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Investigating benefits of mother tongue instruction in multilingual Africa: The role of Content and Language Integrated Learning

Abstract

The paper sought to investigate Grade 7 pass rates in Zambian languages, English, maths and science subjects for three groups of students following Zambia's change of initial literacy of 1996 from English to Zambian languages; to compare the pass rates across urban and rural schools, and to examine the extent of integration of English into the content subjects. A quantitative method was used to investigate the problem, the purpose of which was to explore the extent to which outcomes could be apportioned to the integration of English into the content subjects, typifying Content and Language Integrated Learning (CLIL). Results showed that the pass rates for all the subjects were generally low and those for urban schools were better than the ones for rural schools. Pass rates in English tended to be slightly better than those in Zambian languages and those in maths and science – content subjects. Given the better pass rates in English, the study concludes that the outcome may be indicative of failure by the teachers to integrate English into content subjects. The study makes a case for implementing a CLIL approach in the African multilingual learning context for the improvement of academic achievement.

Key terms: English language, multilingualism, academic achievement, content and language integrated learning

Journal for Language Teaching, **Volume 51, Number 2, pp. 11 – 33. 2017.**
ISSN 0259-9570. http://dx.doi.org/10.4314/jlt.v51i2.1

1. Introduction

The aim of this article is to investigate the benefits of mother tongue instruction in multilingual African school context and to establish the extent to which English as a second language (L2) integrated into content subjects, the purpose of which was to create awareness of the value of Content and Language Integrated Learning (CLIL) to the African multilingual learning context. To achieve this, the study examined Grade 7 pass rates (which represent academic achievement) in Zambian languages, English, maths and science subjects for three groups of students following Zambia's change of initial literacy of 1996 from English to Zambian languages. Since academic achievement can be affected by learners' Socioeconomic Status (SES) which manifests differently across rural and urban areas, this study also attempted to compare pass rates, taking into account the rural/ urban dichotomy.

2. Literature review

Multilingualism

Africa is generally a multilingual setting, and Zambia being situated in southern Africa is a multilingual environment. According to Mpepo (1990:31), Zambia is a multilingual country with "eight languages, including English, Icibemba, Cinyanja, Citonga, Silozi, Cikaonde, Cilunda and Luvale." Zambian languages were first codified into a writing system after the arrival of the British. They are written with the Latin alphabet so that knowledge of a single orthography is required for literacy across languages (Underwood, Serlemitsos and Macwangi, 2007). In referring to the Zambian languages in English, prefixes are not usually used. Thus, instead of "Icibemba" or Cinyanja, the words Bemba and Nyanja are used to refer to these languages. In terms of the regions where these languages are spoken, Bemba is mostly spoken in Northern, Luapula, Copperbelt, Central and parts of Lusaka provinces. Nyanja is predominant in Eastern, Central and Lusaka areas. Tonga is mostly spoken in Southern province. Lozi is the regional language for Western province while Luvale, Kaonde and Lunda are regional languages of North-Western Province. This means that education in Zambia is enacted in this context of several indigenous languages which are regarded as first languages (L1) of learners. For the purpose of this study, the regions in which the five languages, namely Bemba, Nyanja, Lozi, Luvale and Tonga are spoken were sampled. Although certain languages are designated for each region, migration of people from one region to another poses considerable challenges for teachers to be sure that the popular language in the region is the mother tongue for all learners.

Because of the complexity of multilingualism in Zambia, the country has used English as a medium of instruction from independence in 1964 from Great Britain to 1996. In 1991, President Kaunda lost elections and a new government led by President Frederick Chiluba came in under the Movement for Multiparty Democracy (MMD). The MMD government changed the English medium of instruction policy to Zambian languages

in Grade 1 in public schools from 1996 (Chilufya, 2008). Following the change of the medium of instruction policy in Zambia in 1996, new materials called the *New Break Through to Literacy* (NBTL) were used for the teaching of literacy in Zambian schools in 1999. The NBTL is an integrated approach to both reading and writing. Since the implementation of the NBTL in Zambia, Kotze and Higgins (1999) evaluated the NBTL and believed that the use of the NTBL materials had yielded positive results following the change of the policy from initial literacy in English to Zambian languages. In support of the new materials, Zambia introduced a new reading course at primary school level referred to as the *Primary Reading Programme* (PRP) in 1999. The PRP is based on the teaching of reading using the language experience approach with some use of the phonics method. The language experience approach is a particular method that uses students' own words to assist them to read. The PRP was described as a success by Sampa (2005).

