"The role of Headmasters in the successful implementation of One Laptop per Child: A case study in Rwanda"

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Abstract: This paper evaluates the role of headmasters/mistresses (HMs) in the successful implementation of the One Laptop Per Child (OLPC) program in Rwanda. Research was conducted in 11 schools and revealed the important role of HMs. Thorough information, clear policies, and effective communication channels were found to be essential in ensuring the success of the program as HM understandings and perceptions directly impact the way that they implement the program at the school level.

A desired HM development path was revealed: HMs must view the program with high importance. This then motivates them to implement the program and, if possible, use creativity to solve challenges at the local school level. HMs following this development path are building constructive initiatives in their schools in contrast to those who view the program with less importance. Creativity was found to be the most important factor for ensuring the success of OLPC Rwanda.

Introduction:

The introduction of computer technology in learning requires a dramatic transformation of schools and this complex, difficult, and non-linear process requires commitment and support from all members of the education community (headmasters, teachers, students, parents, Government, etc.) (Demetriadis, et al., 2003: 20, Papert, 1993: vii, Urrea, 2007: 3). Recent research has begun to recognise and emphasise the important role of headmasters/mistresses (HMs) in this transformation process and has identified the following conditions required for the successful implementation of ICT in education (OECD, 2001: 90):-

HMs and teachers must value technology in education so that they are willing to adapt to it: The attitude of school staff, in particular teachers, is often the biggest challenge when attempting to integrate ICT in schools; many teachers fear new technologies, fail to understand its role in the classroom, and resist pedagogical change (Bottino, et al., 1998: 166, Demetriadis, et al., 2003: 20, OECD, 2001: 88). Scholars therefore emphasise the need for HMs and teachers to recognise the value of technology in education so that they are willing to adapt to it (ibid).

HMs need to be recognised as key players in the process: According to scholars, the successful implementation of technology in education largely depends on 'highly motivated pioneering principals' who are responsible for managing and sustaining decisions which will, or will not, enable the use of new technologies (Demetriadis, et al., 2003: 21). They are also the ones who can 'persuade and give confidence to all involved – teachers and learners, parents and others in the school and community' (OECD, 2001: 16). HMs can potentially encourage and enable change, rather than resisting it, and must be supported accordingly (see below).

HMs need to be supported according to their specific needs: Once HMs are committed to change, and once the laptops and infrastructure are in place, HMs need to be supported by the parties involved so that they are able to accomplish the program's goals (Bottino, et al, 1998: 165-170, Demetriadis, et al., 2003: 29, OECD, 2001: 92). This support needs to be both pedagogical and technical and varies country to country, depending on factors such as the goals of the project and availability of resources.

Research Questions

Throughout the research process, the following research questions were explored:-

- What previous knowledge do HMs have about OLPC Rwanda's program and policies?
- What are HM reactions and perceived implications (challenges/successes) to receiving XO laptops and how do their attitudes affect the success of the implementation?
- What kinds of actions or processes are HMs currently taking to implement the program at the school level?
- How does the HM experience compare between urban, semi-urban, and rural schools?

Methodology

Semi-structured interviews were used to gather information from HMs as they allow an 'easy framework for discussion' without being too rigid (Bauer and Gaskell, 2000: 40). Semi-structured interviews also enable a logical progression through a set of issues with the advantage of being able to 'probe beyond the questions' asking interviewees to clarify or elaborate their responses when necessary (May, 2001: 123). Personal survey questions and informal interviews were also used to gather background information and cross check HM responses.

The Participants: The target population was male and female Rwandese headmasters/mistresses (HMs) working in schools with XO laptops. In total, 11 HMs were interviewed: six male and five female in order to represent each gender as fairly as possible.

The Schools: Research was conducted in a selection of public and private schools which had received XO laptops between the years 2007–2011. Public schools were the main focus since OLPC aims to reach the poorest children in the world. Out of the 11 schools selected, ten were public and one was private. The schools were selected from different provinces in Rwanda and were situated in urban, semi-urban, and rural areas to sufficiently represent the country's wide variety of contexts. In the recent deployment to 113 schools, 83% of the schools were rural whereas only 9% were semi-urban and 8% were urban. For this reason, the majority of schools visited were rural: six schools were rural, four were urban, and two were semi-urban.

