English Immersion in the Rwandan Secondary Educational System: Challenges and Ways Forward

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Abstract
In 2008 Rwanda replaced French with English as the language of instruction in all its schools from grade four. The abruptness and comprehensiveness of the change created problems for teachers and students, especially in rural areas. In order to identify the challenges and suggest solutions, 15 of the 17 secondary science teachers in the rural schools of Nyarugenge district were surveyed. The results showed that both teachers and students had very low English language proficiency to help them fully implement the new language policy. Another thorny challenge was teachers' lack of job motivation among others. These challenges led teachers to consistently use their mother tongue rather than English in class and rendered them unable to modify lesson content to accommodate their students' needs. Teachers have attempted to overcome the difficulties by reading English grammar books, enrolling in private classes, and attending government-provided language training sessions.

Keywords: Rwanda, science teachers, English as a Medium of Instruction, language policy, Mother Tongue, Target Language

1. Introduction and background to the study

In 2008, the government of Rwanda made a shift in its the education system. At a cabinet meeting held on October 28, the decision was made that English would replace French as the language of instruction (LoI) at all levels of education in Rwandan schools and French would be taught as a subject (Gahigi, 2008). The reasons for this change were practical; some of the rationale was that making English the LoI would enable people to integrate more easily in sub-region organizations and promote economic growth by facilitating access to international markets.

However, even though the language shift was very practical and came when it was needed for various reasons, its implementation still poses very challenging problems for a country that was originally Francophone. In addition, implementation of this language shift is obviously more difficult in rural schools than in urban ones because of some issues that particularly affect rural schools (Niyibizi, 2010; Adedeji&Olaniyan, 2011).
Generally speaking, of the 12,000 secondary school teachers in the country at the time the new policy was announced, just 600 had been taught the language in which they would soon be expected to teach, and the more qualified teachers were not likely to accept deployment to rural areas (Adedeji&Olaniyan, 2011; Bennell&Akyeampong, 2007). These realities have made the implementation of the new language policy very challenging in Rwandan secondary schools in general and in rural schools in particular.

Because of the above discussion, the English immersion in the Rwandan education system is likely to face several challenges that could hinder its successful implementation. These problems are likely to be much more pronounced and difficult to deal with in rural schools as compared with urban ones. The anticipated difficulties against the optimal success of the above-mentioned immersion constitute a driving force to devise this study. It is set to highlight challenges that Rwandan secondary school teachers, especially those teaching science subjects, have encountered in their effort to implement the new language policy.

The paper examines how the challenges regarding English as a medium of instruction (EMI) have affected the science teachers' daily teaching activities and what strategies, if any; teachers have adopted to tackle the challenges and by so doing, pave the way for the so much needed English language immersion. Science teachers were chosen for examination because they receive very limited training in the English language throughout their education as compared to their counterparts in other subjects. Additionally, teaching science subjects was problematic even before the introduction of the new EMI policy due to lack of adequate teaching materials such as laboratories and textbooks.

Language of Instruction Shifts in Other Countries
Rwanda is not the only country to decide to use EMI in its education system. Throughout Western Europe and Asia as well as Africa, governments and educators have introduced English as a LoI to improve their citizens' linguistic competitiveness. Several African countries have attempted remarkable changes in their language policies, notably Namibia (Harlech-Jones, 1990), Botswana (Magogwe, 2007), Mali (Canvin, 2007), and South Africa (Heugh, 2007; Uys, Van der Wait, & Botha, 2007; Webb, 2004). In this section, the introduction of EMI in Malaysia, Belgium, Indonesia, and Tanzania is discussed. Some of the challenges to EMI in these countries are similar to those in Rwanda. The introduction of a new LoI in Canada is also discussed because the implementation of the change there was

relatively easy and the results have been good.

Malaysia: Compulsory EMI in Science and Mathematics
Teaching science in English at the school and university levels is one of the most important changes Malaysia made in its education policy recently. The change was made to react to and arrest the decline of English in the country; officials felt that if not remedied, the gradual loss of English was likely to have a negative impact on the country's economic development (Othman &Saat, 2009).
Nunan (2003) believed the introduction of EMI in the teaching of science and mathematics is among the ways Asian Pacific countries can keep up with the pervasive view that the English language is becoming globally important and will also help countries such as Malaysia achieve its vision of being a developed country by 2020.
However, Malaysia faced the same challenge in implementation as Rwanda: teachers' proficiency and competence in the English language were very low. Pandian and Ramiah (2004) observed that mathematics and science teachers had to cope with the double demand of transmitting content as well as language to their students. The situation was even more challenging for prospective teachers, many ofwhom wereoverwhelmed when first thrust into the classroom. Teaching mathematics and science to Malaysian students using EMI posed a tremendous challenge because the students' levels of proficiency in English were very low.
In an effort to address these challenges, the Malaysian government made it compulsory for all prospective science teachers to take their courses and conduct their practicums in English (Leemk, 2009). This requirement may have helped preservice teachers, but it ignored those who were already teaching; nothing was done for them to raise their levels of English proficiency. Several researchers have suggested that greater focus needs to be given to developing better teacher training if the government wishes to see the language policy it set successfully implemented (Chan & Abdullah, 2005; Pandian &Ramiah, 2004).

