Using Technology for Social Development in South Sudan

EDC Learning transforms lives.

Sudan was at war from 1983 to 2005, the north against the south. Prior to 2005, most schools in the south had been bombed and were staffed by volunteers. Most educated southern Sudanese were older than 40 years and lived in the north or in Kenya or Uganda. The population of this vast area was cut off from reliable information about what was going on in their own country, and while they were united in a struggle for independence, the huge cultural diversity from region to region made for an uneasy alliance among tribes. Outside of a few towns, there were no paved roads, and even recently repaired roads became difficult or impassable during the rainy season. There was no local currency and little in the way of a modern economy, so no tax base existed on which to fund social services. Banking facilities were limited to a few towns in 2005, so special arrangements often had to be made with someone to carry money (at personal as well as institutional risk), which was further complicated because of limited transportation options.

Thus the task facing South Sudan as it built a new nation was daunting, although the pace of development between the signing of the Comprehensive Peace Agreement (CPA) and independence has been rapid. Technology has played an important role in educating and informing this development and in maintaining stability. This paper looks at some of the ways that Education Development Center, Inc. (EDC), has used technology for those purposes.

EDC has worked in South Sudan since 2003, helping to build the basic education system through the South Sudan Interactive Radio Instruction (SSIRI) project and to establish the Sudan Radio Service (SRS), which has kept the general population informed about the CPA and provided daily updates on the progress to independence in July 2011. In both SSIRI and SRS, technology has fulfilled a role in the social and political development of the nation that probably could not have been done as efficiently or effectively any other way.

Fragility

The United Kingdom's Department for International Development (DFID) describes four kinds of political environments, of which one is "weak but willing," where governments want to develop but lack the capacity to do so,[1] a description that probably fits South Sudan. The present government structure of South Sudan was created with the signing of the CPA, resulting in 10 new states plus a new central government. With new government structures comes new policies to develop and newly appointed personnel, often people with excellent motivation but weak qualifications and experience.

Although peace has largely held between the north and south in Sudan, South Sudan is still a country affected by conflict. In May 2008, the northern forces razed the town of Abyei. In 2011, they attacked Abyei and Southern Kordofan again, periodically forcing SSIRI to terminate activities in the state.

[1]Torres, Agui Morena and Anderson, Michael. "Fragile States: Defining Difficult Environments for Poverty Reduction. PRDE Working Paper 1. UK Department for International Development, 2004.

There have also been ongoing LRA (Lord's Resistance Army) activities in Western Equatoria State that forced some SSIRI schools to close. Finally, there has been tribal fighting in many locations, especially in Jonglei State, where over 2,000 deaths were reported in 2009.

Using radio to construct a basic education system

Nevertheless, a new technology-driven education system has sprung up relatively quickly. The following vignette of a school in southern Sudan is typical of schools today.[2]

> *Just a short motorbike ride along a potholed road from Kajokeji, Central Equatoria State, South Sudan, one reaches a SSIRI school. Arriving at 10AM, there is the sound of enthusiastic children in primary 1 singing the "Welcome Song" from the Learning Village, the name of the radio series for schools. The children are happy and actively involved in the half-hour radio lesson—they are learning mathematics, English, local language literacy, and life skills. They have a chance to sing songs as part of their learning activities. The classroom itself is rudimentary—mud walls full of holes and a leaky thatched roof that provide only some shelter from the sun and rain. The fifty children are sitting shoulder to shoulder—some on crude chairs and others on the dirt floor. As the teacher listens to the radio lesson, she translates the dialogue and instructions on the radio from English into the local language. The children are active learners—speaking back to the radio characters, writing in their exercise books, singing, moving, clapping, or participating in other learning and reinforcement activities. Some people have described an IRI (Interactive Radio Instruction) class as an enthusiastic line dance that requires the participation, interaction, and coordinated efforts among the radio characters, the classroom teacher, and the pupils to be successful, satisfying, and fun. But the bottom line is that the pupils not only enjoy the class, they are also learning to master basic competencies fundamental to further learning and living in a modern economy. The teacher is grateful to have the extra support of a co-teacher—the radio teacher—right there in her class, every day.*

Classrooms are slowly being built and staffed in South Sudan. However, in a country with few roads or distribution systems and with only about half of the teachers having completed primary school,[3] those tasks will take years or perhaps decades to complete. Interactive Radio Instruction has been a cost-effective and rapid method of mitigating the effects of those limitations and providing good quality instruction wherever a radio signal can be heard. Teachers appreciate having the daily instructional

[2]The Southern Sudan Interactive Radio Instruction (SSIRI) program (2004–2012), which is an integral part of South Sudan's Ministry of Education, Science, and Technology, designs, develops, and broadcasts cost-effective instructional programs for children, adults, and teachers. The core programs consist of daily half-hour broadcasts for primary school children in grades 1–4. In addition, there is an important audio series for teaching English to youth and adults, and an audio series for teachers on classroom management. Finally, SSIRI supports computer centers with Internet at teacher training institutes and a secondary school.