Findings

Headmaster/Mistress (HM) Knowledge

Previous HM knowledge on the goals of OLPC in Rwanda: Despite attending the same national trainings, HMs were found to differ in their understanding and prioritization of the program's goals:

Teaching ICT: Out of the 11 HMs interviewed, eight think that one of the major goals of the program is to teach students ICT, since their Government's development vision focuses heavily on technology. These HMs said that it is important for students to become comfortable with, and learn skills in, ICT from a young age in order to improve their future opportunities and that is why Rwanda's Ministry of Education (MINEDUC) are providing primary school children with laptops. Three of these HMs were from urban schools; three were from rural schools; and two were from semi-urban schools.

Improving and modernizing education: Almost half of the HMs interviewed (5/11) perceive the program as a means of improving and modernizing education, for example H7 said that XO laptops are designed to help teach students their lessons in an easier and more interesting way and to eventually replace the blackboard (interview 7). Three of these HMs were from rural schools, one was from an urban school, and one was from a semi-urban school.

Research tool: A fewer number of HMs (3/11) think that one of the key goals of the program is to allow students the opportunity to do their own research and consequently expand their knowledge. All of these HMs work in urban schools and emphasized the need for a wireless internet connection. H1 said that accessing the internet is the most important reason for receiving laptops and as her school is not yet connected she is unable to implement the program fully (interview 1).

A lack of understanding: One HM from the recent deployment (H4) said that he has no understanding of the program whatsoever, despite attending a national training for teachers and headmasters (interview 4). None of the HMs interviewed demonstrated a pedagogical understanding of the educational change at hand.

Previous HM understandings of Rwanda-specific OLPC policies

Since the training of teachers and HMs only started recently for schools from the recent deployment, and since MINEDUC were, and still are, developing policies for the OLPC program, it is perhaps unreasonable to expect HMs to fully understand either their role or the policy for OLPC in Rwanda at this point. Nonetheless, it is important to understand the perspective of HMs and so they were asked to explain their understanding of OLPC policies. To date, none of the HMs are aware of a clear policy, with the exception of a paragraph in the Community Awareness booklet stating that they are responsible for the security of laptops.

The source of HMs' knowledge

When asking HMs from where, or from whom, they receive OLPC related information, a significant rural-urban divide was revealed. While all of the urban school HMs, and one of the semi-urban school HMs, said

that they receive information from MINEDUC directly (and consistently mentioned a teacher training booklet which they are following), four out of five of the rural school HMs said that they get most of their information from other OLPC schools in their areas. Interestingly, the fourth rural school HM commented that he doesn't know anything about the program, apart from hearing about a pilot school on the radio (interview 4).

HM Attitudes and Perceived Challenges and Successes

Level of importance attributed to the program: Past research has claimed that HMs need to value technology in education in order to adapt to it (Bottino, et al., 1998: 166, Demetriadis, et al., 2003: 20, OECD, 2001: 88). When asking HMs if they think the program is important for Rwanda seven said that they think it is very important (2 urban, 2 semi-urban, 2 rural), whereas three think that it is quite important (2 urban, 1 rural) and one thinks that it is unimportant and should not be a priority (rural).

Table 1: A table illustrating which HMs view the OLPC program as being "very important", "quite important", and "unimportant".

HMs who view the OLPC program as being "very important"	H2, H3, H5, H7, H8, H10, H11
HMs who view the OLPC program as being "quite important"	H1, H6, H9
HMs who view the OLPC program as being "unimportant"	H4

Perceived successes and challenges

All of the HMs interviewed said that teachers, parents, students, and they were initially very excited for their school to receive the OLPC program. HMs expect, or expected, the program to open the minds of their students; to develop students' ICT skills, and to modernise the school and community in general. While the majority of HMs from the 2010-2011 deployments remain optimistic (and are putting great expectations on the approaching teacher trainings), HMs from the 2007-2009 deployments expressed a low level of motivation towards the program as, according to them, they have faced major issues, most specifically:-

A lack of effective teacher trainings: All of the HMs said that their teachers don't feel confident enough to integrate the laptops in their classes yet as they have not received enough good quality training. This included schools that have already received teacher training, suggesting that it was not effective. Rwandese HMs also complained that their teachers don't have enough lesson plans or other such documents that can guide them in their implementation of the program.

A lack of access to spare parts and technical assistance: Past research has suggested that a lack of technical support leads to significant problems (Demetriadis, et al., 2003: 30). In Rwanda, the issue of accessing spare parts and technical assistance was found to be a major problem in both public and private schools; H2 and H11 both complained that they are not receiving this kind of support when required (interviews 2 and 9). This is restricting public school students and teachers from using the laptops, while in private schools parents no longer want to buy them.