Belgium: EMI in Flemish Higher Education
In Belgium, language is a "highly sensitive and divisive issue" (Donaldson, 1983). The issue of language is especially sensitive in Flanders, the Dutch-speaking part of Belgium. Donaldson explained: "Flanders in particular has established close links between its language and identity which would act as a negative force against innovative undertaking as far as language policy is concerned" (p. 31). However, language usage in Flanders has been changing. Although Dutch is the primary language throughout the region, English has largely replaced French as a second language. Moreover, throughout much of Europe, English has become a medium of instruction in institutions of higher learning.

Academic professionals in Flanders have resisted the inclusion of English or any language other than Dutch for teaching purposes. Nevertheless, Flemish government officials have argued for the introduction of EMI in education. Although its use as a medium of instruction is restricted, its use as an academic language is increasing. Many students and lecturers regard language in general—including foreign languages—as part of their identity (Van Splunder, 2010).
The broad context for the push among many in Flanders to remove restrictions on the use of English as a LoI at the college level is globalization, "the growing importance of English as a lingua franca in European higher education" (Van Splunder, 2010, p. 14). Van Splunder observed that the wideracceptance of English in academia was an unintended side effect of the 1999 Bologna Declaration.
That document launched the European Higher Education Area, a collaboration of 46 nations

that agreed to some synchronization among their colleges and universities. The agreement resulted in greater movement of students and scholars among countries with different languages and required a lingua franca as a practical matter. A lingua franca is "a contact language used among people who do not share a first language" (Jenkins, 2007, p. 1). After the Bologna Declaration, English gained prominence as the lingua franca, and therefore the LoI, in schools throughout the European Higher Education Area. The most important challenge to the use of EMI in Flemish higher education has been the negative attitude of some of the citizens who resisted the acceptance of English and were very protective of French and Dutch. Another obvious problem has been difficulty in raising the level of English proficiency among lecturers and students (Van Splunder, 2010). This discussion makes clear that the introduction of EMI in Flanders—English as a medium of instruction but not the sole medium—was not motivated by political beliefs; rather, it was a practical way to deal with social, economic, and educational changes that were taking place in the country. Implementing EMI as a practical solution to changing realities appears to also be the case for many other contexts worldwide.

Indonesia: EMI in Public Junior Secondary Schools
An EMI program was started in Indonesia in 2006 under the provisions of the National Education Law enacted on March 20, 2003. The Directorate General for Primary and Secondary Education Management (2009) tested the new program at its international school and the remaining secondary schools countrywide soon adopted it. The main objective for introducing EMI was the need for bilingual education. EMI was implemented in the nation's secondary schools under various names: dual language education (Lindholm-Leary, 2001), bilingual immersion (May 2008) and its variants such as one way/two way immersion (Fortune &Tedick, 2009), content and language integrated learning (Seikkula-Leino, 2007), teaching English for mathematics and science (Hashim, 2009), or simply English as a medium of instruction (Wannagat, 2007). EMI was employed as a form of content-based foreign language learning; it was used for certain subjects such as mathematics and science, and its overall aim was to improve subject and linguistic competitiveness. The most challenging problem in the implementation of the EMI policy in Indonesia was poor human resources; that is, most teachers in the country had relatively limited proficiency in English (Kustulasari, 2009; Sundusiyah, 2010)

Tanzania: Resisted Introduction of the EMI Policy
When Tanzania gained independence in 1961, the country inherited a colonial education that used Swahili and English as languages of instruction, but when socialism was introduced in 1967, Swahili was declared the only LoI. As the English language gradually rose in status worldwide, some educationalists in Tanzania felt that the government must "enable all children to master English in order for them to acquire an education that allows them to compete favorably for employment" (Swilla, 2009, p. 1). In the 1990s, the government legalized private schools and schools using EMI and pressed education officials to firmly establish English as a LoI beginning in primary school. The government's decision to introduce English as a LoI in Tanzanian schools met with some challengesbefore finally succeeding. For one, teachers were not qualified to teach in English. For another, some parents and influential educators openly resisted the decision. At the beginning, traditional educators were of the opinion that Swahili should be the only LoI and they openly dubbed the new language policy "English as a language of destruction in schools" (Mhegera, 2011). Nevertheless, the policy eventually became successful, and students, teachers, and Tanzanian society at large have enjoyed fruit from the implementation of this policy (Rugemalira,

2005).

