interview data to tap into parents' and teachers' perceptions of the reasons for multilingual children to do so well in school. Due to financial and time constraints during the field research, in depth interviews were limited to 20 parents and 10 teachers. A similar but larger study in which all parents and teachers involved in the study can be interviewed in depth will yield more comprehensive data that can be compared to the current findings.

Additionally, with adequate resources, a field experiment could be conducted in which random samples of schools and classrooms would be used, and potentially confounding variables be controlled – such as children's age, parents' education, teacher qualification, topic and time of instruction, place and school context, teaching style, learner motivation and teaching materials. Varying only the number of languages spoken would empirically establish whether speaking multiple languages *causes* more effective learning in school. In this study parents, teachers and the community effortlessly contributed to the multilingual children's effective learning in school.

References

Askew, M. & Eastaway, R. (2010). *Old Dogs, New Math: Homework Help for Puzzled Parents*, New York: The Experiment (Online Publishers).

, Bandura, A, (1977). *Social Learning Theory*. Englewood Cliffs NJ: Prentice Hall

Baker, Colin 2006. *Foundations of bilingual education and bilingualism*. 4th edn. Toronto: Multilingual Matters.

Berk, L. E., 2005. *Infants and children: Pre-natal though middle childhood*, 5th Edn, New York; Pearson.

Bowerman, M. 1974.Discussion of Summary – Development of concepts underlying Language.In R.Schiefelbusch & L. Lloyd, Eds.), *Language perspectives – Acquisition, retardation and intervention.* Baltimore, University Park Press.

Bruck, M., & Genesee, F. 1995. Phonological awareness in second language learners. Journal of child language 22, 307 – 324 .

Bialystok, E. 1997. effects of bilingualism and biliteracy on children's emerging concept of print. Developmental Psychology 33(3) 429 – 440.

Chomsky, N. (1978). *Syntactic Structures*. The Hague: Morton.

Clemens, Douglas H., and Sarama, J. 2005..Building math through play everyday. *Early Childhood Today* 3,(4) 50 – 57.

Conboy, B. T. & Kuhl. P. K. (2011). Impact of Second Language Experience in Infancy: Brain Measures of First and Second Language Speech Perception. *Developmental Science*, Vol. 14, No.2, pp 242-248

Eliot, Lise 1999). *What's Going on in there? How the brain and mind develop in the first five years of life.* New York: Bantam Books.

Eliot, L, and Sharon, S. (2001). *Language and the brain*. One of nine modules developed by the

Erikson Institute and supported by the McCormick Tribute Foundation and the Harris
Foundation.

Eliot, Lise & Syc, Sharon. 2008. Language and the brain. In Linda Gilkerson and Rebecca Klein, (eds.) Early development and the brain: Teaching resources for educators. Erikson Faculty Development Project on the Brain, Washington DC: Zero to Three

Fernald A. & Kuhl, P. (1987). Acoustic Determinants of Infant Preference for Mothrese Speech. *Infant behaviour Development*, Vol 10, No. 3, pp279-293.

Fledge, J. E. 1987. A critical period for learning to pronounce foreign languages? *Applied Linguistics*, 8, 162 – 177.

Fledge, J. E. & Fletcher, K. L. 1992. At what age are learning (AOL) do foreign accents first become perceptible? *Journal of the Acoustical Society of America*, 91, (379-389).

Galambos, S. J. & Goldin-Meadow, S. 1990. The effects of learning two languages on the levels of metalinguistic awareness. Cognition 34, 1 – 56.

Gilmore, C. K. 2006. Investigating children's understanding of inversion using the missing number paradigm, *Cognitive Development*.2 (3), 301 – 316. (EJ738986).

Gopnik, A., Meltzof, A. N., & Kuhl, P. K. (1999). *The Scientist in the Crib. What Early Learning Tells us About the Mind*. New York: HarperCollins Publishers Inc.

Greenes, C., Ginsburg, H.P., and Balfanz, R. 2004. Big math for little kids, *Early Childhood Research Quarterly*, Vol. 19, No.1 pp159 – 166. (EJ731137).

Hannula, M. M., and Lehtinen, Erno 2005. Spontaneous focus on numerosity and mathematical skills of young children. *Learning and Instruction*15,(3) 237 – 256. (EJ697838)

Huntsinger, Carol S. and others 1996. .Different cultures, different competencies: A

comparison of Chinese-American and Euro-American first and second grade children, Paper presented at the Biennial Conference on Human Development, (14th Birmingham, AL, March 29 – 31.