This issue also arose as a predicted challenge in rural schools from the recent 2010-2011 deployment; H4, H7 and H9 all expressed concerns that employees from Kigali will take a long time to respond to their technical needs as they are based in rural areas outside of the city (interviews 4, 7, and 9). Essentially, this demonstrates two things: a lack of clear policy regarding laptop repairs and maintenance and a lack of efforts to work with the community to minimise breakages.

Issues of laptop security: H10 initially allowed her students to take their laptops home but returned them to storage after having to deal with the burden of thirteen stolen laptops (interview 10). H1and H2 also said that they have experienced theft at their schools; one laptop was stolen from each school towards the beginning of the program (interviews 1 and 2). Security concerns are also affecting the decisions being made by HMs from the recent 2010-2011 deployment (see table 4).

HM Action

General laptop usage in classrooms and at home: Rwandese HMs are responsible for decisions such as whether students can take laptops home and they also play an important role in encouraging their teachers to integrate the laptops in their classes. In order to better understand and assess this process for HMs, it is important to understand how the laptops are currently being used and the reasons why. This will also enable future researchers/evaluators to measure the improvement of schools over time.

Table 2: A Table explaining current laptop usage in urban schools (all of which received laptops in the initial 2007-2009 deployments)

HM number according to Appendix 1	Are students using laptops in the classroom?	Reason why students are/are not using laptops in the classroom	Are students taking their laptops home?	Reason why students are/are not taking their laptops home
H1	Yes, but this is limited: only classes that don't have a lesson between 11-11:45 use their laptops and this only happens once a week.	The school has not achieved 1:1 laptop ownership, despite there being enough laptops for all P4-P6 students. The HM was originally told that all students would receive a laptop; when this changed to P4-P6 students only, she decided to create a shift system so that every student can still access a laptop, at least very occasionally.	No – but the HM thinks that they should.	The issue of 1:1 ownership. The HM has not yet resolved security concerns.
H2	Yes. Students use their laptops for two hours a week: for one hour on Wednesdays and for one hour on Fridays.	The HM said that his teachers still need more training in order for them to fully integrate the laptops but they are trying.	Yes	It is a private school which means that students purchased and own their laptops.
H6	No	The HM has, until recently, refused to use the laptops as the school did not receive one laptop per child "as promised" (interview 6). The school recently received an additional 1,700 laptops, achieving saturation for grades P4-P6 and the HM is now planning how the laptops can be used.	No – but the HM thinks that they should.	The school has only recently received enough laptops for every P4-P6 student to have their own laptop. He is now in the process of resolving security concerns.
H10	Yes. Students have one hour a week for using their laptops.	The HM thinks that students should "learn laptops" as they learn other subjects and is waiting for MINEDUC to include them in the official timetable and curriculum.	No – but the HM thinks that they should	Students were taking their laptops home but after 13 were stolen the HM decided to return them to storage.

Table 3: A table explaining current laptop usage in semi-urban schools (H8 received laptops in the recent 2010-2011 deployment and H11 received laptops in the initial 2007-2009 deployments)

HM number according to Appendix 1	Are students using laptops in the classroom?	Reason why students are/are not using laptops in the classroom	Are students taking their laptops home?	Reason why students are/are not taking their laptops home
H8	No	HM said that they are first waiting for the teacher training.	Yes	See 'HM Initiative 3', page 5
H11	Yes. The HM understands that the laptops can be used to assist all lessons: "You don't have a lesson for laptops. Instead, you use the laptops in all lessons". (interview 11).	The HM understands the program and has received support from early MINEDUC trainings and their partner OLPC Rwanda	Yes (in term time only)	The HM understands the benefits of taking laptops home. She said: "Taking laptops home is very difficult but that's what the program needs. If students don't take their laptops home they can't explore beyond the classroom. Children learn some things from teachers but learn more from exploring themselves"

				(interview 11).