Canada: French Immersion

Although Canada is a bilingual nation with citizens speaking English and French, English has clearly become more economically powerful than French even in Québec, where French is spoken by the majority of the population ("Is There a Deep Split," n.d.). In response to this reality, Quebecers made many attempts to elevate the French language. In 1965, members of the English speaking community in Québec introduced an experimental French immersion program in kindergarten classes with the goal of making the children bilingual (Lambert & Tucker, 1972). The children in the immersion classes received the same education they would have received in the regular English program except that the material was taught in French. The teachers were generally native French speakers who understood English, and they treated the children as though they, too, were native speakers. The experiment was a success. The success of the experimental program led to the establishment of other immersion programs. Canada now has three types of immersion programs: early total immersion, delayed immersion, and late immersion. The early immersion programs begin in kindergarten and last up to 11 years. They are divided into three phases: a monolingual phase, a bilingual phase, and a maintenance phase. The monolingual portion usually takes place from kindergarten to Grade 2 or 3. In this phase all curriculum materials are presented in the second language (French) but children may speak among themselves or to the teacher in the students' first language (English). In the bilingual phase, usually from Grade 2 or 3 to Grade 6, the two languages are used equally for instruction.

In the maintenance phase, usually from Grade 7 to the end of secondary school, three to five subjects are offered in French. Most educators believe this program yields better results than the other two types. In delayed immersion, the use of French as a major medium of instruction is delayed until the middle elementary grades, usually introduced at Grade 4. Late immersion programs postpone intensive use of French until the end of primary school or the beginning of secondary school (Genesee, 1995). All three types of French immersion programs produced very good results; students became competent in both French and English, and learning French did not affect the students' proficiency in the English language.

Some prominent researchers reported that students who completed French immersion programs appeared toenjoy some advantages over monolingual English students. Cummins (1987), for example, found that immersion students not only did as well in using English language skills as students educated entirely in English, but they also performed as well in subject matter as students who were educated in English and they acquired a great deal of the second language. Edwards and Smyth (1976) and Lambert and Tucker (1972) observed that French immersion students reported being satisfied with their programs, felt confident in speaking French, and saw less social distance between themselves and French Canadians. They also tended to fear foreign languages far less. The success of Canada's French immersion led some scholars to call it a "two for one" benefit. Students in the programs achieved both a high level of second-language development and mastery of school subject matter equivalent to that of similar students studying in their first language, English (Calvé, 1991; Halsall 1989; Lambert & Tucker 1972; Lapkin, Hart, & Swain, 1991). The success of Canada's French immersion seems to suggest that the challenges that can hinder the implementation of a new language policy in any education system are not the result of the new language, but of infrastructures, facilities, and strategies that governments and education officials institute to help teachers implement the policy fully. The Canadian immersion

programs were successful because competent professional French teachers were available and schools had sufficient equipment, administration, and other resources. Students also had access to French language resources and opportunities to use the target language in everyday situations.

1.2. Research questions
This study was guided by the following research questions:
1. What are the main challenges faced by rural secondary school science teachers in their effort to implement the EMI policy in the education system?
2. How do these challenges affect science instruction in Rwandan rural secondary schools?
3. What is being done to tackle and rectify the problems to make English immersion a success in the Rwandan educational system?

