

World

Expanding Access to Early Childhood Development Using Interactive Audio Instruction

Innovation Challenge 2014

September 2014

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INNOVATION CHALLENGE 2014:
EXPANDING ACCESS TO EARLY CHILDHOOD DEVELOPMENT
USING INTERACTIVE AUDIO INSTRUCTION

GUIDELINES FOR PROGRAM DESIGN AND REPORTBACK ON PROTOTYPING
IN THE DEMOCRATIC REPUBLIC OF CONGO

September, 2014

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Executive Summary

The returns to investments in ECD are manifold and can include improved school readiness, reduced drop-out rates, higher labor force productivity and greater social cohesion. Despite these high returns, enrollment in early childhood education is just 18% across Africa, with disproportionately high enrollment from children in urban areas and from wealthier families.

The Early Learning Partnership (ELP) provides targeted technical assistance and funding to support Early Childhood Development (ECD) and early learning across Sub-Saharan Africa. The ELP aims to catalyze change in countries to promote high-quality ECD and early learning opportunities for young children.

In December 2013, the ELP was awarded a grant through the World Bank Innovation Challenge for a proposal entitled “Expanding Access to Early Childhood Development Using Interactive Audio Instruction.”

Interactive Audio Instruction (IAI) is a distance learning technology that can deliver low-cost, culturally appropriate education via radio or MP3. It is a highly effective tool to reach children who can be hard to reach through conventional programs, including the rural poor and children with disabilities. IAI can also be an effective form of service delivery in unstable and conflict-affected regions.

IAI has been shown to dramatically improve the quality of teaching and learning in a range of contexts across subject matter, age, gender and location. However, despite the strong evidence base supporting IAI programs, scale up from pilot phase to long-run permanent phase is rare.

As part of its work in developing low-cost models to expand access to quality early childhood education throughout the region, the ELP decided to work with EDC, a global leader in production of IAI programs to outline a replicable process for scaling up IAI programs for ECD. The project site for this Challenge was the Democratic Republic of Congo.

The attached report is divided into two parts. Part 1 outlines the process for scaling up an IAI program – from initial start-up in a given community, to large scale expansion in a country. It highlights the main steps in the production cycle, the roles and responsibilities of government and communities, and provides useful tips for practitioners at each stage of the process. Part 2 provides a summary of how this process was followed in DRC and lessons learned.

It should be noted that this report is a summary document. A fuller version of this report – meant to be a user friendly toolkit for project managers is still under production. This report includes much of the content which will be included in the formal toolkit.

Summary of Part 1: General guidelines for implementing an IAI program at scale

This section of the toolkit outlines the four phases in the IAI program cycle as they pertain to ECD programming for a facilitated group setting (early childhood classrooms, informal community learning centers, or adult-led group childcare settings). These phases are summarized as follows:

- Phase 1: Preparation- Introduction and engagement with stakeholders. This stage involves audience research, analysis of the educational context, assessment of technology options and program design. The end product of this stage is a program design document.
- Phase 2: Development- This stage involves scriptwriter training; scriptwriting, and formative evaluation that prepare for the production of final use-ready episodes and supporting materials.
- Phase 3: Production- This stage involves local production of audio episodes and preparation of supplementary learning materials for the program.
- Phase 4: Delivery- This stage involves training teachers/ caregivers in the use of IAI and delivering the program via radio, MP3 or other technology.

Part 2- Case Study: Assessing the potential for a large scale IAI program in the DRC

The ECD IAI pilot in DRC was a small-scale effort undertaken to determine the potential feasibility of a large-scale IAI program for kindergarten in that country and to inform any future efforts to roll out IAI for ECD in other countries. The contractor, EDC, was already implementing a primary-grade IAI program in DRC, and was tasked with:

- Engagement with government stakeholders around IAI as a means of delivering high-quality ECD, and identification of target communities for a pilot of such programming
- In-country program organization and community engagement
- Curriculum review and program development
- IAI episode prototyping and feedback generation
- Process documentation and recommendations for scale up

The pilot took place over the course of five months. The feasibility of the program for scale up was tested in a number of ways:

- Ministry of Education personnel were introduced to the concept of the pilot and endorsed it
- Communities and schools were identified for the testing of the pilot IAI episodes
- A local market study was undertaken to identify appropriate and within-reach technology for distribution of programs
- A scope and sequence, master plan, and set of six scripts were developed, translated, produced, and validated by the Ministry of Education; community sensitization
- Meetings and facilitator trainings were conducted
- The IAI series and supporting materials were field tested in four ECD centers in July 2014
- Modifications identified from the testing were integrated into the IAI programs and the accompanying materials
- Interviews with individuals participating in the testing groups—children, parents, and teachers—were conducted to better understand their needs and interests relative to the pilot. Overall, feedback from these stakeholders was positive and they were hopeful for a continuation of programming.

Introduction to IAI for ECD

A large body of solid evidence demonstrates the significant effects of early childhood education and development (ECED) interventions¹ on children's success in school, long-term social integration, and improved life chances². Short-term and longitudinal studies on program effects and research on the impact of early education on human brain development provide strong support for increased investments in high-quality ECED programming. Indeed, good early childhood education can be a key contributor to narrowing social and economic gaps and driving development, particularly in low-resource, disadvantaged communities.