Table 4: A Table explaining current laptop usage in rural schools (all of which received laptops in the recent 2010-2011 deployments)

HM number according to Appendix 1	Are students using laptops in the classroom?	Reason why students are/are not using laptops in the classroom	Are students taking their laptops home?	Reason why students are/are not taking their laptops home
H3	No	HM said that they are first waiting for the teacher training.	Yes	See 'HM Initiative 2', page 5
H4	No	HM said that they are first waiting for the teacher training. The school is also waiting for MINEDUC to finish wiring the required classrooms.	No – but the HM thinks they should.	The HM has not yet resolved security concerns.
H5	Yes	The school has received its teacher training.	Yes	The HM wants her school to be the best OLPC school! She resolved security concerns by asking teachers to create a list of students and their laptop serial numbers.
H7	No	HM said that they are first waiting for the teacher training. The HM has also been working hard in the preparation phase first (see 'HM Initiative 1', page 5).	No	The HM thinks that "it is not necessary for students to take their laptops home" (interview 7).
H9	No	HM said that they are first waiting for the teacher training	No – but the HM thinks they should	The HM has not yet resolved security concerns

The differences in HM perceptions, attitudes and understandings of the program presents an opportunity to define clear policies, to conduct further (or initial) HM training, and to give HMs the important place that they need within the program.

HM Initiatives

Below is a list of current HM initiatives, all of which are happening in rural or semi-urban schools that received laptops in the recent 2010-2011 deployment:

HM Initiative 1: H7 (rural) is working with an organization of local prisoners to design and construct cheap and reliable power bars after recognizing that others had been failing at a high rate (interview 7). The HM has also created an inventory system for tracking the laptops (ibid).

HM Initiative 2: H3 (rural) is solving the issue of unaffordable power bars by employing local workers to build cheaper ones made externally from wood (interview 3). The HM is also allowing students to take their laptops home; he is opening the school at weekends so that students can charge their laptops and is organising sessions for students to share their knowledge (ibid).

HM Initiative 3: H8 (semi-urban) has allowed students to take their laptops home, providing that their parents pay RWF 500 (less than $1) towards electricity costs each term (interview 8). The HM made this arrangement with parents before receiving the laptops and implemented it three days after; parents and students had their photos taken with their laptops, promoting a sense of pride, ownership, and responsibility for the laptops. The photos were taken as evidence of who took laptops home and a book was created containing the names, districts, sectors, and other information about these students. The HM also asked parents to buy their children a small bag for their laptops to protect them from being damaged (interview 8). To date, no laptops have been stolen or are otherwise missing from students at this school, suggesting that when HMs promote parental and student commitment and involvement in the program, security becomes less of a barrier. This is supported by findings

from XO schools in Nepal; since taking laptops home, there have been no thefts as children and parents value the laptops and protect them accordingly (One Laptop Per Child, 2001: official website).

Discussion

From the research findings, it is unequivocal that HMs play a key role, which is different from that of teachers, in the successful integration of technology in learning, including the implementation of the OLPC program in Rwanda (Demetriadis, et al., 2003: 21, OECD, 2001: 16). Rwandese HMs are in charge with all specifics of the OLPC project at the school-level including the distribution of laptops to students, organization of inventory, and decision of child ownership. HMs are the ones responsible for encouraging teachers to integrate XOs in their lessons; they are also the ones who have the potential to persuade communities, and especially parents, to value the program and care for the laptops' management. Considering this, it is important for MINEDUC and other OLPC countries in general, to work with and plan specifically for the needs of HMs; they have different needs and concerns than teachers and need to be supported accordingly.

Throughout the research process, it was found that, in order for HMs to fulfil their essential role and ensure the program's success in their school, the following inter-connected factors are required:

Communications: misinformation, a lack of clear information, and documents

The findings of the study show that a clear understanding of OLPC's objectives and policies is crucial for HMs to successfully implement the program while, in contrast, a lack of information, or misinformation, can lead to reduced motivation, a general lack of action from HMs, and, overall, a less successful implementation of the program. When conducting research, the following major obstacles were found to hinder HM understandings:

Misinformation: As displayed in the findings, some schools are not using their laptops, or are using them in less meaningful ways, because of initial misinformation. An early case of this comes from schools of the 2007-2009 deployments that were originally promised full saturation (see table 2). When this changed to P4-P6 students it was never fully communicated to a majority of HMs. One example is a HM who refused to use the laptops because the school did not receive one laptop per child as they were originally "promised" (interview 6). This HM is currently waiting for their "full shipment" before use (ibid). Another example is a HM who understood the change in policy but nonetheless decided to include every student by creating a shift system (interview 1). Students at this school consequently access laptops very occasionally rather than achieving the OLPC principles of child ownership and saturation (of Grades 4-6 in Rwanda). Perhaps if the HM was aware of these OLPC principles (which she was not) and, more importantly, the reason for the policy, she would have made a different decision, emphasising again the importance of clear and thorough information and the need to establish an effective communication channel between MINEDUC and HMs (and schools in general).