1.3. Theoretical and conceptual Framework
The diagram below proposed by Norudin et al. (2011) can be taken as a summary of the theoretical framework underlying this study.
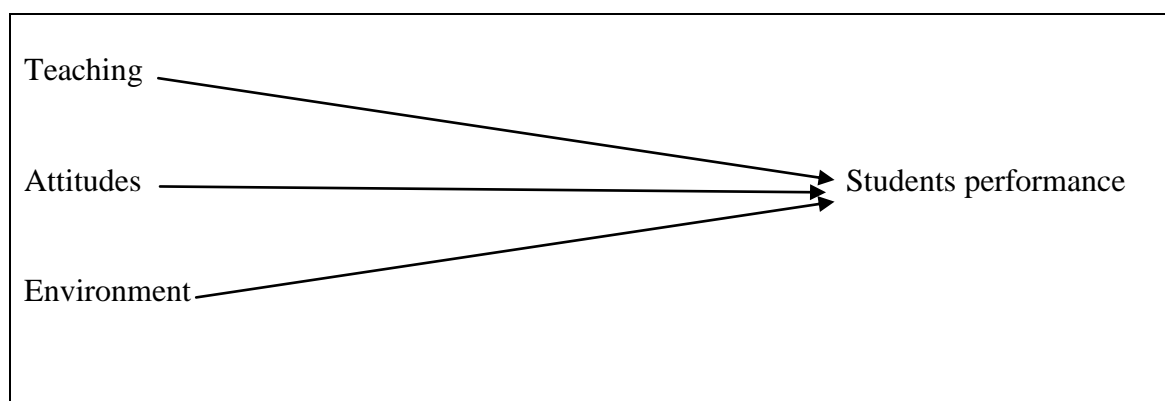
Students' performance, which is the measure of the success of any teaching program/policy, is conditioned upon three major elements: teaching, attitudes, and environment.
Teaching encompasses teachers' training and experience, teaching/learning materials, teaching facilities, teaching methods, and other materials and strategies employed by the teacher. The review of attempts to implement LoI shifts in five countries above, suggests that the training and experience of teachers has been a major impediment to implementation, particularly teachers' struggles with proficiency in the new LoI. Implementation has been successful in Canada, which has access to teachers with good language skills and adequate materials.
Attitudes of both teachers and students toward the overall teaching and learning process were shown to affect student performance. Attitude includes teachers' motivation and job morale, the degree of seriousness with which teachers approach their tasks, the amount of love teachers have for their profession, and students' thoughts and behavior toward class activities. The literature revealed that the negative attitudes toward the introduction of EMI in Flanders and Tanzania hindered the language policies there. The literature also demonstrated the importance of environment, both in the home and in the school, on the success of introducing a new LoI in a nation's schools. An environment devoid of English does not lend itself to development of English proficiency regardless of what occurs in the relatively few hours in classrooms.

2. Research Methodology

This research explored the challenges faced by Rwandan secondary school science teachers in their effort to implement the EMI language policy introduced in the Rwandan education system in 2008. It is a case study of implementation in the schools in Nyarugenge District in Kigali. It answered specific research questions by seeking "a range of different kinds of evidence, which is there in the case setting and which has to be abstracted and collated to get the best possible answers to the research questions" (Gillham, 2000, p.1).

One of the drawbacks of case study research is difficulty in generalizing findings from one case study to others or to the larger population. Nevertheless, case study findings can offer important hints that permit "fuzzy generalizations" (Bassey, 1999). Because little research has been conducted on the implementation of the language policy in the Rwandan education system, a study that produces tentative generalizations can be a starting point for more in-depth research on the subject, suggesting questions and direction for further exploration.

2.1 Location, Population, and Sampling Procedures

This study was conducted in the rural part of Nyarugenge District. The study population consisted of all the S6 secondary school science teachers in the rural part of Nyarugenge District in the 2013-2014 academic year; 15 teachers completed the survey and 18 of their students, who were selected randomly, participated in the study. The S6 classes are taken in the final year of secondary education. The schools offer five science courses: mathematics, biology, chemistry, physics, and information and communication technology. Of the 17 potential participants, 15 completed the survey instrument; therefore, the sample size was 15. The sample was small, but the study had very limited sampling errors because its sample population was nearly the same as the whole population of the research. The representativeness advocated by Ghiglione and Matalon (1985) was guaranteed by the fact that 88% of the total population participated in the study.

The S6 students who were included in the study were selected by a simple random sampling technique. Simple random sampling is a technique of selecting *n* units out of a population by giving all units equal chances of being selected (Ding, Hsieh, Wu, &Pedram, 1996). In order to give every student the same chance to be selected, names of all the students in each class were written on small pieces of paper, all name tags were put into a hat, and names were randomly picked from the hat. In every class, this sampling method yielded students of both sexes.

2.2 Data Collection Procedures

This research was a descriptive survey. In order to gather all the information, the researcher distributed the participating teachers and students an introductory letter and questionnaires. A pilot study was conducted to make sure the survey instrument would give the researcher reliable and pertinent data. In the pilot study, questionnaires were sent to science teachers in the school in which the researcher was a teacher, which was also located in Nyarugenge District. The science teachers were asked to provide answers to the questions exactly as the participants in the actual research would do. The researcher used the information from the pilot to revise the final questionnaires that were then sent to research participants and were asked to complete them as fully as possible.