Mother tongue education

Since reading ability is an important element in students' ability to grasp educational content, research has tended to focus on how the medium of instruction influences reading abilities of learners. Therefore, much of the previous research has suggested that academic achievement in Africa has been problematic because learners have been deprived of acquiring education through African languages mother tongue (MT). Advocates of MT education seem to be motivated by principles and practice underpinning the teaching of a language to young learners that see "teaching children as an extension of mothering rather than an intellectual enterprise" (Cameron, 2005:xii). SkutnabbKangas, Philipson and Rannut (1994) have even extended the line of argument of MT as being the best medium of instruction for any child, as advanced by the United Nations Educational Scientific and Cultural Organisation (UNESCO), to linguistic human rights. They posit that only speakers of dominant majority languages enjoy all linguistic human rights, and that most linguistic minorities are deprived of these rights. They describe what linguistic human rights are, who has and who does not have them and why, suggesting which linguistic rights should be regarded as basic human rights. Skutnabb-Kangas (2000) is even more critical of the superiority of foreign languages like English to indigenous languages, in what she terms as linguistic genocide. Nevertheless, if a mother tongue is not fully integrated into academic learning materials, the issue of linguistic proficiency is problematic because oral linguistic proficiency differs substantially from academic language proficiency. For example, research by Skutnabb-Kangas (1984) herself revealed that Finnish students in Sweden, although able to interact successfully on a social level in both Finnish and Swedish, had literacy skills which were way below age-appropriate levels in both their languages. This led to a distinction being made between surface knowledge and deeper conceptual-linguistic knowledge and the development of a continuum of a language proficiency, basic interpersonal communication skills (BICS) and cognitive academic language proficiency (CALP) at either end of the continuum (Cummins, 1981). On the issues of BICS and CALP, Cummins argued that language demands could be divided into those surface features needed for basic, interpersonal communicative skills used for everyday social interaction and more abstract, contextually reduced skills used for learning. He maintained that BICS occur in contexts which

support meaning and which are not cognitively demanding. As the supportive context is reduced and the level of abstraction increases, a process which is part of schooling, the processing and production of language become cognitively more demanding, necessitating the development of CALP, if learners are to succeed at school.

Notwithstanding, past research in Zambia has been critical of using English as a medium of instruction for academic achievement, especially for rural people. For example, Serpell (1993:10) gives as a typical example of one of his respondents who said in his mother tongue (Chewa): *Nzelu ndinalibe.....linanikanga sukulu.* 'I didn't have the brains…school was too tough for me.' He further quotes one of his respondents who said: 'I failed to pass the exam in Grade 4 to go into Grade 5. I tried repeating but I still failed. That is when I decided I might as well leave school since there was nothing I was getting out of it. I didn't even know how to read properly,' (Ibid). The quotation above can be interpreted to be an indication of self-blame of a student who fails to pass exams because of his inability to understand English. This sort of self-blame led Serpell (1993) to the conclusion that education in Zambia had created a form of trap for the rural people who believed that formal schooling produced failures in their society. Serpell considers this a moral dilemma. Although Serpell does not report on other rural learners who may have profited from education obtained through the same medium of English, he questions how the English medium of instruction could be beneficial to the rural people in any way. He believes that his respondent would have benefitted something from schooling if he had received it in his mother tongue. He further points to the hegemonic nature of English, arguing that English in Zambia has a distinctive character that is associated with aspects of power which dictate the direction of ideas and interpersonal relationships.

There is other research in support of the efficacy of using a first language for initial literacy (Andoh-Kumi, 1998; Bamgbose, 1991; Brock-Utne, 2005; Brock-Utne & Alidou, 2005; Bunyi, 2005; Ejieh, 2004; Kotze and Higgins 1999; Sampa 2005; Wilmot, 2003). Zambia's change of the medium of instruction policy of 1996 was however criticised for recommending the use of Zambian languages as languages of literacy only in Grade 1. Thus, when the Patriotic Front Government under President Michael Sata won elections in 2011, Zambia changed the policy of literacy once again. It was declared that "[f]amiliar languages will be used for teaching initial literacy and content subjects in the early education (pre-school) and lower primary school (Grades 1 to 4)… The new policy shall be implemented in January 2014, in all the primary schools, public and private" (MoESVTEE, 2013:3). Therefore, an evaluation of this new policy along the lines of the current research is a matter for further research because the pass rates for the first group of Grade 7 students to learn under this new policy would only be available six years after 2014 in 2020.

High literacy levels in a country are important because they allow citizens to actively take part in national discourse. More importantly, reading literacy is the means by which learning itself takes place. However, there is no consensus on the transferability of literacy skills from one language to another, even if literacy takes place in a familiar language. For example, reviewing the work of Bernhardt and Kamil (1995), Alderson (2005) argues that first-language literacy is "a strong predictor of L2 reading ability but

L2 linguistic knowledge is a consistently more powerful predictor" (Alderson, 2005:38). Similarly, research by Hacquebord (1994), Pretorius (2002), and Pretorius and Mampuru (2007) has shown that learning in one's own language does not necessarily lead to high academic achievement. In recent times Freire and Macedo (2005: vii) have made the point that:

> The goal should never be to restrict students to their own vernacular….Educators must understand the value of mastering the standard dominant language of the wider society. It is through the appropriation of the dominant standard language that students find themselves linguistically empowered to engage in dialogue with the wider sections of society.

The dominant standard language of the wider Africa society, including Zambia, is English. However, not much is known about pass rates in Zambian languages and even little is known if pass rates in English are commensurate with those in maths and science (or content subjects).