Huttenlocher, J. 1998. Language input and language growth. *Preventive Medicine* 27, 195 – 199.

Huttenlocher, J., Haight, W.,Bryk, A., Seltzer, M., & Lyons, T. 1991. Early vocabulary growth: Relation to language input and gender. *Developmental Psychology*, 27, 236 – 248.

Huttenlocher, J., Wasilyeva, M, Cymerman, E. &Levine, S. 2002. Language input and child syntax. *Cognitive Psychology* 45, 337 – 374.

Johnsson, B. O. S. 2005. Numeral writing skill and elementary arithmetic mental Calculations, *Scandinavian Journal of Educational Research* 49, (1) 3 – 25. (EJ719287)

Johnson, J. S. & Newport E. L. 1989. Critical period in second language learning: The influence of maturational state on the acquisition of English as a second language. *Cognitive Psychology* 21, 60-99.

Krashen, S. D. 1981. *Second language acquisition and second language learning*. Oxford: Pergamon press

Krashen, S. D. 1982. *Principles and practice in second language acquisition*. Oxford; Pergamon Press.

Krashen, S. D. 1985. *The input hypothesis: Issues and implications*. London: Longman.

Kuhl, P. K. (2004). *Early Language Acquisition, Cracking the Speech Code*. Nature Reviews Neuroscience, Vol 5, pp 831-843

Kuhl, P. K. (2000). A new View of Language. Proceedings of the National Academy of Sciences, 97, 11860-11857.

Loeb, S., Bridges, M., Fuller, B. Rumbeger, R. and Bassok, D. 2006. How much is too much?

The influence of preschool centers on children's social and *Cognitive Development*. Working paper No. 11812, National Bureau of Economic Research. (ED490868)

McLaughlin, D. & McLaughlin D. J. (1998). *Parent's Homework Dictionary* [CD-ROM] Damand Promotions

McNerney, N. (2011). *Homework: A Parent's Guide To Helping Out Without Freaking Out!* Integrated Press

McLean, L. and Snyder-McLean, L. 1978. *A Transcational Approach to early language Training*. Columbus Ohio: Merrill

Mierzwik, N. D., (2004). *Quick and Easy Ways to Connect With Students and Their Parents, Grades K-8: Improving Student Achievement Through Parent Involvement,* Corwin Press

Morrison, F. J. Griffith, E. M., Williamson, G., & Hardaway, C. L. 1995. *The nature and sources of literacy.* Paper presented at the biennial meeting of the Society for Research in Child Development, Indianapolis, IN

Mosha, R. S. (2000). *The Heartbeat of Indigenous Africa: A study of the Chagga Educational System*. New York: Garland Publishing Inc.

Mulligan, J., Prescott, Anne, and Mitchelmore, M. 2004. children's development of structures in early mathematics, Proceedings of the 28th Conference of The International Group for the Psychology of Mathematical Education 3, 393 – 400.

Mushi, Selina L. P. 1996. Some general ideas informing second language teaching globally; Obstacles to their utilization in Tanzania. *Language, Culture and Curriculum* 9(2)133 – 147.

Mushi S. and Adeodu R. 2004. Early childhood education in Tanzania and Nigeria: A

prototype of similarities, differences and implications for international collaborative

Partnerships. In Susan Davis Lenski and Wendy L. Black (Eds.) *Transforming Teacher*

Education Through Partnerships. New York: The Edwin Miller Press, 135 – 148.

Mushi, S. 1999. Preparing Tanzania's young children for the economic world: possibilities

for collaboration with other countries (ED436463)

Mushi, S. L. P. 2002a. Acquisition of multiple languages among children of immigrant

families: Parents' role in the home-school language pendulum, *Early Child Development*

and Care 172 (5) 517 – 530.

Mushi, S. L. P. 2002b. Simultaneous and successive second language learning: Integral

ingredients in the human development process. *Early Child Development and Care*. 172

(4) 349 – 358.

National research Council & Institute of Medicine 2000. From neurons to neighbourhoods: The

science of early childhood development. In J. P. Shonkoff & D. A. Phillips (eds.).

Washington DC: National Academy Press.

Oller, D. K., Ellers, R. E., Urbano, R. & Cobo-Lewis, A. B. 1997. Development of precursors to

speech in infants exposed to two languages. Journal of Child Language 24, 407 – 425.