3. Results and discussion

3.1. Challenges against the successful English immersion in Rwanda

A 2009 survey conducted by the British Council identified the teacher as the weakest link in the chain of the implementation of the new language policy in Rwanda in particular and in the improvement of the educational quality in the country in general (Lynd, 2010). Therefore, the discussion below demonstrates the truth behind the statement above.

3.1.1. Low Teacher Motivation

Lynd (2010) explained that a major problem in implementing the policy was teachers' lack of motivation. The fact that teacher' salaries are lower than those of other Rwandan workers with similar qualifications sapped from many teachers any motivation to adopt a difficult policy that would not profit them. Lynd conducted a study in various African countries and found that Rwandan teachers were the lowest paid of all the countries studied and yet the pupil-to-teacher ratio in Rwanda was the highest of all the sampled countries. The ratio of pupils to teacher was as high as 67:1 in Rwanda whereas in Ghana it was 33:1.

Teachers' salaries in Rwanda were lower than those of other government employees with the same qualifications. See Tables 1 and 2.

As Tables 1 and 2 indicate, Rwandan teachers have a heavy student load and receive little compensation for their work. The inadequacy of teachers' salaries is exacerbated by the fact that teachers sometimes have to wait 2 to 3 months to get their paychecks. Some teachers feel the financial necessity of having more than one job, and some work night shifts. Because of their low wages, teachers are often not able to pay their rent on time or meet other day-to-day obligations and are thus considered second-class citizens. They cannot afford expenditures that would make their lives comfortable, and their economic plight undoubtedly affects the quality of the education they deliver. Bennell and Akyeampong (2007) observed that "low pay forces teachers to find additional sources of income" and "secondary income activities create divided attention and loyalty to teaching and impact negatively on the quality of schooling" (p. xi). In their research on teachers' motivation and incentives for teachers in Rwanda, Bennell and Ntagaramba (2008) found that low job satisfaction affected Rwandan teachers' performance. They found high teacher absenteeism; 42% of the participants in their study reported that teachers are "only available sometimes." Sickness was given as a reason for absence only 2.5% of the time, suggesting that teachers do not go to work regularly. Such conditions obviously affect the quality of education. Among the factors that depress teacher motivation is lack of professional development opportunities for teachers and the absence of any kind of school-based support. Lynd (2010) found that at the time of his research only 10% of teachers in the study had completed or were undertaking further studies in order to acquire additional qualifications; this percentage is low compared to other African countries. Moreover, only 8% of the surveyed teachers had benefited study leave.

The absence of professional development opportunities is tough because it means that Rwandan teachers do not have a chance to grow their salaries; without the potential to acquire new qualifications that might lead to promotions, teachers will see their salaries remain stagnant for the duration of their teaching careers. This state of affairs definitely impacts teacher motivation negatively. Teachers' motivation, ability, and satisfaction with the situation in which they work seriously affect their performance (Leithwood, Day, Sammons, Harris, & Hopkins, 2006; Mulkeen, Chapman, DeJaeghere, &Leu, 2007).

3.1.2. Teachers' Lack of Proficiency in English

Another factor in the success of the policy implementation is the ability of teachers to actually carry out the new language policy. The survey conducted by the British Council in

2009 (as cited in Lynd, 2010) showed that most Rwandan teachers did not have even intermediate levels of proficiency in English. The survey found that 85% of primary teachers and 66% of secondary teachers had only beginner, elementary, or pre-intermediate levels of English proficiency based on the Common European Framework for Languages. This means that in secondary schools, which are the focus of this paper, 34% of the teachers have little or no grasp of English and yet are expected to teach all their classes in that language. The in-service training in English that the government envisages cannot help these teachers because they do not have a basic knowledge in the language upon which the training builds.

In 2009, the Ministry of Education (Republic of Rwanda, MINEDUC) surveyed secondary school teachers to ascertain their backgrounds in the English language and their teaching experience. The researchers found that only 35% of the teachers had studied English formally during their secondary school education.

The remaining 65% had acquired some knowledge of English informally, either through evening classes or by simply picking up some of the language through various means.