Academic achievement

James, Jurich and Estes (2001:x) define academic achievement as the learners' ability to "obtain good grades (C or higher), take standardized and college entrance exams (e.g. SAT, ACT, Achievement, and Advanced Placement tests) and successfully pursue graduate/professional school degrees or fulfilling work in their chosen career". For the purposes of this research, academic achievement is defined as Grade 7 pass rates in English, Zambian languages, Mathematics and Science. The data were pass rates published by the Examination Council of Zambia (ECZ) for the 2005, 2006 and 2007 cohorts following the implementation of the Zambian languages medium of instruction in 1996 for Grade one learners.

Content and Language Integrated Learning

CLIL has been "often seen as an umbrella term covering aspects of bilingual education, cross-curricular teaching, content-based teaching, and ESP" (Darn, 2009:275). Graddol (2006) places English at the centre of discourse of CLIL by arguing that although CLIL is related to English for Specific Purpose (ESP), the difference is that CLIL is best suited for delivery in multilingual contexts.

Over the past two decades, an increasing body of research has demonstrated that CLIL can enhance multilingualism and provide opportunities for deepening learners' knowledge and skills. CLIL has been found to be additive (one language supporting the other) and not subtractive (one language working against the other) (British Council, 2014:1). Thus, it is further postulated by the British Council (2014) that:

> The logic lies in the acronym: in delineating that *Learning* involves the *Integration* of both *Content* and *Language*, CLIL

> makes explicit the fact that the learning of any content must involve the learning of *the language associated with the content*. At the level of schooling, successful education in either a first or additional language requires that learners are equipped with the *language for thinking about the content* (p.4).

According to Coyle (2013), CLIL approach has received attention as a mainstream form of education at all stages of education in several European contexts as a response to the realities of internationalisation, mobility and employability transfer across countries. Writing about contexts of English as Foreign Language (EFL), Jiang (2010) also argues that CLIL is theoretically welcomed as being feasible (as it is seen as being able to motivate content learning, develop students' multiple intelligences and help them achieve positive attitudes towards the relevance of English. Lasagabaster (2011) adds that even in a context where a foreign language (FL) has little social presence, CLIL can be a successful approach in terms of helping improve learners' competence in the FL. For example, in Taiwan, which is an EFL context, CLIL approach has been implemented because of the perceived positive linguistic improvement CLIL is associated with. CLIL has also been thought to bring non-linguistic benefits to learners. It has been regarded as a powerful motivating factor which keeps learners interested in learning a foreign language because CLIL learners put what they are learning into practice from the very beginning in order to communicate in the classroom (Ruiz de Zarobe, 2013). Furthermore, Grandinetti, Langellotti and Ting (2013) confirm that CLIL facilitates content learning if the learning materials are appropriately designed while Jappinen (2005:163) opines that CLIL "supports thinking and content learning, in particular, in situations where the learners have to compare different concepts and meaning schemes with each other."

However, potential concerns have been raised regarding CLIL implementation, chief of which is the lack of qualified CLIL teachers (Lo, 2007; Luo, 2006). Similarly, Bruton (2011) casts much doubt on the reported positive results of CLIL. He points to the research methodological shortcomings in the previous positive outcomes in selecting students in CLIL courses, misinterpreting scores in pre- and post-tests and extra English provisions to CLIL students. He therefore concludes that CLIL is not always beneficial and does not necessarily produce better outcomes than its alternatives. Nevertheless, arguments in support of CLIL have held sway (Coyle, 2013; Coyle, Hood and Marsh, 2010; Jiang, 2010; Perez-Canado, 2012). Counter arguments are that the challenges reported about in previous research could be attributed to other numerous possible causes, including the learners' affective filter and their lower command of English, which makes content assimilation difficult. Other reasons have been that those students who had challenges grasping particular content with difficult concepts also had weak literacy in their L1, thereby rendering policies of L1 instruction in initial literacy dubious. Research countering lack of CLIL efficacy has further posited that the failed CLIL approaches did so because some teachers grappled with problems of concentration which required to deal with both communicative problems and content learning simultaneously and therefore tended to oversimplify English or indeed content. It is therefore concluded that those CLIL approaches which have been said to fail do not meet the definition of CLIL. Commenting about the benefits of CLIL, Coleman (2006:5) states that CLIL "is firmly

harnessed to the European ideals of multilingualism and the MT + 2 formula (mother tongue and two additional languages for all citizens including school pupils)". The clear conclusion is that the efficacy of CLIL approaches need further investigation instead of being dismissed.

3. Theoretical framework

The theoretical basis of the medium of instruction policy of 1996 in Zambia is Cummins' (1979, 1984) Linguistic Interdependence Hypothesis in which he proposed that children could develop language skills in either the first or the second language. The notion underlying the Linguistic Interdependence Hypothesis is that literacy-related abilities are interdependent across languages such that knowledge and skills acquired in one language are potentially available in the other language. The relevance of Cummins' work to the issue of pass rates is that reading is the means through which educational attainment is achieved. Therefore, students who do well at reading would similarly pass their subjects better after transferring their developed language skills from their L1 to their L2. Hence, the assumption is that there will not be a big difference in pass rates in English and the pass rates in maths and science (content) subjects of the first three groups of Grade 7 students, who immediately benefited from the medium of instruction change of 1996. Since a good policy should not discriminate against geographical boundaries of learners, it is theorised that the pass rates will also be similar across rural and urban schools.

