Transforming Society Through Access to a Modern Education

Map of Rwanda with Provinces and Districts
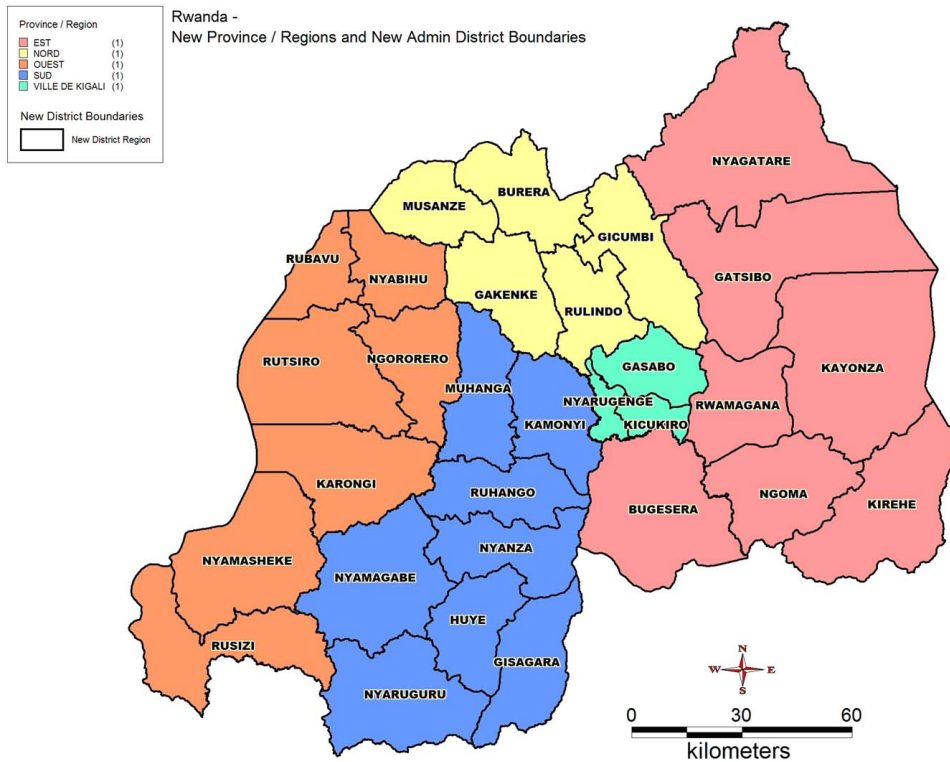
Key Demographics Statistics

2011 Population[1]	10,718,379
2010 Gross National Income per Capita[2]	US$ 1,190
Total Adult Literacy Rate[3]	70% (2005-2009)
Language	Kinyarwandan, English (official language as of 2008), French, Swahili
Primary School Age Children[4]	2+ million
Number of Primary Schools[5]	2,295 (601 public; 1,627 subsidized; 67 private)
Survival Rate to Last Primary Grade (P6)[6]	31%
Mean Years of Schooling[7]	3.3 years
Secondary School Enrollment (gross)[8]	68%
Primary School Teachers[9]	39,274
Average Class Size[10]	49 students

OLPC Statistics

OLPC Start Date	1st pilot at end of 2007
XO laptops deployed as of 10/1/2011	110,000
Full-time OLPC Staff	5
Ministry of Education OLPC Core Team	27

Background

Rwanda, a small landlocked country in East Africa, is in the midst of a multi-year effort to transform itself from a subsistence agrarian society into a knowledge-based economy. The country is striving to overcome the devastation caused by the genocide of 1994 during which an estimated 800,000 people lost their lives and two million others fled their homes. On top of the tragic loss of human resources, Rwanda – unlike other African nations that are rich in minerals or oil – lacks saleable natural resources and easy access to the sea for transport of goods. According to the United Nations 2010 Human Development Index, Rwanda ranked 152 out of 169 countries.[11]

In 2000, under the leadership of His Excellency President Paul Kagame, the government of Rwanda established a set of objectives to transform the country into an industrial/services-based economy in 20 years. The VISION 2020[12] plan specifies short-, medium- and long-term goals with measurable indicators of progress. Key to this plan is six underlying pillars: the second pillar being human resource development and a knowledge-based economy. The plan also has three horizontal areas: the third being science and technology, including Information and Communications Technology (ICT).