These statistics are disturbing given the fact that these teachers are now required to transmit knowledge to students using a language they did not study in an adequate way (English). They are not equipped to teach by implementing the theory of comprehensible that suggests that teachers use the target language (English in this case) in the classroom to facilitate the flow of communication between them and their students because teachers have not received adequate comprehensible input in English themselves during their education. Commenting on the challenges of the implementation of the EMI policy, Ssenyonga (as cited in Republic of Rwanda, MINEDUC, 2009) cautioned that transforming the more than 90% of French-speaking teachers into competent users, let alone English instructors, was too overwhelming a task to complete in a short period of time. He believed that the language shift was a good idea but teachers and students should be given sufficient time to assimilate the new language before starting to use it as a medium of instruction. Several other researchers were of the same view (Lynd, 2010; Niyibizi, 2010; Norudin, Badarudin, & Mat, 2011; Nzitabakuze, 2011; Othman &Saat, 2009; Samuelson & Freedman, 2010).

The first indication of the inadequacy of the science teachers' English language proficiency was found in the participants' self-ratings of their level of proficiency in English. As Table 3 illustrates, the majority of respondents regarded themselves as "basic users." The category with the second highest number of respondents was "intermediate independent user." Only one teacher claimed to be a "proficient user." The Common European Framework of Reference for Languages (*Teacher's Guide*, n.d.), the international standard for measuring language proficiency, identifies "basic user" as the lowest of all proficiency levels. No one truly at this entry level can effectively use the language as a LoI in teaching students (See table 3 for ample details). The researcher thought that some language skills may be more challenging than others, and the various skills are likely to play differing roles in the overall process of teaching a class in a second language. The survey asked teachers to rate the level of challenge they associated with four specific language skills. Results are presented in Table 4 in the appendices.

The information that emerged from responses to this item was somewhat shocking. More than half of the participants perceived all four skills to be challenging. The most challenging skill was speaking, with 80% of respondents who reported it as challenging. Yet this skill is essential for teaching a class in any subject.   Teachers cannot provide comprehensible input to their students if they cannot use the target language extensively while teaching. This

lack of ability to establish clear communication between teachers and students blocks the progress of learning and is a source of poor student performance, especially in cognitively demanding subjects such as science and mathematics (Bellack et al., 1966; Maminta, 1985).

Writing was also perceived to be greatly challenging in a sense that 66.7% of respondents found it challenging. The productive skills (speaking and writing) appeared to be more difficult than the receptive ones (reading and writing), which means that the teachers in the study have a long way to go to bring their levels of English up to a point that would enable them to successfully implement the EMI policy. The productive skills, especially speaking, are more important in handling a class than the receptive skills. This finding is compatible with what several other researchers reported in their studies of the same issue. Those researchers consistently reported in 2010 and 2011 that primary and secondary school teachers in Rwanda were not ready for an EMI policy because their English language proficiency was too low (Lynd, 2010; Niyibizi, 2010; Nzitabakuze, 2011; Samuelson & Freedman, 2010).

In an attempt to identify as many serious impediments to the implementation of the EMI policy as possible, the researcher included an open-ended question that solicited the teachers' points of view on the roadblocks to successful implementation. The two-part question was: "Generally speaking, what do you think are the most important challenges that you face in the course of implementing the EMI language policy in your class? And what do you think can be done to address them?" The teachers were also asked to rate the challenges according to their level of gravity. From the responses, the researcher identified several themes; the responses are presented in Table 5 in the appendices.

What stands out from these responses is that the most challenging problems against the smooth implementation of the EMI policy in Rwandan rural secondary schools are the teachers' low level of English language proficiency, the students' lack of preparedness for English as a LoI, teachers' lack of job motivation, and home and school environments and a school administration not conducive to the new policy. These were named as challenges by 60-100% of the teachers surveyed. Less challenging problems, named by 40-53% of respondents, were teachers' inexperience and teachers' lack of qualifications. Less frequently cited but still seen as challenges were poor attitudes of both teachers and students toward the English language. These responses suggest that the English language *per se* is not the primary problem in policy implementation; the greatest problems lie in the preparation for using English as a LoI in the Rwandan education system.

3.2 Impact of the Challenges on Daily Teaching and Learning Activities

The challenges science teachers face in the implementation of the EMI policy obviously affect the daily teaching and learning activities in the classroom. The teachers in this study were asked several questions regarding if and how science instruction was impacted by the introduction of the new language policy. For the sake of brevity, this discussion deals only with the impact of teachers' low level of English proficiency on their science instruction, the challenge that proved to be the most serious of all and that concerned teachers the most.

When the teachers rated their ability to use the English language to communicate about science, their responses clearly showed that their teaching of science using the English language was negatively affected by their poor English proficiency. They reported serious difficulties using English to communicate with students in different classroom situations; the majority rated their skills "fair" or "poor." These were the two lowest-level options on the survey.