The aim of focusing on the first three groups of Grade 7 students is to independently examine the pass rates in Zambian languages (students' L1) and whether that performance had some influence on pass rates in English (students' L2) and the content subjects which are taught through English. The overall aim is to examine the extent to which English is integrated into the two content subjects, namely maths and science. The purpose is to document the extent to which the medium of instruction change was beneficial to the students and how such benefits, if any, had further positive influence on pass rates in English and ultimately in content subjects, in a multilingual African context.

4. Problem statement

What is known about research that has investigated the role of English in multilingual education in Africa is that such research has tended to be critical of using English as a medium of instruction. Consequently, using English as a medium of instruction in multilingual Africa has been thought to be responsible for poor academic achievement and literacy. Such research is important because it helps us scrutinise the possible unintended consequences of using a foreign language like English which is essentially a colonial language to many African countries. Unfortunately, in Africa, research even on theoretical effectiveness of CLIL approach is seriously lacking. In South Africa,

where some have written about CLIL, there is however evidence that some teachers are not aware of CLIL (Ferreira, 2011). Similarly, Mathole (2016:57) suggests that English has not been integrated in content subjects in South Africa's education curriculum when she states that:

> During the lessons, the teachers resort to switching from the use of English to the learners' home languages as a way to bridge the gap of understanding. In that case, it would be better to use Content and Language Integrated Learning (CLIL) approach to improve learning of languages and different subject matters.

It can be concluded from the above that little is known about CLIL approach in the African context in general. In particular, research that looks at an evaluation of the efficacy of CLIL education taking into account learners' performance outcomes in the African setting is not yet available. As Yang (2015:362) argues, an evaluation of "the effectiveness of CLIL education cannot be complete without taking learners' performance outcomes into consideration". Thus, this paper takes up Yang's (2015) line of argument in order to concretise our knowledge of CLIL education in the African context. Research (Coyle, Hood and Marsh; Dale and Tanner, 2012; Grandinetti, Langellotti and Ting, 2013; Lasagabaster, 2011; Ruiz de Zarobe, 2013) maintains that CLIL is a powerful tool for explaining students' achievement in content subjects. Therefore, a point can be made that the English which students learn at primary school level is integrated into content subjects if pass rates in English and content subjects are similar in the current study.

5. The research methodology

This study was based on a quantitative research approach (Nunan, 2008). The design of this research was therefore based on the ontological view of quantitative methods which are objective as conceptualised by Bryman (2004) and Mackey and Gass (2005). In order to attain objectivity, I approached the investigation of the problem from an outsider's perspective with less intrusion and disruption as recommended by Seliger and Shohamy (2001). This facilitated a deductive theoretical testing of the efficacy of the medium of instruction policy, which underpinned the research.

5.1. Context and participants

The research context constituted records of the pass rates I obtained from the Examination Council of Zambia and the participants Grade 7 students who wrote their final year examinations in Zambian languages, English, mathematics and science subjects in 2005, 2006 and 2007. These participants were based in public primary schools in Zambia.

5.2. Sampling strategy

The population sample involved Grade 7 students' pass rates in 4,705 public primary schools in Zambia as described by MOE (2006). I first picked 10 primary schools using purposive sampling of the schools listed in the Microsoft Office Excel sheet and then drew on the same samples for first, investigating pass rates in Zambian languages and then in English, maths and science. The aim of sampling 10 schools from the electronic files was to include five main Zambian languages used as L1 in schools. The data comprised pass rates for the 2005, 2006 and 2007 Grade 7 students because the results of the first group of students who benefited from the medium of instruction change were available in 2005, the second in 2006 and the third in 2007. I collected the pass rates from the Microsoft Office Excel data files of the Examination Council of Zambia (ECZ).

Since Zambia is a developing country where challenges of poverty can be differentiated according to rural and urban binaries, I was also interested in exploring academic achievement in the subjects according to rural and urban schools. To achieve this, I stratified the schools as follows: five based in urban areas and five based in urban areas before comparing their pass rates. Finally, I sampled the pass rates in order to investigate the extent to which English was integrated into maths and science subjects by comparing pass rates in English with those in maths and science.

5.3. Validity and reliability

I drew on the secondary data of the pass rates based on the examinations prepared and administered by the ECZ. Validity of the research instruments for measuring the construct of academic achievement was fulfilled by ECZ examiners who set and mark the national examinations from which the pass rates were obtained. In terms of the reliability of the findings in this study, the names of the human participants are anonymous. However, mentioning the names of the schools and the geographical location of the schools in this research enhanced the reliability of the data in the current study. Researchers interested in replicating this study can therefore independently do so. I further obtained written permission to use the data from the ECZ. To this extent, all ethical requirements were met for the purpose of the study.

5.4. Data analysis

Pass rates at school level were the units of analysis. For the analysis of the data, I used the Statistical Package for the Social Sciences (SPSS) Statistics in a limited way of calculating the overall pass rates and standard deviation because I did not test the students to arrive at the pass rates in the subjects of interest myself. The data are presented in terms of tables for the purpose of indicating pass rates in each subject of interest, with a comparison of pass rates across urban and rural schools and a comparison of English pass rates with those of content subjects.