In order to achieve the goals defined by VISION 2020, the Rwandan government established an Economic Development and Poverty Reduction Strategy.[13] The EDPRS recognizes the key role that education can play in improving social and economic wellbeing and in reducing poverty. Only a well-educated workforce with the necessary skills to operate in a rapidly changing business environment will allow Rwanda to become the competitive and diversified economy it aspires to be.

The EDPRS's high-level objectives for education are to improve and increase access to education for all; provide quality education at all levels; establish equity in education at all levels; develop effective and efficient education systems; promote science and technology and ICT in education; and promote positive values, critical thinking, Rwandan culture, peace, unity and reconciliation.

Finally, the Education Sector Strategic Policy[14] (ESSP) and the National Information

Communication Infrastructure[15] (NICI) plans provide an ICT policy for Rwanda and a framework for bringing technology to Rwandan schools. These governmental plans recognize that the children of Rwanda are the nation's most precious natural resource.

What progress has there been in Rwandan primary school education since the launch of VISION 2020 a decade ago? According to the Ministry of Education, enrollment is nearly universal; completion rates have risen from 53% to an average of 75%; class sizes, while still large, are shrinking along with the student-teacher ratio (from 74:1 to 65:1).[16]

In terms of ICT integration into education, there has been steady progress with more work ahead. In 2001, only one of the country's 2,300 primary schools had even a single computer. As of 2005, 1,138 schools had at least one PC; 40 schools in Kigali had Internet access and connectivity was being rolled out to schools in other regions. About 1,000 teachers had been trained in computer literacy and deployed in 120 primary schools.[17]

With the overarching objective of disseminating ICT throughout all educational institutions in order to equip learners with 21st century skills, the government is focusing on expanding its ICT infrastructure to provide widespread access to power, connectivity and equipment; developing capacity by training teachers how to integrate ICT into teaching practices; developing and distributing digital content that is adapted to the Rwandan context; and strengthening partnerships to encourage participation of local institutions and civil society in ICT in education.[18]

The remainder of this case study will examine how the Ministry of Education (MINEDUC) is working with One Laptop per Child (OLPC) to meet these objectives.

XO Deployment in Rwanda

The government of Rwanda officially announced its commitment to working with One Laptop per Child in January 2007.[19] In late 2007, 750 pre-production XO laptops were distributed to 11-12 year-old children (grade P5) at the Rwamagana B primary school in a rural area about two hours east of Kigali. This first phase focused on setting up technical infrastructure and observing the children's interactions with the laptop.

The Rwamagana initiative resulted in a reduction in the number of students missing classes; increased student engagement in searching for information for schoolwork; and greater family involvement in the day-to-day education of children. Furthermore, the parents wanted to learn from their children how to use the laptops for themselves.[20]

Based on these positive outcomes, the government committed to a much larger program involving 10,000 XO laptops. These were distributed in late 2008 to a mix of 22 public and private schools across all five of the country's provinces. Presiding over an October 2008 ceremony to launch this phase, H.E. President Kagame said, "Our goal is to continue raising means and ways to provide all primary school children in Rwanda with this important learning tool."[21]

Also in October 2008, the government changed the official language in schools from French to English starting with grade P4. Providing English language content on the laptops supports this strategy.

In early 2010, the Rwandan government purchased the next tranche of 65,000 XO laptops so that at least five schools (152 in total) in all of the country's districts could receive laptops for P4-P6 students.

The purchase was financed by the sale of cellular licenses to a multi-national telecommunications company operating under the Tigo brand in Africa, and to Korea Telecom, which is working with the Rwandan government to extend broadband connectivity nationwide.

The World Food Programme (WFP) has also been an important partner, providing logistical support through its school feeding program ("Feed the Mind While Feeding the Body") and the use of a secured warehouse for storing the laptops while they are prepared for distribution and deployment to the schools and the children.