[3]Only 50% of primary school teachers in southern Sudan have any education beyond grade 8, and only 5% have completed a teacher training program or a diploma level course.

[4] English language programs had a large positive effect on student learning (0.72), local language programs had a medium effect (0.41), and math programs had a small effect (0.28), as reported in Ho, J., & Thukral, H. (2009). *Tuned in to student success: Assessing impact of interactive radio instruction for the hardest to reach*. Washington, DC: Education Development Center, International Development Division

support to help them in the classroom, and student learning gains have been strong.[4] The cost of developing 150 radio lessons for each of grades 1–4 has been borne by the U.S. Agency for International Development (USAID), but the recurrent cost of broadcasting them is relatively small.

Using radio to keep people informed

SRS answers a different need. In 2003, as the CPA talks moved towards their conclusion, there was a dearth of impartial and independent news and information available to people in the south. Mostly illiterate, people relied on word of mouth and radio broadcasts from Khartoum or other sources for their news. The farther south they lived, the less likely it was that they understood Arabic, the language of most broadcasts in Sudan, and there were no broadcasts in local languages available to most people. When people got information, it was often late and of unknown reliability since it was filtered through personal or political channels. Some information was malicious and deliberately misleading.

So the USAID-funded Sudan Radio Service, with offices in Juba and Nairobi, undertook the task of recruiting and training local journalists to gather independent news and information, which SRS would broadcast in nine languages in the morning and evening. A network of stringers with satellite phones were stationed around Sudan, calling in stories to a team of journalists and editors, who put together the programs and sent them by Internet to London, where they were broadcast to Sudan. While Sudanese already had radios, finding batteries was difficult and expensive; therefore, solar-powered or wind-up radios were distributed across the country to listeners.

SRS is now based in Juba, with its own FM radio station and training function. SRS operated out of Nairobi for many years in case the security situation in southern Sudan should deteriorate. Even now, with a new SRS office and studio in Juba, the project maintains some staff and production facilities in Nairobi to ensure the continuance of production, even if major fighting were to break out again in South Sudan. Accurate and balanced news is a proven conflict mitigator.

Three phases of technology use in South Sudan

Since 2003, there have been three phases of technology use in South Sudan, which points to the rapid evolution of technology as well as to the quickening expansion of options and strategies available to development.

Phase 1: Before the CPA

In the years prior to the CPA (2003–2005), the information and education sectors were challenged by a lack of delivery systems, poor infrastructure and outdated technologies, insufficient human resources and institutional capacity, and overall poor communication systems. The IT technologies that are now so useful in developing contexts were then only in their early stages of development, both in terms of

their capabilities and their costs. Both SSIRI and SRS delivered information and instruction through shortwave radio broadcasts, wind-up or solar-powered radios, Thuraya satellite phones, and VSATs. Most other delivery systems were 20th-century solutions, which, by today's standards, almost seems like delivering the mail on horseback. Materials and salaries were delivered by hand because there wasn't much of a banking system, hardly a phone system, and no fiber optic system.

EDC brought people together for face-to-face in-service training, some participants taking about two weeks to attend a three- to four-day training. The project had a relatively heavy dependence on expatriate support from the region, the United States, and the Diaspora for technical support and spent much time and effort on staff capacity development—not only technical (how to use a computer) but psychological (post-traumatic stress from war years) and social (how to work in an office and get along with co-workers, how to work with those of other clans, tribes, and nationalities). To address the lack of teaching skills and learning materials, EDC developed Interactive Radio Instruction broadcasts to guide untrained and under-trained teachers in their classrooms and to provide audio learning materials to their children.