5.5. Research questions

To investigate the problem, six research questions are posed thus:

(1) What are the pass for the three groups Grade 7 learners in Zambia languages immediately after the implementation of the Zambian languages medium of instruction?

(2) What are the pass rates for the three groups of Grade 7 learners in English immediately after the implementation of the Zambian languages medium of instruction?

(3) What are the pass rates in maths?

(4) What are the pass rates in science?

(5) How do the pass rates in Zambian languages, English, maths and science subjects compare across urban and rural schools?

(6) To what extent is English integrated into the content subjects in the Zambian context?

Answers to these questions would provide ammunition for promoting CLIL approaches in an African context.

6. Findings

As explicated in this paper, little is known about academic achievement in African mother tongue languages in the Zambian context, as past research has tended to limit itself to investigating reading abilities. The research question was therefore: *What are the pass rates for three groups of Grade 7 learners in Zambia languages immediately after the implementation of the Zambian languages medium of instruction*? Table 1 below presents Grade 7 pass rates in Zambian languages from 2005 to 2007 in 10 primary schools.

6.1. Grade 7 pass rates in Zambian languages

Table 1: Grade 7 pass rates† in Zambian languages in public schools

Name, area and main language of school	Mean and number of students			Overall pass rates† and SD*
	2005	2006	2007	
Mutende, Mansa (urban), Bemba	72.8 % (N= 227)	48.6% (N= 252)	58.1% (N= 210)	Pass rates= 48.5% SD=12.8
Chibolya, Samfya (rural), Bemba	68.1% (N= 110)	50.2% (N= 116)	59.6% (N= 107)	
Mongu, Mongu, (urban), Lozi	49.5% (N= 187)	48.4% (N= 193)	50% (N= 181)	
Shangombo , Shangombo (rural), Lozi	52.2% (N= 56)	53.5% (N= 51)	53.9% (N=72)	
Bimbe, Chongwe (rural), Nyanja	57.1 % (N= 35)	30.4% (N= 41)	26.6% (N= 45)	
Chibelo, Lusaka (urban), Nyanja	60.6% (N= 240)	35% (N= 278)	25.7% (N= 307)	
Kikombe, Solwezi (rural), Kaonde	38.2% (N= 193)	60% (N= 235)	36.7% (N= 254)	
Solwezi, Solwezi (urban), Kaonde	47.1% (N= 355)	62.2% (N= 326)	39% (N= 318)	
Holy Cross, L/stone (urban),Tonga	57.7% (N= 143)	60.2% (N= 150)	34.3% (N= 148)	
Zambezi, L/stone (rural),Tonga	57.8% (N= 157)	32.7% (N= 155)	29.9% (N= 146)	

* SD – Standard Deviation

† Pass rates express average percentages of students who passed in each school

The pass rate in Zambian languages three cohorts after the change of the policy of the language of initial literacy in the 10 public schools was 48.5%. The implication is that more than half of the students did not make it in Zambian languages over the three-year period. Since the overall pass rates in Zambian languages were below 50%, it can be concluded that the medium of instruction policy did not have sufficient effect on the overall pass rates.

6.2. Grade 7 pass rates in English

In order to investigate pass rates in English, the following research question was posed: *What are the pass rates for the three groups of Grade 7 learners in English immediately after the implementation of the Zambian languages medium of instruction*? Table 2 presents Grade 7 pass rates in English from 2005 to 2007 in 10 public primary schools.

Table 2: Grade 7 pass rates† in English

Name, area and main language of school	Mean and number of students			Overall pass rates† and SD*
	2005	2006	2007	
Mutende (Mansa, urban, Bemba, public)	74.5% (N= 227)	56.2% (N= 252)	57.5% (N= 210)	Pass rate= 56.8% SD = 9.6
Chibolya (Samfya, rural,Bemba, public)	67.7% (N= 110)	51.4% (N= 116)	46.5% (N= 107)	
Mongu (Mongu, urban,Lozi, public)	51.5% (N= 187)	55% (N= 193)	49.1% (N= 181)	
Shangombo (Shangombo, rural, Lozi, public)	39.8% (N= 56)	49.2% (N= 51)	55% (N= 72)	
Bimbe (Chongwe, rural, Nyanja, public)	57.9% (N= 35)	36.6% (N= 41)	43.5% (N= 45)	
Chibelo (Lusaka, urban, Nyanja, public)	66.3% (N= 240)	49.9% (N= 278)	50.2% (N= 307)	
Kikombe (Solwezi, rural, Kaonde, public)	64.5% (N=193)	70.7% (N= 235)	56.1% (N= 254)	
Solwezi (Solwezi, urban, Kaonde, public)	55.2% (N= 355)	67% (N= 326)	52.6% (N= 318)	
Holy Cross (L/stone, urban, Tonga, public)	69.4% (N= 143)	72.2% (N= 150)	60.4% (N= 148)	
Zambezi (L/stone, rural, Tonga, public)	67% (N= 157)	58% (N= 155)	54.5% (N= 146)	