Even more disturbing were responses regarding the skill "speaking about sciences"; this was the most challenging skill for participants. Of the 15 teachers, 12 said they could speak about sciences at a "fair" level and 3 rated themselves as "poor." These responses are alarming because when science teachers cannot communicate with their students using the English language, the flow of communication and interaction between students and their teachers is blocked and science instruction as a whole is negatively impacted. The way the teachers' responded to their inability to use English in teaching science was to revert to using their mother tongue—the first language of both the teachers and the students—in their everyday teaching activities.As Table 6 illustrates, 67% of the teachers reported always using their mother tongue when delivering instruction and 73% always used their first language when explaining science concepts. These activities are essential to teaching science, and the teachers were not conducting them in the mandated LoI. On the other hand, they used English more frequently when disciplining students and praising them for their work, activities not very important for science instruction. (See table 6 for more details)

The finding that so many of the research participants reported seldom if ever using English to teach science indicates that low second-language proficiency is undermining implementation of the EMI policy. Lack of English skills, coupled with the mandate to teach in English, is also lowering the overall quality of science instruction. If English is to be the LoI in all content areas, teachers must use as much of it as possible to help students develop their English language proficiency as well as their ability to grasp academic content (Bellack et al., 1966). Failure to correctly use English in cognitively demanding subjects can be the source of poor student performance in those disciplines (Maminta, 1985).

Furthermore, survey responses indicate that the low level of proficiency in the English language kept the teachers from using the best practices for teaching science. When asked if they modified their lesson content to best meet the level of English of their students, 13 of the 15 teachers reported that they did not. None of the 15 participants gave any suggestion for how they could make science learning in English more enjoyable for their students. In normal circumstances, when teachers are comfortable with the LoI, they take command of the subject content and adjust what is supposed to be taught to the needs and abilities of their students in order to make the overall learning experience enjoyable and profitable. Several scholars have pointed out the benefits of modifying lesson content to meet the needs of all learners (Comfort, 1990; Moon & Callahan, 2001; Reisberg, 1990; Switlick, 1997).

In the case under investigation, however, teachers could not take command of the subject content; they had to deliver to students the content of the national curriculum, which was in English, word by word, line by line, without any modification. Their level of English was too low to enable them to modify the lessons written in a language in which they were not conversant. The inability of the educators to employ best practices likely made the teaching experience frustrating to the teachers and the learning experience confusing to the students.

3.3 Strategies Adopted to Address Challenges to Implementation of the EMI Policy
In addition to identifying the challenges to policy implementation, the researcher explored the strategies science teachers used to overcome the challenges. Because the greatest hindrance to the success of EMI was inadequate knowledge and skill in English, the researcher focused on strategies the teachers adopted to improve their proficiency in the English language. Participants were asked to list all activities in which they engaged specifically for the purpose

of increasing their English language proficiency. The teachers' responses revealed that they engaged in various activities aiming at improving their proficiency in the English language. The most common activity was "independent reading of grammar books." Of the 15 teachers surveyed, 14 indicated that they frequently sought help from grammar books. This response shows how desperate the teachers were in their quest to know how the English language works. This activity is not the most effective one for learning or mastering a language, but it is the cheapest option, the option most teachers were able to access.

The second most frequently reported activity was "attending English language schools after work"; 13 of the 15 participants said they attended such schools. This activity appeared to be the most appealing to the teachers, and it is the one most likely to help them improve their English. Although the quality of the instruction varies considerably from school to school, some private evening schools offering courses in English have very competent professional teachers. However, this option is expensive and difficult. A full-time secondary school teacher in Rwanda works 8 hours a day, Monday through Friday, and following a course of study in addition to managing such a teaching load is taxing. Besides, few secondary school teachers can easily afford private schooling on their meager salaries.

The activity one might expect to be the most frequently used was "attending all the public trainings in the English language." The government has organized training sessions to help teachers raise their levels of proficiency in English. The sessions are free and are held during holidays when teachers are likely to have time away from other commitments. Surprisingly, however, 6 of the 15 teachers had not attended any of the public English language trainings.
None of the participants reported using "independent reading of newspapers in English" as an activity for improving their English proficiency. This finding probably reflects the scarcity of print materials in English in the rural areas. Teachers in rural parts of Rwanda, like those in many other African countries, have little exposure to English. This finding is consistent with the research of several others (Adedeji&Olaniyan, 2011; Bennell&Akyeampong, 2007; Samuelson & Freedman 2010).