In the fall of 2011, another 35,000 laptops were being readied for deployment in an additional 70 70 schools. In concert with the government's commitment to equality and social inclusion, schools for children with disabilities were also receiving laptops.

Plans are underway to deploy the next 100,000 units by mid-2012. By 2017, Rwanda intends to distribute half a million laptops to primary school students.[22]

Scaling up laptop deployments requires significant advance preparation of both technical infrastructure and human resources. The introduction of the laptops represents substantial cultural and educational change for teachers, parents and children. MINEDUC, with support from an OLPC team in Rwanda, organizes teacher-training sessions, community awareness meetings and student workshops to prepare for and achieve successful laptop integration. The OLPC team also partners with local and multi-lateral organizations on research and content development in order to build local capacity.

Technical Infrastructure

Before the laptops arrive at a school, the first step is to ensure that the school is wired and that the classrooms have power outlets to recharge the laptops. If the school is too far from the electrical grid, solar panels are used. The next step is to install a wireless local area network that is connected to MINEDUC's network servers from which the students can download the Rwandan curriculum and other digital learning materials.[23]

Headmaster and Teacher Training

The attitude of school staff is one of the greatest challenges when integrating ICT into schools. Many teachers fear new technologies, fail to understand its role in the classroom, and therefore, resist pedagogical change.[24]

The first comprehensive set of teacher training sessions was conducted in the spring of 2010. The objectives were to enable teachers to feel comfortable and confident in the use of the laptops and to support them in the development of lesson plans incorporating laptops into classrooms. Because headmasters provide an important leadership role, they were also included in the sessions.

MINEDUC selected 150 schools and asked that the headmaster and a teacher of their choice come to Kigali for one week of intensive training. The first two days were spent on how to use the laptop and the other three days on how to teach with it. The "Champions" then went back to their schools to share this knowledge with their colleagues. MINEDUC's OLPC team subsequently spent four days at each school to work with the teachers and students, and one day for community awareness meetings.[25]

Since this initial set of workshops a much more in-depth and ongoing teacher-training program has been put in place and continues to be supported by the OLPC Rwanda team.

MINEDUC working with teachers at GS Remera in Rulindo (Northern Province)

Community Awareness

Initially, many Rwandans viewed the XO laptop as a toy. To change this perception, MINEDUC has developed an awareness program and published an "Awareness Guide" to help communities understand that the XO is a tool for learning and education. In meetings with local Parent Teacher Associations (PTA) and local authorities, MINEDUC explains how the laptop will be integrated into the classroom. Common questions are:

• If the laptop is stolen, who pays?
• If the laptop is broken, who will repair it?
• Can parents and siblings use the laptop?

In addition to these community sessions, MINEDUC representatives go on radio and TV and write newspaper articles to discuss the project. Social media channels – Facebook, Twitter, a blog, YouTube and Flickr – are also used to discuss new developments and showcase progress.[26]

Parents learning about how the XO laptops will be used by their children

Supplemental Student Programs

As part of the 2010 rollout, the OLPC Rwanda team organized a series of workshops, holiday camps and after-school clubs for the students.

At the ESCAF School, in Kigali, space was set up for experienced students to teach (with the assistance of teachers) younger students how to develop projects. The objective was to empower the students to take an active role in their own learning and to shift from hierarchical instruction to collaborative learning.

During the spring holiday break, the Nonko School in Kigali held a one-week camp that provided an opportunity for students to learn about the XO while developing projects on the theme of malaria.

In mid-2010 at the Nonko, Kagugu and ESCAF schools, students participated in music and game programming clubs that enabled them to use their laptops outside of school time in educational and fun ways. These sessions ignited the students' creativity, enthusiasm for learning, enjoyment in collaborating with classmates, and instilled confidence and hope for a brighter future.[27]

Learning By Doing

Two projects that took place in the spring of 2011 demonstrate how the laptops are not only a tool for learning, but also how they can connect the students to Rwandan culture.