* SD – Standard Deviation

† Pass rates express mean percentages of students who passed in each school

The overall pass rate in English three cohorts after the change of the policy of the language of initial literacy in the 10 public schools was 56.8%. The implication is that at least more than half of the students made it in English over the three-year period. This finding is surprising in that the pass rate in the learners' L2 is higher than that of the learners' L1 (at 48.5%) – the language in which the learners should have been more knowledgeable after the change of language of initial literacy in 1996. Since this finding relates to transfer of academic achievement in terms of pass rates from L1 to L2 and not transfer of reading abilities, the theoretical basis of this study, it can be concluded transfer of academic achievement from L1 to L2 is not supported by this finding. However, if this pass rate can be similar to the ones in maths and science, a point could still be made that English is integrated in these two subjects because it is the language through which these subjects are taught. If on the other hand the pass rates are not similar, a counter point can be made that English is not taught within the CLIL approach. This would then provide ammunition for integrating English in content subjects.

6.3. Grade 7 pass rates in Mathematics

In order to investigate integration of English in maths, the research question was therefore posed thus: *What are the pass rates in maths*? Table 3 below presents Grade 7 pass rates in maths from 2005 to 2007 in 10 public schools.

Table 3: Grade 7 pass rates† in Mathematics

Name, area and main language of school	Mean and number of students			Overall pass rates† and SD*
	2005	2006	2007	
Mutende (Mansa, urban, Bemba, public)	66.2% (N= 227)	42.5% N= 252	54.1% (N= 210)	Pass rate 51.5% SD=10.3
Chibolya (Samfya, rural, Bemba, public)	72.8% (N=110)	51.3% (N= 116)	47.7% (N= 107)	
Mongu (Mongu, urban, Lozi, public)	46.3% (N= 187)	43.8% (N= 193)	46% (N= 181)	
Shangombo (Shangombo, rural, Lozi, public)	32.9% (N= 56)	43.5% (N= 51)	54.6% (N= 72)	
Bimbe (Chongwe, rural, Nyanja, public)	58.9% (N= 35)	35.8% (N= 41)	45.7% (N= 45)	
Chibelo (Lusaka, urban, Nyanja, public)	62.4% (N= 240)	38.3% (N= 278)	49.2% (N= 307)	
Kikombe(Solwezi, rural, Kaonde, public)	48.1% (N= 193)	66.3% (N= 235)	47.8% (N= 254	
Solwezi (Solwezi, urban, Kaonde, public)	42.4% (N= 355)	63.3% (N= 326)	45.9% (N= 318)	
Holy Cross (L/stone, urban, Tonga, public)	65% (N= 143)	68.3% (N= 150)	52.6% (N= 148)	
Zambezi (L/stone, rural, Tonga, public)	62.6% (N= 157)	43.8% (N= 155)	49.2% (N= 146)	

* SD – Standard Deviation

† Pass rates express mean percentages of students who passed in each school

The overall pass rate in maths three Grade 7 cohorts after the change of the policy of the language of initial literacy in the 10 public schools was 51.5%. Interestingly, even though the pass rate is still lower than that of English this overall pass rate in maths is closer to that of English at 56.8% than it is to Zambian languages (48.5%), implying that English is integrated into maths. However, the point remains that a good number of students (48.5%, which conversely passed in Zambian languages) still did not make it in maths. Additionally, given that maths is taught through English, the formulaic nature of the language of maths should have benefited more from English if this finding was to be firmly interpreted as an indication of the implementation of a CLIL approach in Zambia. Therefore, this finding is to be interpreted with caution, pending investigation of the integration of English into science.

6.4. Grade 7 pass rates in Science

To compare the pass rates in English with the ones in science, the research question was therefore posed as follows: *What are the pass rates in science*? Table 4 presents Grade 7 overall pass rates in Science from 2005 to 2007 in 10 public schools.

Table 4: Grade 7 pass rates† in Science

Name, area and main language of school	Mean and number of students			Overall pass rates† and SD*
	2005	2006	2007	
Mutende , Mansa (urban), Bemba	68.7%, (N=227)	32.9% (N=252)	35.9% (N=210)	
Chibolya, Samfya (rural), Bemba	74.6% (N=110)	45.9,% (N=116)	30.7% (N=107)	
Mongu , Mongu (urban), Lozi	31.3% (N=187)	30.8% (N=193)	31.6% (N=181)	
Shangombo , Shangombo (rural), Lozi	32.9% (N=56)	35.4% (N=51)	43.2% (N=72)	
Bimbe, Chongwe (rural), Nyanja	58.6% (N=35)	24.7% (N=41)	29.2% (N=45)	
Chibelo, Lusaka (urban), Nyanja	63.1% (N=240)	29.2% (N=278)	32.7% (N=307)	Pass rate = 43.6% SD = 15.9
Kikombe, Solwezi (rural), Kaonde	38.9 %(N=193)	66.8% (N=235)	34% (N=254)	
Solwezi, Solwezi (urban), Kaonde	33.1% (N=355)	66.1% (N=326)	32% (N=318)	
Holy Cross, L/stone (urban), Tonga	66.8 % (N=143)	70.2% (N=150)	38% (N=148)	
Zambezi, L/stone (rural), Tonga	64.1% (N=157)	32.7% (N=155)	34.2% (N=146)	

* SD – Standard Deviation

† Pass rates express mean percentages of students who passed in each school

The overall pass rate in science three Grade 7 cohorts after the change of the policy of the language of initial literacy in the 10 public schools was 43.6%. This shows again that most of the students did not pass their science in Grade 7 despite being instructed in their first languages in Grade 1. Furthermore, the fact that the overall pass rate in English was much better at 56.8% means that the English administered to these cohorts may have been too simplified to have tangible positive effects on science.