4. Conclusion and recommendation for further research
This research investigated the challenges faced by rural Rwandan secondary school science teachers in the implementation of the nation's EMI policy. Specifically, the researcher sought to identify the challenges, to investigate how they affect rural secondary school science teachers' everyday teaching activities, and to explore strategies adopted by the teachers to address and overcome the challenges in order to make the English language immersion in the Rwandan education system a success. Some government provided supports in the very effort was also discussed.

The findings from the case study show that Rwandan rural secondary school science teachers face several challenges as they attempt to implement the EMI policy in their everyday teaching and learning activities. The most important challenges were found to include but not be limited to teachers' and students' low levels of proficiency in the English language; teachers' lack of job motivation; and school administrations, school environments, and home environments not conducive to the use of English as the LoI. These challenges were found to negatively affect the efficiency and quality of the science instruction in general. In fact, the science teachers in the study, being unable to use English in their respective classes all the time, tended to use their first language instead, seriously affecting the overall quality of science teaching and learning in their classes in particular and in Rwanda in general.

In addition, the researcher found that the teachers were unable to adapt lesson content to best fit learners' profiles and needs and were thereby unable to make the teaching/learning experience enjoyable. The primary reason the teachers could not modify the lesson content was that the lessons were written in a language in which they are not proficient.The research also revealed that teachers engaged in various activities to address some of the impediments to implementation of the EMI policy, especially their low English proficiency, which proved to be the most challenging of all. The activities they used, in order of frequency, were independent reading of English grammar books; attending English language schools after work; attending government-provided public trainings in the English language; independent reading of novels, short stories, or nonfiction in English; and trying to use English in everyday activities.

Basing on the finding above, it may be concluded that the success of the English immersion in the Rwandan education system still face very serious challenges. This would generally result in the overall decrease of the quality of education in Rwanda and a combined effort (teachers, students, the government of Rwanda and all other educational stakeholders) is needed to completely overcome these challenges.

Another research is highly recommended especially to deal with the obvious limitation of the current study, which, due to time and spatial constraints, did not make use of triangulation in the process of data collection. A more thorough research is needed whereby the researcher would use tools such as interviews and direct classroom observation, which are effective and efficient research tools that are likely to aid a deeper understanding of what is happening on the ground.

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Appendices

Table 1. *Number of Pupils per Teacher in Selected African Countries in 2008*

Country	No. Pupils
Rwanda	62-67
Benin	47
Burkina Faso	50
Burundi	54
Eritrea	47
Ghana	33
Kenya	40
Madagascar	48

Note. Adapted from "Assessment Report and Proposal for an Education Strategy (USAID/Rwanda report)," by M. Lynd, 2010, p. 16, retrieved from http://pdf.usaid.gov/pdf_docs/PNADY121.pdf

Table 2 *Monthly Salaries of Teachers and Other Civil Servants inRwanda*

Qualification	Teacher	Other
Bachelor's degree	113,000RwF (USD 173.84)	200,000RwF (USD 307.69)
Diploma	89,000RwF (USD 136.92)	144,000RwF (USD 221.53)
Certificate	27,012RwF (USD 41.55)	80,012RwF (USD 123.09)

Note. Adapted from **"**Assessment Report and Proposal for an Education Strategy (USAID/Rwanda report)", by M. Lynd (2010), p. 17, retrieved from http://pdf.usaid.gov/pdf_docs/ PNADY121.pdf

Table 3   *Distribution of Study Population by TeachingExperience*

Teaching Experience (in Years)	No. of Teachers	Percent of Total
Less than 1 year	2	13.4
2-3 years	8	53.3
4-5 years	5	33.3
6-10 years	0	0
More than 10 years	0	0
Total	15	100.0

Table 4   *Distribution of Study Population by Level of Education*

Level	No. of Teachers	Percent of Total
Master of Science	0	0
Bachelor of Science	12	80
A1 (Sciences)	3	20
D7	0	0
D6	0	0
Total	15	100

Notes. A1 = 2 years of university education; D7 = Secondary school diploma
with 1 year internship; D6 = Secondary school diploma

Table 5 *Teachers' Self-reported English Language Proficiency*

Proficiency Level	No. of Teachers	Percent of Total
Basic user	10	66.7
Intermediate independent user	4	26.6
Proficient user	1	6.7
Total	15	100.0

Table 6   *Teachers' Perceptions of Difficulty of Selected English Skills (N =15)*

Skill	No. Rating as Challenging	No. Rating as Somewhat Challenging	No. Rating as Not Challenging	% Rating as Challenging
Speaking	12	2	1	80
Writing	10	4	1	67
Listening	9	3	3	60
Reading	8	3	3	53

Biography:

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