Both these projects were conducted outside of the classroom in non-formal spaces as an additional strategy to bring changes to schools. The non-formal learning activities were designed to connect with the curriculum and complement classroom learning. The goal was to show the community how it is possible to learn with technology in a very concrete way.
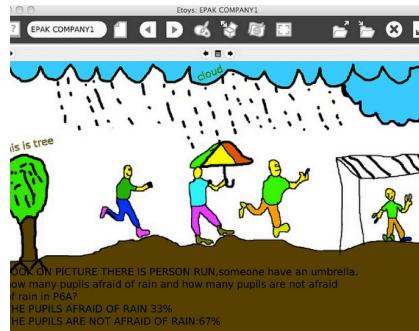
Parents learning about how the XO laptops will be used by their children

ESCAF P6 students use their XOs to explain the legend of their school

Grandmother Rwanda

Thirty-two P6 students, three teachers and the headmaster of the ESCAF School in Kigali participated in an XO-based project known as "Grandmother Rwanda." One of the focal areas of the P6 social studies curriculum is related to the cultural identity of the citizens of Rwanda. Using this as a starting point, the Grandmother Rwanda project entailed students working together to create their own stories and then sharing those stories with their friends, family and communities.

From this project the students learned that research can be used as a powerful knowledge strategy. The group work helped the students improve their listening and teamwork skills, share ideas and promote spaces to express what they think and take leadership within the group.

In addition to student learning, the teachers involved gained confidence from leading an innovative project that utilized technology to support creative storytelling. Another very positive outcome was the participation of the community contributing stories for the kids.[28]

Social Mapping

Thirty-two students and two teachers from two P6 classes participated in a Social Mapping project at the EPAK School in Kigali. The aim was to improve children's mathematical knowledge through social and mathematical mapping of their peers, school and community. The project closely tied with the Rwandan P6 mathematical curriculum, focusing on percentages, graphing, statistics and data analysis. It also required that the students think critically, be an important skill in a knowledge-based economy.

In the course of this project, the students harnessed their creativity to develop the survey, learned how to manage their time, and integrated mathematical processes through the use of statistics. They brainstormed meaningful questions to ask their classmates and the community and consolidated their data using an XO activity called Poll Builder.[29]

Increasing Local Capacity

As with any project intended to achieve large-scale change and sustainability, one of OLPC's main roles is to support the development of local capacity. Current capacity-building initiatives include partnerships with non-governmental organizations (NGOs), academic institutions, foundations and multi-lateral organizations.

Rwandan Education NGO Coordination Platform (RENCP)

This group of educational NGOs shares information, knowledge and experiences in order to affect education in Rwanda through educational policy and curriculum development. This partnership is being used to influence educational policy at scale and to keep policies and plans updated at both the national and local levels.

Volunteer Service Overseas (VSO)

VSO is the largest independent volunteer-sending organization in the world. Since its founding in 1958, VSO has over 42,000 experienced volunteers to more than 140 developing countries. OLPC has partnered with VSO on a workshop to create lessons plans for the Rwandan school curriculum.

Kigali Rotary Club

OLPC is working with the Kigali Rotary Club, which is building Rwanda's first public library, in order that the library is fully digitized. Groundbreaking for the library was in May 2011.

Scarcity of books in Rwanda has led to the lack of a culture of reading. A public library will help safeguard freedom and aid the development of a healthy democracy by providing free access to information that enables citizens to make decisions necessary to govern themselves.

Academic Institutions

OLPC Rwanda is working on the development of a grassroots network of university students at Rwandan academic institutions including the Kigali Institute of Education (KIE), the Kigali Institute of Science and Technology (KIST), the National University of Rwanda's Centre of Instructional Technology and the Technical and Vocational Schools' Association (TEVSA). With these institutions, OLPC has led workshops on the philosophy behind one laptop per child, how to support technology-integrated classrooms and how to repair and develop localized activities for the laptop.

Multi-Lateral Organizations

OLPC partners with a number of other international organizations supporting educational development in Rwanda.
These include:

- International Education Exchange – to develop English-language workshops

- Carnegie Mellon University – to conduct workshops at two local schools

- Search for Common Ground and Environmental Systems Research Institute (ESRI) – to develop localized activities for the project[30]

The Future

Since the first laptops arrived in Rwanda in late 2007 much progress has been made in getting the initiative off the ground. However, there remains a long way to go until all of Rwanda's primary schools are fully saturated and 2+ million students have their own XO.