6.5. Learners' pass rates across urban and rural schools

Zambia is a developing country where the locality of schools affects learners' Socioeconomic Status differently. For this reason, this research builds on Serpell's (1993) study regarding how the 1996 initial literacy policy aided the rural people in Zambian languages, English, maths and science subjects. To achieve this, pass rates based on 5 schools in rural areas and 5 schools in urban areas were compared. The research question was therefore posed thus: *How do the pass rates in Zambian languages, English, maths and science compare across urban and rural schools?*

Table 5: A comparison of Grade 7 pass rates across rural and urban schools

Rural schools (2005-2007	**Overall mean pass rate**	**Urban schools (2005-2007)**	**Overall mean pass rate**
Chibolya, Samfya: Eng = 55.2% , Maths = 57.2%, Science = 50.4% , Zambian lang. = 59.3%	**Eng, Math, Scie.& Zam. lang.** (rural schools 2005-2007)	Mutende, Mansa: Eng = 62.7%, Maths = 54.2%, Science=54.8%, Zambian lang. = 58.9%	**Eng. Math. Scie. & Zam.lang** (urban schools 2005-2007)
Shangombo , Shangomb: Eng = 48%, Maths = 43.6%, Science = 37.1%, Zambian lang. = 53.2%		Mongu, Mongu: Eng = 51.8%, Maths = 45.3%, Science=31.2%, Zambian lang. = 49.5%	
Bimbe, Chongwe, Eng = 46%, Maths = 34.8 Science = 37.5%, Zambian lang.= 38%		Chibelo, Lusaka: Eng = 55.4%, Maths = 49.9%, Science=41.6%, Zambian lang. = 40.4%	
Kikombe, Solwezi: Eng = 63.7%, Maths = 54%, Science = 46.5%, Zambian lang. = 44.7%		Solwezi, Solwezi: Eng = 58.2%, Maths = 50.5%, Science=43.7%,Zambian lang. = 49.4%	
Zambezi, L/stone, Eng = 59.8%, Maths = 51.9%, Science = 43.6%, Zambian lang = 40.1%		Holy Cross, L/ stone: Eng = 67.3%, Maths=61.9%,Science=58.3%, Zambian lang. = 50.7%	
Overall rural schools		**Overall urban schools**	
English = 54.5%, Mathematics = 48.3% Science = 43%, Zambian lang**.** = 47%	38.5% N= 1616	English = 59%, Mathematics = 52.3% Science=37.6%, Zambian lang**.** = 39.6%	47.6% N= 3074

It is seen in Table 5 that the overall pass rate of Grade 7 **rural** schools in the four subjects (i.e. English, Mathematics, Science and Zambian languages) is lower at 38.5% than that of **urban** schools at 47.6%. Although the difference between the pass rates is not wide (9.1%), the implication is that a slightly higher percentage of students who wrote their examinations in urban schools passed their examinations in the four subjects than that of those who wrote their examinations in rural schools. These findings are consistent with those of Lee, Zuze and Ross (2005) who looked at the effects of several school-level factors on Grade 6 reading ability using the Southern and Eastern Africa Consortium for Monitoring Educational Quality (SACMEQ) II data collected from 2,294 schools in 14 countries in Africa. In that study, it was found that schools located in urban areas had higher achievement, compared to rural areas, especially in Botswana, Zambia, Namibia, South Africa and Lesotho.

In the current study, the pass rates in English and maths are better in urban schools than in rural schools. However, although the overall pass rates in English and Mathematics were higher in urban schools (at 59% and 52.3% respectively) than those in rural schools (at 54.5% and 48.3% respectively), the pass rates in Science and Zambian languages in urban schools (at 37.6% and 39.6%) were slightly lower than those in rural schools (at 43% and 47% respectively).

The findings from this study have indicated that the pass rates among Grade 7 students in Zambian languages and English are higher than those of their maths and science subjects. Given this reality, the pass rates reveal that teachers in Zambian primary schools may not be using CLIL in their teaching of content subjects, or if they do, it is not effectively implemented.

6.6. Extent to which English is integrated into content subjects

The research question was: *To what extent is English integrated into the content subjects in the Zambian context*? The overall pass rate of Grade 7 students in maths in the 10 public schools was 51.5%. It is lower than that of English at 56.8% (a difference of 5.3%). In science, findings showed an even larger difference between students' overall pass rate in English of 56.8% and that of science as a content subject at 43.6% over the three-year period (a difference of 13.2%). These results indicate that English may not be integrated in the teaching of the content subjects. Where the CLIL approach has been known to be implemented, a finding like this can indicate a poor implementation of the CLIL approach (e.g. Dafouz, Camacho and Urquia, 2014). However, since research on the implementation of the CLIL approach in Zambia is non-existent, this finding can only suggest that English is not integrated into content subjects and vice versa, thereby providing ammunition for implementing CLIL in Zambia.