Owens, R. E. Jr. 2008. *Language development: An introduction*, Seventh Edition. Toronto:

Pearson.

Owens, R. 1978. *Speech acts in the early language of non-delayed and retarded children:*

A taxonomy and distributional study. Unpublished Doctoral Dissertation, The Ohio State

University.

Oyama, S. 1976. A sensitive period in the acquisition of a nonnative phonological system.

Journal of Psychological Research 5, 2621 – 2655.

Petito, L. A. Katerelos, M. Levy, B. G., Guana, K. Tetreault, K., & Ferraro, V. 2001. Bilingual signed and spoken language acquisition from birth: Implications for the mechanics underlying early bilingual language acquisition. *Journal of child language* 28, 453 – 496.

Piaget, J. (1952). *The Origin of Intelligence in Children:* New York: International Universities Press. (Original work published in 1926).

Piaget, J, (1951). *Play, Dreams and Imitation in Childhood.* New York: Norton. (Original work published in 1943).

Piaget, J. (1930). *The Child's Conception of the World.* New York: Harcourt Brace and World. (Original work published in 1926).

Piaget, J. (1926). *The Language and Thought of the Child*. New York: Harcourt Brace and World. (Original work published in 1923)

Piper, T. 1998. *Language and Learning: The home and the school years,* 2nd edn. New Jersey: Merrill

Rubagumya, C. M. (2008). A Three-Tier Citizenship: Can the State in Tanzania Guarantee Linguistic Human Rights? Paper presented at a Workshop on The Multilingual Citizen: Towards a Politics of Language for Agency and Change, Cape Town, South Africa 23-24 February, 2007; and published by EdQual – a research consortium lead by the University of Bristol UK.

Rubagumya, C. M. (1990). Language in Tanzania. In In. Casmir M. Rubagumya (Ed.). *Language in Education in Africa: A Tanzanian Perspective*. Clevedon, Multilingual Matters. pp 5-7.

Rubagumya, C. M. & Lwaitama, A. F. (1990). Political and Economic Dimensions to Language Policy Options in Tanzania. In. Casmir M. Rubagumya (Ed.). *Language in Education in Africa: A Tanzanian Perspective*. Clevedon, Multilingual Matters. pp 143 -152.

Sarama, J. and Clemens, D. 2005. Encouraging mathematical thinking: how to help children explore and expand math skills. *Early Childhood Today*, (30) Vol 20 (2) 11 – 23. EJ726248

Sarama, J. and Clemens, D. H. 2004. Building blocks for early childhood mathematics. *Early*

Childhood Research Quarterly. 19 (1) 181 – 189. (EJ731144)

Skinner, B. F. (1957). *Verbal Behaviour*. New York: Appleton-Century-Crofts

Swanson, H. 2006. Cognitive processes that underlie mathematical precociousness in young

Children. *Journal of Experimental Child Psychology* 93, (3) 239 – 264 . (EJ732022)

Tabors, P. O. 1998. What early childhood educators need to know: developing effective

programs for linguistically and culturally diverse children families. *Young Children*

11(6), 20 – 26.

Umbel, V. M., Pearson, B. Z., Fernandez, S. C., & Oller, D. K. 1992. Measuring bilingual

children's receptive vocabularies. *Child Development* 63, 1012 – 1020.

Vygotsky, L. S. (1962). *Thought and Language*. E. Haulmann & G. Vakar, (Eds. And Trans).
Cambridge M.A.: MIT Press.

Yahya-Othman, S. (1990). When International Languages Clash: The Possible Detrimental

Effects on Development on the Conflict Between English and Kiswahili in Tanzania. In.

In. Casmir M. Rubagumya (Ed.). *Language in Education in Africa: A Tanzanian*

Perspective. Clevedon, Multilingual Matters, pp 42-53.

A Brief Biography

Dr. Mushi is Associate Professor in the Teacher Education Department at Northeastern Illinois University. She has been teaching in the Early Childhood Education program at this institution for about fourteen years. Her entire teaching career of about32 years in three countries (United States, Canada and Tanzania) focuses on preparation of effective teachers for young learners. Dr. Mushi's expertise and research interests include child development, language development and learning, authentic assessment, and cultural and linguistic diversity. Her recent work includes over fifteen publications comprising mainly book chapters and journal articles in her areas of research interest.