Phase 2: Between the CPA and independence

The years after the CPA was signed (2005–2011) was a time of rapid development, both for the state of South Sudan and for the use of information technology in development. While the government and its partners were busy demining and building roads (completing six miles of tarred roads) and building institutional capacity, the SSIRI project moved from broadcasting via shortwave, which was weak during the time of day that it was broadcast, to commercial, faith-based, and government FM stations that were coming online. Where FM didn't reach populations, EDC supplemented them with CD and MP3 audio devices. SRS developed an FM station that covered the greater Juba areas. For resources, we developed education resource centers with computer labs, digital equipment, and Internet connection via VSAT. Gradually, mobile phone coverage extended beyond the major urban centers to smaller towns, and EDC began to rely more on mobile phone technology than satellite phones, except in emergencies. The project also began employing SMS technology to obtain feedback from listeners on our SRS programming and introduced SMS as a way to notify teachers of upcoming SSIRI and ministry of education events. The IRI program continued to be effective as the education program branched out into additional areas of South Sudan, greater numbers of children were enrolled, and the shortage of trained teachers in the system continued.

Phase 3: After independence

The years following independence in July 2011 will be a time for the continued application and expanded use of new technologies. EDC expects to expand the transmission of SRS FM broadcasts throughout most of South Sudan via relay towers. For SSIRI, we're increasing the use of MP3 players

and wind-up radios with SD cards and memory stick slots to replace the radios that only received broadcasts, thus giving schools the choice of either broadcasts or digital devices. SSIRI anticipates using IT hubs through education resource centers at new sites, especially in colleges. The project will use mobile technologies to serve as modems for computers; this will provide for more information and lesson distribution devices as well as a mode of feedback from learners, interactive practice exercises, and a way to conduct monitoring and evaluation cost effectively. While EDC will continue to use FM broadcasts for news and information as well as for teaching and learning, digital audio and video devices are likely to gain use as their costs continue to go down. SSIRI will leapfrog over the heavy use of computers in classrooms to a greater use of personal mobile devices, especially mobile phones, for providing access to education resources and timely communication. Fiber optics is just being introduced in South Sudan, and a day will come sometime soon when the use of VSAT, at least in urban areas, will be significantly reduced in favor of the cable services.

What is the edge that radio brings?

Constructing an education system from a base of practically nothing needs a national response. Small volunteer-driven responses are useful, but to educate a nation takes a larger initiative. If the nation does not have enough teachers, and those that it does have are under-educated, then broadcasting IRI lessons offers certain advantages.

- Radio has a multiplier effect. This allows a small number of the best educators in the country to reach millions of children and adults, and to do it every day with uniformly high quality across every lesson.
- Radio is affordable. Transmission and reception costs are relatively low, and many donors and charities are eager to donate wind-up or solar-powered radios to schools. Most countries using IRI show recurrent costs of between $1 and $3 per child per year, depending on the number of children who are reached.
- Radio can bring quality to the classroom quickly. It takes decades to improve the performance of teachers on a massive scale and costs millions of dollars. IRI lessons can bring an overnight change to a classroom, providing high-quality content and a model of good pedagogy that improves the performance of teachers and learners. In most countries, learning outcomes among children using IRI are 20 percent higher than classrooms where children do not use it.
- IRI is simple. Sudan does not yet have much infrastructure to supervise an education system. It lacks teacher training institutions, curriculum centers, and experienced staff in districts and *payams*. Despite high expectations about what will accrue from the fruits of independence and oil revenues, the fact is that schools do not yet have much support from the state or national governments. In return for switching the radio on at the right time and working with the radio teacher during the

broadcast, classroom teachers get an instant friend and collaborator in the classroom, one that is reliably there day after day.

- IRI is easy to use. Teachers need only a few days of orientation in how to use the lessons. Most teachers are used to tuning a radio and find the technology easy to manage as well as durable. Well-written IRI lessons provide both content and direction—the teacher is guided through 30 minutes of varied, interesting activities with a minimum of teacher preparation and suggestions of what to do before, during, and after the broadcast.

Emerging technologies

The interactive format of IRI was introduced in the Radio Mathematics Project in Nicaragua in 1974, and though since then it has also been used with other audio systems, radio remains the most cost-effective means for delivering programs to a large audience. Using radio rather than other audio devices has some advantages:

- Radio broadcasts set a pace throughout the year.
- Knowing that a missed lesson will not be repeated, a teacher is less likely to skip a day's lesson.
- The staff that broadcasts the program ensures that all of the lessons are covered by the end of the year.
- If a class does miss an occasional lesson, there is sufficient review in IRI lessons so that the pupils can keep up.
- IRI programs typically pick up a substantial "shadow" audience (parents or other adults in homes or public places).