The technology infrastructure issues are significant: lack of electricity and Internet connectivity in schools and in homes; lack of servers for networked applications; lack of spare parts and technicians for laptop maintenance and repair. One consequence of the lack of servers is that the XO's security system cannot be implemented, so the children are generally not allowed to take the laptops home. Creative financing solutions, such as a laptop lease-purchase program, are being worked on to remedy this situation.

For the headmasters and teachers, the OLPC initiative is an entirely new approach to education. Teaching with laptops and digital software is completely different from a traditional education in which teachers lecture from the front of the classroom and students memorize content. With the OLPC approach, the teachers become guides and facilitators who encourage the children to innovate, create, collaborate and think deeply by doing.

Teacher training is a very important part of any OLPC deployment but also one of the most challenging. Many of the teachers in Rwanda are poorly educated, overworked by large classes and double shifts, and poorly paid. The teachers require continuous encouragement, technical support and assistance with curriculum integration.

OLPC model schools can serve as reference centers where teachers from across the country can come and see what their peers are doing. The major challenge with this approach is how to spread what happens in the model schools to the rest of the school system.

Measurement of the program's impact is another challenge facing the project. The Rwanda National Examinations Council administers standardized tests after grades 6 and 9 to determine if students will progress to the next stage of the school system. How will integrated laptop usage affect test scores? Are test scores the best measurement of success? What about the impact of the laptops on student self-esteem, the ability to collaborate and share, and the passion for learning and exploring? OLPC is working on ways to make learning impact more visible and to move beyond basic literary and numeracy to advanced learning such as robotics.

Given these challenges and questions, as well as other pressing societal needs (e.g., healthcare), some skeptics question whether the Rwandan government's expenditures on laptops for children are worth the effort.

The response to this question goes back to the fundamental premise of VISION 2020 – the children of Rwanda are the country's most precious natural resource. By investing in children's education, the government is investing in the future, not the present. The XO laptops provide the children a window to the world and access to an education that will enable them develop into citizens capable of transforming their own society and ready to compete in a 21st century economy.

Perhaps the children themselves are the best advocates for OLPC. Mars, a shy 6th grade student, walked four hours each week to use her laptop. After a few weeks, she blossomed into a confident young woman who used her newfound skills to teach her class about the laptop and showed her family the importance of continuing her education.[31]

Similarly, Oliver, a 12-year old boy in Rwamagana, proudly showed a visiting journalist work he had done on his laptop about protecting the forest from human destruction. When asked what he wants to be when he grows up, Oliver replied, "a doctor."[32]

Stories such as those of Oliver and Mars say what One Laptop per Child is all about.

References

[1]National Institute of Statistics Rwanda,
http://statistics.gov.rw/index.php?option=com_content&task=view&id=250&Itemid=338.

[2]United Nations Development Program, Human Development Report,
http://hdrstats.undp.org/images/explanations/RWA.pdf.

[3]World Bank Data, Adult (15+ years old), Total adult literacy rate,
http://data.worldbank.org/country/rwanda.

[4]National Institute of Statistics Rwanda, http://statistics.gov.rw/images/PDF/education.pdf.

[5]Education Sector Strategic Plan 2010-2015, Republic of Rwanda, Ministry of Education, July 2010, p. 4,
http://planipolis.iiep.unesco.org/upload/Rwanda/RwandaESSP20102015.pdf.

[6]United Nations, State of the World's Children 2009, p. 134,
http://www.unicef.org/sowc09/docs/SOWC09-FullReport-EN.pdf.

[7]United Nations Development Program, Human Development Report,
http://hdrstats.undp.org/images/explanations/RWA.pdf.

[8]World Bank Data, http://data.worldbank.org/topic/education?display=graph.

[9]Ministry of Education of Rwanda, Rwanda Education Sector: Long-Term Strategy and Financing
Framework, 2006-2015, September 2006, p. 19,
http://planipolis.iiep.unesco.org/upload/Rwanda/Rwanda%20LT%20Strategy%20and%20financing%20fra
mework%20Sept%2006.pdf.