Table 1: Data Sources

		Received Back/ Obtained	Sent Out/ Requested	Response Rate
1	Parent Questionnaires	91	120	75.8 %
2	College/University faculty Questionnaires	5	5	100%
3	Class Observation by teachers	20	20	100%
4	Parent Interviews	20	20	100%
5.	Teacher Interviews	10	10	100%
6	Test Scores	18, 15, 23, 14, 15, 23	Not specified	N/A

TABLE 2: Multiple Languages and School Performance: Parents' Views

	Mathematics	Science	Kiswahili	English	Overall Percent
Multiple Languages *support* **academic progress**	58 (65.2%)	59 (66.3%)	51 (57.3%)	49 (55.0%)	61%
Multiple Languages *undermine* **academic progress**	21 (23.6%)	17 (19.1%)	25 (28.1%)	33 (37.1%)	27%
Multiple Languages have *no effect on* **academic progress**	3 (3.4%)	11 (12.4%)	12 (13.5%)	7 (7.9%)	9%
"Spoiled" responses	7 (7.8%)	2 (2.2%)	1 (1.1%)	0 (0%)	3%
Total	89 (100%)	89 (100%)	89 (100%)	89 (100%)	100%

Table 3A: Comparison of Performance Based on Test Scores

Student	Performance (Letter Grades)				Rank
Sch.3 Grd 1A	**Math**	**Science**	**Kiswahili**	**English**	**Out of 46**
1. (female)	A	B	A	A	2nd
2. (female)	A	A	B	B	3.5th
3..(male)	B	A	B	B	3.5th
4. (male)	B	B	B	C	6th
Sch3 Grd. 1B					**Out of 40**
1. (female)	A	B	A	A	2nd
2. (male)	B	A	B	B	4th
3. (male)	B	B	B	B	7th
Sch3 Grd. 2B					**Out of 35**
1. (female)	A	A	A	A	3rd
2. (female)	A	A	C	A	7th
3. (male)	C	D	B	D	21st
Sch3 Grp 3					**Out of 62**
1. (female	B	A	B	B	3rd
2. (female)	B	B	B	B	5th
3. (female)	C	B	B	C	18.5th
Sch3 Grp 4					**Out of 91**
1. (male)	A	A	A	B	2nd
2. (female)	B	A	A	C	9.5th
3. (female)	A	B	B	B	14th
4. (female))	A	B	B	C	17.5th
5. (male))	**C**	**B**	**B**	**C**	**24.5th**

Table 3B: Comparison of Performance Based on Test Scores

Student	Performance (Scores)				Rank
Sch4 Grd. 2	Math	Science	Kiswahili	English	Out of 89
1. (male)	96%	40%	95%	95%	4th
2. (female)	84%	60%	80%	85%	5th
3. (female)	72%	80%	75%	60%	6th
4. (male)	88%	55%	80%	60%	8th
5. (male)	64%	65%	70%	70%	11th
6. (male)	64%	79%	90%	40%	12th
7. (female)	64%	55%	95%	65%	12th
8. (male)	36%	82%	85%	70%	14th
9. (male)	72%	50%	85%	70%	17th
10. (male)	52%	80%	70%	60%	23rd
11 (female)	80%	35%	70%	50%	29th
12 (female)	64%	65%	75%	40%	30th
13. (female)	64%	45%	75%	45%	42nd
14. (male)	60%	50%	35%	35%	55th
15. (male)	60%	14%	50%	30%	74th

Table 3B: Comparison of Performance Based on Test Scores - Continued

Student	Performance (Scores)				Rank
Sch4 Grd 3	Math	Science	Kiswahili	English	Out of 75
1. (female)	95%	80%	100%	92%	1st
2. (female)	95%	80%	100%	85%	2nd
3. (male)	100%	85%	100%	68%	3rd
4. (female)	85%	85%	100%	76%	4th
5. (female)	95%	75%	84%	80%	5th
6. (female)	95%	70%	100%	64%	6th
7. ((female)	95%	70%	100%	64%	6th
8. (female)	90%	70%	96%	72%	9th
9. (male)	90%	80%	96%	60%	11th
10. (female)	85%	80%	80	72%	12th
11. (female)	85%	75%	100%	56%	13th
12. (female)	70%	70%	100%	64%	18th
13. (female)	80%	90%	96%	78%	19th
14. (male)	70%	70%	100%	68%	20th
15. (female)	90%	60%	85%	64%	21st
16. (female)	75%	55%	92%	48%	23rd
17. (female)	75%	60%	100%	44%	29th
18. (male)	65%	60%	76%	76%	29th
19. (male)	70%	65%	92%	40%	32nd
20. (male)	50%	60%	92%	40%	40th
21. (female)	40%	45%	92%	28%	63rd
22 (female)	**45%**	**45%**	**84%**	**20%**	71st