Misunderstanding of the program's goals: As discussed in the findings, HMs differed in their understanding and prioritization of the program's goals. HMs' understandings of OLPC in Rwanda are affecting the way that they engage with the program, for example one HM who views the program as an ICT project consequently wants students to "learn laptops" as they learn other subjects - rather than allowing students to use laptops in all lessons (interview 10). This limits students' use of, and time with laptops. A more extreme example occurred in the HM who said he has no understanding of the program (interview 4). This HM is also the one who does not view the program as a priority which demonstrates, once again, the connection between understanding, valuing, and being motivated to create good initiatives for the program.

Unclear policies and the role of HMs: As discussed in the findings, HMs are not aware of a clear policy; HMs are unsure about whether students should take their laptops home and, if so, how to deal with that logistically, including security issues and encouraging and advising teachers and communities on the project. This is resulting in a lack of action from many HMs, and consequently teachers, who are waiting for more information and instruction before proceeding with the program (see tables 2, 3, and 4). A concise policy that outlines the role of the HM in the project is therefore needed for HMs to clearly understand what is expected from them in order to lead the project to success. This policy should include a reference document that each HM can consult in order to easily update their knowledge and responsibilities. Some of the key roles that might be included in this policy are:

- To decide if students will take home their laptops and coordinate the related logistics
- To devise a plan to maintain the security of the laptops both inside and outside of school
- To create an organizational chart related to the project inside the school and encourage and motivate the roles of the chart participants
- To create or provide ideas around the evaluation and assessment of the teachers and project, more generally, and report these findings to MINEDUC

- To create conditions for approaching the community to generate innovative and effective strategies to support and take full advantage of the project.

Access to appropriate technical support: The lack of access to spare parts and guidance on how to access technical assistance is reducing HM and teacher motivations and is affecting the program at the school-level since the school does not have any spare parts and the exact number of laptops for students. This is supported by past research which argues that a lack of technical support leads to significant problems (Demetriadis, et al., 2003: 30). It is also widely known that XO laptops experience easily addressed and ongoing bugs that need ongoing support even though there is no guidance for neither HMs, teachers, or students of the community on how to address these issues or to create local capacity. This issue needs to be addressed as it stops the program from being sustainable at the school level; HMs will remain dependent on MINEDUC rather than being given the tools to solve their own challenges.

Documentation: The research findings suggest that documents and instructions are very important to Rwandese HMs, for example when asking them about their initial training from June 2010 in Kigali, the only outcome that was consistently mentioned was the training booklet, which they said they are following.

Every official OLPC program has a site which contains guides and lesson plans to help teachers integrate "XO" laptop activities in their teaching and in students' overall learning process. Support documents, lesson plans, and other educational materials have also been used for HMs and/or teachers in other countries when introducing technology in learning, for example the Japanese Ministry hired educational experts to create documents and examples for schools to use in the initial stages (ibid). Furthermore, in Sweden the Foundation of Knowledge and Competence Development launched 'a data base of educational material'; available both online and on CD-ROM and including teachers' reviews after using them in the classroom (OECD, 2001: 50). Considering this, it would make sense for the trainings of HMs – and teachers – to be focused around the right use and navigation of specific and effective documents. These documents can be presented to HMs together as a tool kit which can be referred to at any time and should be accompanied by other strategies including clear policy, HM-specific training and ongoing school support.

Headmaster Development Path: high importance, motivation, and creativity

From the findings, a desired development path for HMs in Rwanda was revealed. First HMs must view the program with *high importance.* This then *motivates* them to carry out the goals of the program and, if possible, to employ *creativity* to solve issues at the local school level. HMs who are following this development path are building constructive initiatives in their schools, as outlined in the findings (see "HM Initiatives", pg. 5). In contrast, HMs who view the program with less importance display little motivation and, therefore, will not create or promote the creation of localized initiatives that are paramount for the success of the program. Examples of these HMs include one from the recent deployment who thinks that the program should not be a priority (H4) and, therefore, has not yet removed the laptops from their boxes; he is waiting for the teacher training and other help from MINEDUC rather than creating his own additional initiatives in the meantime (interview 4, see table 4).