Interactive Audio Instruction

From the start, however, there has been interest in using non-broadcast means to deliver the lessons. Where at one time, the only alternative was audiocassettes (which were too complicated and costly with large numbers of tapes and the heavy drain on the batteries of the recorders), today, with the advent of digital storage devices, there are now attractive options for Interactive Audio Instruction (IAI).

For teachers who lack access to a good radio signal, SSIRI has provided a complete set of IRI programs loaded on a flash drive that can be inserted into a wind-up radio and played to the whole class. IAI has many potential advantages:

- Most important, the distribution of audio files through digital devices enables the use of programs

beyond the range of broadcast coverage or for groups that meet at times different from the broadcast schedule.

- Teachers can play the programs at any time that is convenient, taking into account the school year, holidays, special events, and vacation times unique to the school or listening group.
- The quality of the sound is often better than a radio broadcast.
- Teachers have the option of listening to programs ahead of time or repeating lessons for the students.
- The digital device enables a teacher to pause the lesson at any time to elaborate on a topic or to engage students in a relevant discussion. This feature has been especially popular with teachers using the SSIRI advanced English lessons in secondary schools.

Besides IAI, EDC's projects in South Sudan are using other technologies, including video and mobile phones, to strengthen their implementation, outreach, and impact.

Video

SSIRI has incorporated video to support its training efforts and to disseminate information about programs. A short video clip on IRI is far more effective than just talking about IRI.

SSIRI has produced two training videos of IRI classes that quickly show what IRI classes are like, especially how the radio characters, classroom teachers, and pupils all work together to ensure a fun and instructive lesson. EDC has begun advocating the use of a new generation of consumer video products, such as smart phones. In one afternoon, individuals can be trained to shoot and edit basic videos. Of course, while the technology is relatively easy, the planning and creative effort involved in producing a useful video is more challenging.

Given that video can now be carried anywhere, on a iPod, computer tablets, or other mobile computer devices; projected in any location using a Pico projector; and stopped and started at will, there are possibilities of making video truly interactive in ways that were not possible before.

Mobile Phones

SRS is embracing mobile phone technology to enhance its outreach. Mobile phones help broaden the reach and scope of the Darfur News and Information Service (DNIS) by supplementing radio news with text-message updates and encouraging community feedback on local radio programming via SMS(e.g., reactions to specific programs such as *Let's Talk* or *Road to Peace*). SRS's mobile phone service has been operating since mid-2010.

Selecting technologies

In selecting devices that are appropriate for South Sudan—and other countries with similar, fragile environments—a number of practicalities must be considered:

- Sudan has virtually no electricity to operate the devices or recharge the batteries.
- A continuing supply of batteries is not affordable, so there is a need for rechargeable options.
- Most schools have no storage spaces, so the devices must be light enough for teachers to carry to and from school, while being rugged at the same time.
- Sudan has few technical people or maintenance options, so the devices must be reliable.
- Classes are large, so the device must have a loud volume.
- A large number of audio files must be stored.
- The device must be affordable.

Challenges

Despite their benefits, new technologies have not overcome all challenges. IRI lessons are broadcast in English, and the teachers have to translate the instructions into a local language. Some teachers simply lack sufficient English language skills to do so. One may ask whether they should be teachers in the first place, or one may conclude that even an unskilled teacher and imperfect support through IRI are better than none at all.

Some teachers are unmotivated because they are not paid on time, have low salaries, and teach in poor learning environments, often holding classes under a thatched roof or a tree. Many request an "incentive" or some form of payment to use the IRI programs. The behavior of teachers is an issue for local government and communities to solve. SRS has raised this, among other social and political issues, in its broadcasts.

One outcome of peace over the last few years is that many more children are going to school. The downside is that there are not nearly enough classrooms and teachers. Thus, an additional challenge for most teachers is handling large classes, often with over 50 and sometimes over 100 pupils. IRI, like any instructional system, falters in the face of impossible circumstances. Forty learners are about as many as can hear a radio and a teacher can manage, although extra radios and extra teacher's aides may allow more students to learn together.

To Conclude

Both SSIRI and SRS have used technology to deliver education and information that would not otherwise have reached the students in South Sudan who live outside Juba. They have done so quickly and economically. But it is not the technology itself that has made the difference. It is also the quality of the programming. Simply throwing technology at the problem is usually a waste of money, as are programs that have not been shown to be effective.

In South Sudan, where SSIRI and SRS have been demonstrated to deliver information and education effectively, it is arguable that the benefits of a better quality education and more accurate and reliable news and information have lent stability to a country that has badly needed it as it has faced challenges from without and crises from within.