Table 3C: Comparison of Performance Based on Test Scores

Student	Performance (Scores)				Rank
Sch.5 Grd. 2	Math	Science	Kiswahili	English	Out of 65
1. (female)	100%	100%	90%	70%	3rd
2. (male)	80%	80%	80%	70%	9th
3. (male)	70%	80%	70%	60%	11th
4. (male)	705	90%	90%	80%	14th
5. (male)	80%	100%	40%	60%	17th
6. (female)	50%	90%	50%	40%	21st
7. (female)	90%	40%	705	30%	24th
8. (female)	70%	60%	40%	70%	37th
9. (female)	50%	80%	40%	30%	42nd
10. (female)	40%	70%	50%	10%	44th
11 (male)	70%	30%	40%	70%	45th
12 (female)	90%	70%	50%	--	48th
13. (male)	90%	20%	10%	30%	56th
14. (male)	50%	50%	30%	10%	64th

Table 3C: Comparison of Performance Based on Test Scores - Continued

Student	Performance (Scores)				Rank
Sch.5 Grd 3	Math	Science	Kiswahili	English	Out of 75
1. (male)	70%	85%	90%	85%	3rd
2. (female)	75%	100%	80%	60%	3rd
3. (male)	75%	95%	100%	55%	5th
4. (male)	55%	90%	90%	50%	8th
5. (male)	65%	85%	90%	70%	8th
6. (female)	50%	90%	80%	55%	12th
7. ((female)	65%	55%	85%	75%	14th
8. (female)	55%	85%	80%	65%	16th
9. (male)	35%	100%	90%	65%	18th
10. (female)	80%	65%	75%	80%	20th
11. (female)	60%	60%	85%	45%	28th
12. (female)	35%	45%	70%	25%	46th
13. (male)	30%	25%	75%	30%	51st
14. (male)	30%	25%	50%	40%	60th
15. (male)	65%	5%	25%	15%	73rd

Table 3C: Comparison of Performance Based on Test Scores - Continued

Student	Performance (Letter Grades)				Rank
Sch.5 Grd 4	Math	Science	Kiswahili	English	Out of 90
1. (male)	B	B	A	A	1st
2. (female)	B	B	A	A	2nd
3. (female)	A	C	A	B	3rd
4. (male)	A	C	B	A	4th
5. (male)	C	B	B	A	4th
6. (female)	A	A	B	B	7th
7. ((female)	B	B	B	A	8th
8. (female)	C	B	B	B	11th
9. (male)	B	A	C	A	11th
10. (male)	B	B	B	B	13th
11. (female)	C	A	B	C	16th
12. (male)	D	A	A	B	18th
13. (female)	A	C	B	B	19th
14. (male)	B	B	C	B	19th
15. (female)	B	B	B	B	23rd
16. (male)	C	C	C	B	23rd
17. (male)	B	B	A	C	26th
18. (male)	C	B	B	C	31st
19 (male)	D	B	B	C	44th
20 (female0	C	D	C	C	54th
21 (male)	D	C	D	C	65th
22 (male)	D	E	D	D	80th
23 (male)	E	D	E	E	85th

Table 4: A Summary of Ratings of Parents and College/University Faculty on Whether Multilingual Children are Advantaged or Disadvantaged If They Use Only One of Their Languages in the School Curriculum

Highly Disadvantaged	Somewhat Disadvantaged	Neither Advantaged nor Disadvantaged	Somewhat Advantaged	Highly Advantaged
64	20	7	5	0