Another example is a HM who views the program with importance but, after dealing with the burden of 13 stolen laptops, has returned the laptops to storage (interview 10). Other reasons for losing motivation included a lack of appropriate technical and/or pedagogical support. These examples demonstrate the importance of motivation; HMs need to be encouraged and supported from the government side through strategies such as recognizing HMs that engage in positive initiatives and creating useful examples for other OLPC schools. This strategy has been employed by Italy's Ministry of Education who launched a competition to identify 100 of its schools able to lead in the development of multi-media educational materials (OECD, 2001: 46). In the UK a major initiative, the National College for School Leadership, was established in 2000, 'to provide professional qualifications for HMs, and an on-line community for discussion and debate, with links to esteemed school leaders internationally' (OECD, 2001: 90). These kinds of initiatives make schools feel involved in the program, act as incentives for producing high quality outcomes, and allow members of the academic community to learn from others. It is also essential that HMs receive training which is specific to their needs, for example Norway and Ireland have both developed national programmes and courses to support HMs' role (OECD, 2001: 90).

Headmaster Development

Creativity was found to be the most important factor in ensuring the success of HMs, and in turn the program: HMs can understand and value the program; they can be motivated for the program; they can receive the logistical support that they need to run the program, but this does not necessarily mean they will take the creative actions required to provide local solution to challenges, especially in a system that is very rote and hierarchical. This is supported by Demetriadis, et al. (2003: 30) who argues that HMs require a considerable degree of flexibility and creativity for dealing with problems at the local-level. Creativity workshops for HMs

would be a valuable addition to their training. Helping the HMs to work in a creative way and also to understand how to encourage, motivate and follow their teams is a valuable set of skills - almost a requisite for HMs as leaders in their communities.

A Rural-Urban Comparison

During the analysis, one significant rural-urban divide was identified, i.e. rural schools tend to get their information from informal networks, whereas urban and semi-urban schools get all of their information from MINEDUC. Clear communications should also be established with rural schools and perhaps the informal networks could be used to assist this.

Other than this, it was not possible to compare rural, semi-urban and urban schools at this point as all of the rural schools are in the initial stages of the program. However, interestingly, the findings at this point lean towards the opposite of the mainstream findings which argue that schools furthest away from urban centres implement less quality programs of this kind (Dyer, 1996: 7, Mitra, 2008: 168, United Nations, 2010: 22-25). In Rwanda's case, the schools creating the most interesting and constructive initiatives are from rural and semi-urban locations. Follow up research would be necessary to fully understand this question, however.

References

Bauer, M. and Gaskell, G. (2000). *Qualitative Researching with Text, Image and Sound.* London: Sage.

Bottino, Rosa Maria, Forcheri Paola, and Maria Teresa Molfino. (1998). "Technology transfer in schools: from research to innovation", *British Journal of Educational Technology.* 29:2 (163-172)

Demetriadis, S., Barbas, A., Molohides, A., Palaigorgiou, G., Psillos, D., Vlahavas, I., Tsoukalas, I. and A. Pombortsis. (2003). "Cultures in Negotiation": teachers' acceptance/resistance attitudes considering the infusion of technology into schools", *Computers and Education.* 41: 1 (19-37)

Dyer, C. (1996). "The Improvement of Primary School Quality in India: Successes and Failures of Operation Blackboard", *Education and Sociology: School of Social and Political Studies.* University of Edinburgh: 4.

May, T. (2001). *Social Research: Issues, methods and process.* Glasgow: Open University Press.

Mitra, Sugata. (2008). "Effects of remoteness on the quality of education: A case study from North Indian schools", *Australasian Journal of Educational Technology*. 24: 2 (168-180)

OECD (Organisation for Economic Co-operation and Development). (2001). *Learning to Change: ICT in Schools (Centre for Educational Research and Innovation).* Paris: OECD Publications.

One Laptop per Child (Official Website). (2011 cited): www.laptop.org

Papert, Seymour. (1993). *Mindstorms: Children, Computers, and Powerful Ideas.* New York: Basic Books.

United Nations. (2010). "The Path to Achieving the Millennium Development Goals: A Synthesis of MDG Evidence from Around the World", *United Nations Development Program:* http://www.scribd.com/doc/34945474/MDGs-Assessment-2010

Urrea, C. (2007). "One to One Connections: Building a Community Learning Culture", Massachusetts Institute of Technology: http://pubs.media.mit.edu/pubs/papers/ClaudiaUrrea-PhDThesis.pdf

Interviews:

Interviews 1-11: HM interviews took place between the 16/03/2011 – 20/03/201. Interviews were translated from Kinyarwanda to English by Research Assistants Ndikumana Adrien, Rwagaju Desire and Tuyishimire Jean Claude.