[10]Ministry of Education of Rwanda, Rwanda Education Sector: Long-Term Strategy and Financing
Framework, 2006-2015, September 2006, p. 19,
http://planipolis.iiep.unesco.org/upload/Rwanda/Rwanda%20LT%20Strategy%20and%20financing%20fra
mework%20Sept%2006.pdf.

[11] United Nations Human Development Index
2010,http://hdr.undp.org/en/reports/global/hdr2010/.

[12]VISION 2020, Republic of Rwanda, Ministry of Finance and Economic Planning, July 2010,
http://www.gesci.org/assets/files/Rwanda_Vision_2020.pdf.

[13]Economic Development and Poverty Reduction Strategy
Republic of Rwanda, Ministry of Finance and Economic Planning, September 2007,
http://www.undp.org.rw/EDPRS_2008-2012.pdf.

[14]Education Sector Strategic Plan 2010-2015, Republic of Rwanda, Ministry of Education, July 2010,
http://planipolis.iiep.unesco.org/upload/Rwanda/RwandaESSP20102015.pdf.

[15]The NICI-2010 Plan, Government of Rwanda, http://www.uneca.org/aisi/nici/Documents/NICIfinal.pdf.

[16]Education Sector Strategic Plan 2010-2015, Republic of Rwanda, Ministry of Education, July 2010, pp.,
4-5, http://planipolis.iiep.unesco.org/upload/Rwanda/RwandaESSP20102015.pdf.

[17]The NICI-2010 Plan, Government of Rwanda, p. 33,
http://www.uneca.org/aisi/nici/Documents/NICIfinal.pdf.

[18]Education Sector Strategic Plan 2010-2015, Republic of Rwanda, Ministry of Education, July 2010, pp.,
15-16, http://planipolis.iiep.unesco.org/upload/Rwanda/RwandaESSP20102015.pdf.

[19]Business Wire Press Release, http://www.businesswire.com/news/home/20070103005861/en/Rwanda-
Commits-Laptop-Child-Initiative.

[20]One Laptop per Child, Internal Report on Rwanda by Giulia D'Amico, p. 7.

[21]World Focus Online, YouTube video, http://www.youtube.com/watch?v=6jaGrvbQLhg.

[22]Middle East North Africa Financial Network, Interview with Nkubito Bakuramutsa, Rwanda's OLPC
Coordinator, August 30, 2011, http://www.menafn.com/qn_news_story.asp?storyid=%7Bc673b789-0f01-
41ae-80b6-026927e20672%7D.

[23]Middle East North Africa Financial Network, Interview with Nkubito Bakuramutsa, Rwanda's OLPC
Coordinator, August 30, 2011, http://www.menafn.com/qn_news_story.asp?storyid=%7Bc673b789-0f01-
41ae-80b6-026927e20672%7D.

[24]The Role of Headmasters in the Successful Implementation of OLPC: A Case Study in Rwanda, Ceri
Whatley, February-May 2011, p.10.

[25]Middle East North Africa Financial Network, Interview with Nkubito Bakuramutsa, Rwanda's OLPC
Coordinator, August 30, 2011, http://www.menafn.com/qn_news_story.asp?storyid=%7Bc673b789-0f01-
41ae-80b6-026927e20672%7D.

[26]Interview with Jean Paul Hitimana, OLPC Rwanda Awareness Officer, October 3, 2011.

[27]One Laptop per Child Internal Document, OLPC Rwanda Timeline 2010.

[28]One Laptop per Child Internal Document, OLPC Rwanda Project-Based Learning Series: Grandmother
Rwanda Project, March 2011.

[29]One Laptop per Child Internal Document, Social Mapping Project, April 2011.

[30]One Laptop per Child Internal Document, Monthly Status Report, March 2011.

[31]One Laptop per Child Internal Document, Mars & Sandrine: Two Success Stories from Constructionist
Learning in Rwanda, Julia Reynolds.

[32]The Observer, Rwanda's Laptop Revolution, Peter Beaumont, March 27, 2010,
http://www.guardian.co.uk/technology/2010/mar/28/rwanda-laptop-revolution.

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