7. Discussion and conclusion

The theoretical basis upon which the medium of instruction was changed in 1996 in Zambia does not hold when it comes to transfer of skills from L1 to L2 as far as pass rates are concerned. The findings from this study show that the overall pass rate in English, which is the language of the content subjects of the students, is consistently higher than the ones of the content subjects. The implication is that students in the Zambian learning context find the English language used in content subjects rather difficult. This means that English language as a subject may be intentionally oversimplified, especially because the overall pass rate in English is even higher than that of their L1.

The educational formalities of maths for instance differ from ordinary communication (von Glasersfeld, 1991). Therefore, the main contribution of this study is that English should be integrated into Mathematics in the earliest form of learning for the African schoolchild. What this means is that children's reading in English should equally involve maths. When it comes to science, Carrasquillo and Rodriguez (2002:132) have made the point that "science is, in itself, a language and each different science (biology, physics, chemistry) is a separate language". Therefore, here too, the English academic language of Grade 7 learners in Zambia needs to be integrated into science.

CLIL is not only expected to be beneficial to learners but also motivating to teachers who are either content teachers or language teachers, even if they are non-native English

language teachers (Coyle 2013; Lorenzo, Casal, and Moore, 2010). In this sense, CLIL provides opportunities both for learners to learn and for teachers to learn to teach and to reflect differently in the Zambian/African school context. One example of a lesson on how to integrate English language learning into science is the one recommended to Grade 2 learners by Freeman, et al. (2010). In that lesson, the researchers recommend content in which learners name uses of various simple machines and explain/ demonstrate how they work. They show that learners could identify simple machines and their parts (e.g., bicycle, gears, wheels), and demonstrate and label the workings of simple machines (screws, wheel and axle, lever, pulley) on a compound machine, the bicycle. Key vocabulary for such a lesson could include wheels, gears, machine, parts and work. Likewise, oral language could include naming, retelling, reporting and asking for explanations while grammar could involve the teaching of future tense such as "going to", helping verbs such as "can" and can't" as well as commands. Comprehension could include visualization and description of information from text and charts while literacy could involve the use of alphabet to find information. At the level of writing, children could be exposed to writing about simple machines such as writing about how a bicycle works as well as labelling of a diagram of simple machines such as wheelbarrows, pulleys and pivots. Cameron (2005:xii) says that the teaching of language needs a highly skilled teacher "to reach into children's worlds and lead them to develop their understandings towards more formal, more extensive and differently organised concepts." In teaching content subjects, this suggests the value of CLIL or what has been referred to as languages across the curriculum.

Since children are usually taught by one teacher in most African primary schools, primary school teachers need to be trained in teaching methods using CLIL if they have to make a difference in the development of the whole child. This should provide impetus for considering approaching teaching content subjects from a CLIL perspective, instead of limiting the challenges of educational attainment highlighted in some of the literature (e.g. Serpell, 1993; Sampa, 2005) to the medium of instruction. Temptations for switching to L1 where the English language has been found to be difficult have been reported in European cases (Airey, 2009). While language perceived to be difficult may lead to a loss of motivation for learning content subjects by learners, such worries should not prompt English language teachers to design courses whose content has been intentionally simplified, as the findings from the current study in Zambia seem to suggest. A more appropriate CLIL approach for addressing students with low English language proficiency would be that proposed by Roiha (2014) which is aimed at providing differentiation practices to meet different types of learners' needs.

Since the pass rates in Zambian languages were lower than those in English, the findings from this study do not support the theoretical assumptions of linguistic transferability from L1 to L2, which Cummins' (1979, 1984) studies seem to suggest. Research on CLIL (e.g. British Council, 2014) suggests that CLIL aids additive rather than subtractive multilingualism in European multilingual learning contexts where CLIL approaches have been implemented. In any case, as Banda (2000) points out, the context of Cummins' research was a bilingual and not a multilingual one where learners contend with the challenges of multilingualism. Since Zambia, like most African countries, is a multilingual

learning context where learners have to contend with multiple languages for educational attainment, implementing a CLIL approach to teaching content subjects which are taught in English may be a better option than relying on policy changes of using Zambian languages as media of literacy.

One of the limitations of this study is that it is based on pass rates which are outcomes for investigating the teaching approaches of CLIL and Zambian context. Although Yang (2015) recommends an evaluation of assessment outcomes in investigating CLIL, the question of whether the teachers in Zambia are aware of or even use CLIL in their teaching is a matter which should also be investigated through interviews, document analysis or by conducting lesson observations. Similarly, this research was limited to an examination of pass rates at primary school level. While some studies could replicate this study across secondary schools, others could examine the extent to which university students' English language has been integrated into science and maths disciplines. Such research would provide a fuller picture for supporting struggling university students. Unsupported students tend to be resistant towards the CLIL approach (Denman, Tanner, and Graaff, 2013). Therefore, studies addressing university needs would inform university institutions in developing or introducing support courses in English for academic/specific purposes, instead of relying, as they do, on students' secondary-school-leaving pass marks in English.

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