	Age of child	Gender	Grade	Location of school	Number of languages spoken	Performance in Math	Performance in Science	Performance in Kiswahili	Performance in English
Age of child	1.0	.048 Sig at .651 N = 91	.727 Sig at .000 N = 91	.163 Sig at .124 N = 91	.221 Sig at .036 N=91	.103 Sig at .330 N = 91	.013 Sig at .165 N = 91	.090 Sig at .397 N = 91	-.077 Sig at .466 N = 91
Gender	.048 Sig at .651 N = 91	1.0	-.001 Sig at .990 N = 91	-.083 Sig at .432 N = 91	.048 Sig at 652 N = 91	.074 Sig at .486 N = 91	.079 Sig at .152 N = 91	.125 Sig at .238 N = 91	.118 Sig at .263 N = 91
Grade	.727 Sig at .000 N = 91	-.001 Sig at .990 N = 91	1.0	.212 Sig at .044 N = 91	.361 Sig at .000 N = 91	.010 Sig at .925 N = 91	.112 Sig at .098 N = 91	-.119 Sig at .261 N = 91	-.323 Sig at .002 N = 91
Location of school	.163 Sig at .124 N = 91	-.083 Sig at .432 N = 91	.212 Sig at .044 N = 91	1.o	.186 Sig at .077 N = 91	-.092 Sig at .385 N = 91	.201 Sig at .412 N = 91	-.056 Sig at .597 N = 91	-.028 Sig at .793 N = 91
Number of languages spoken	.221 Sig at .036 N=91	.048 Sig at 652 N = 91	.361 Sig at .000 N = 91	.186 Sig at .077 . N = 91	1.0	.355 Sig at .043 N = 91	.307 Sig at .029 N = 91	.251 Sig at .016 N = 91	.155 Sig at .142 N = 91
Performance in Math	.103 Sig at .330 N = 91	.074 Sig at .486 N = 91	.010 Sig at .925 N = 91	-.092 Sig at .385 N = 91	.355 Sig at .043 N = 91	1.0	.304 Sig at .003 N = 91	.412 Sig at .000 N = 91	.411 Sig at .000 N = 91
Performance in Science	.013 Sig at .165 N = 91	.079 Sig at .152 N = 91	.112 Sig at .098 N = 91	.201 Sig at .412 N = 91	307 Sig at .029 N = 91	.304 Sig at .003 N = 91	1.0	.298 Sig at .006 N = 91	-.111 Sig at .370 N = 91
Performance in Kiswahili	.090 Sig at .397 N = 91	.125 Sig at .238 N = 91	-.119 Sig at .261 N = 91	-.056 Sig at .597 N = 91	.251 Sig at .016 N = 91	.412 Sig at .000 N = 91	.298 Sig at .006 N = 91	1.0	.342 Sig at .001 N = 91
Performance in English	-.077 Sig at .466 N = 91	.118 Sig at .263 N = 91	-.323 Sig at .002 N = 91	-.028 Sig at .793 N = 91	.155 Sig at .142 N = 91	.411 Sig at .000 N = 91	-.111 Sig at .370 N = 91	.342 Sig at .001 N = 91	1.0

Figure 1A: Correlation Matrix of Selected Variables

	Age of child	Gender	Grade	Location of school	Number of languages spoken	Performance in Math	Performance in Science	Performance in Kiswahili	Performance in English
Age of child	**1.0**		**.727**** **Sig at .000** **N = 91**		**.221*** **Sig at .036** **N=91**				
Gender		**1.0**							
Grade	**.727**** **Sig at .000** **N = 91**		**1.0**	**.212*** **Sig at .044** **N = 91**	**.361**** **Sig at .000** **N = 91**				**-.323*** **Sig at .002** **N = 91**
Location of school			**.212*** **Sig at .044** **N = 91**	**1.o**					
Number of languages spoken	**.221*** **Sig at .036** **N=91**		**.361**** **Sig at .000** **N = 91**		**1.0**	**.355*** **Sig. at .043** **N=91**	**.307*** **Sig at .029** **N = 91**	**.251*** **Sig at .016** **N = 91**	
Performance in Math					**.355*** **Sig. at .043** **N=91**	**1.0**	**.304**** **Sig at .003** **N = 91**	**.412**** **Sig at .000** **N = 91**	**.411**** **Sig at .000** **N = 91**
Performance in Science					**307*** **Sig at .029** **N = 91**	**.304**** **Sig at .003** **N = 91**	**1.0**	**.298**** **Sig at .006** **N = 91**	
Performance in Kiswahili					**.251*** **Sig at .016** **N = 91**	**.412**** **Sig at .000** **N = 91**	**.298**** **Sig at .006** **N = 91**	**1.0**	**.342**** **Sig at .001** **N = 91**
Performance in English			**-.323**** **Sig at .002** **N = 91**			**.411**** **Sig at .000** **N = 91**		**.342**** **Sig at .001** **N = 91**	**1.0**

Figure 1B: Significant Correlations of Selected Variables   * = significant at .05 level; **=significant at .01