Governments, private sector entities, and civil society organizations in most developed economies have responded to evidence of the importance of early childhood experiences by increasing access to high-quality programs, particularly for low-income families with the greatest need. Resources in lower-performing economies have been harder to redirect to early childhood, however, and the numbers of children who lack access to high-quality programs remains vast. In the poorest and most challenging contexts, citizens' opportunities for success are thus further limited by this early exclusion from stimulating, learning-promoting programming.

Interactive Audio Instruction (IAI) provides one solution to the challenge of providing high-quality early childhood education at scale and at reasonable costs. The IAI medium allows for the development and delivery of both teacher and caregiver training and direct instruction, using best practices in early childhood education, and has demonstrated powerful results in contexts as diverse as Honduras, Nepal, El Salvador, Indonesia, Zanzibar, Malawi, and Paraguay. As a low-cost, high-reach, renewable and reusable teaching and learning medium, IAI provides an ideal mechanism for early childhood programming. IAI packages for early childhood include lessons designed to promote comprehensive child development and school readiness in a logical, research-based scope and sequence. Content is delivered through CD, MP3, or radio, with the assistance of a classroom teacher or group facilitator, who is coached by the recorded "teacher facilitator" to implement active, child-centered instruction that is highly relevant to the daily lives of the young participants. Songs, stories, and dramatic themes provide an engaging framework for literacy, math, life skills or

¹ ECED interventions are defined for the purposes of this document as programs with a specific educational purpose delivered to children below grade 1 of primary school. While we touch on the potential of IAI as a medium for providing early childhood programming that is not explicitly focused on child learning and development (for instance, IAI dramas for parents), we do not present a model for those activities.

² See, for example, Christina, R. (2011). *First Principles: Designing Effective Education Programs for Early Childhood Development (Compendium)*. Washington, DC: EQUIP1/American Institutes for Research; Heckman, J. (2006, January 10). *Investing in disadvantaged young children is an economically efficient policy*. http://www.ced.org/images/library/reports/education/early_education/report_2006prek_heckman.pdf; and Nores, M., & Barnett, W. S. (2010). Benefits of early childhood interventions across the world: (Under) investing in the very young. *Economics of Education Review*, 29(2), 271–282.

other learning content. The participatory nature of the guided lessons engages students in multiple ways -- cognitively, physically, creatively and socially.

IAI's recorded audio programs, accompanying teacher guides, student materials, and training for teachers and caregivers provide a dual-pronged program of high-quality instructional content for children and guided-practice professional development for teachers and caregivers, transforming classrooms and centers and promoting strong early childhood development. Audio content, particularly when delivered over radio, also makes learning more transparent for families and community members, who may otherwise not understand what their children are learning if they themselves cannot read. This transparency is a particular advantage in contexts where ECED is newly available, as parent support and buy-in is critical to increasing ECED access.

This document was commissioned by the World Bank's Early Learning Partnership to provide a resource for staff and counterparts who support the expansion of ECED efforts in low-resource contexts, particularly but not necessarily exclusively in Africa. It builds on and supplements the 2005 publication that EDC prepared for the World Bank, "Improving Educational Quality through Interactive Radio Instruction," by integrating lessons learned from the past decade's IAI efforts, focusing specifically on IAI programming for ECD, and providing evidence and resources from a 2014 World Bank Innovation Challenge pilot of IAI ECD programming in the Democratic Republic of Congo.

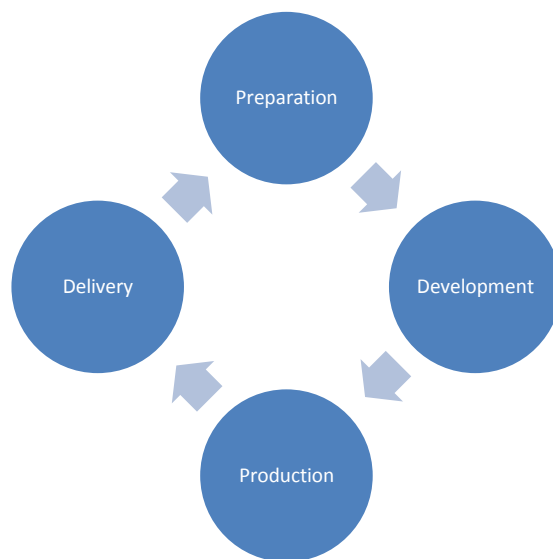
The document outlines a general approach to high-quality IAI production for ECD, and uses the DRC case study to detail the development process. It also provides technical recommendations for how to scale-up production and delivery in the DRC and considerations for program adaptation in other similar contexts, including an outline of necessary steps and components, estimated costs of a program with broad reach and content depth (including a financial model for production and program implementation), and a results monitoring and evaluation framework.

Part 1

The ECD IAI Programming Cycle: Preparation, Development, Production, Delivery, Evaluation, Sustainability

This section of the report outlines the steps in the IAI program cycle as they pertain to ECD programming for a facilitated group setting (early childhood classrooms, informal community learning centers, or adult-led group childcare settings), building on the general IAI development model articulated by Anzalone and Bosch (2005). Inputs and processes are described, and cost considerations are highlighted for each phase.

Figure A: Four phases of the ECD IAI programming cycle



Phase 1: Preparation- Introduction and engagement with stakeholders. This stage involves audience research, analysis of the educational context, assessment of technology options and program design. The end product of this stage is a program design document.

Phase 2: Development- This stage involves scriptwriter training; scriptwriting, and formative evaluation that prepare for the production of final use-ready episodes and supporting materials.

Phase 3: Production- This stage involves local production of audio episodes and preparation of supplementary learning materials for the program.

Phase 4: Delivery- This stage involves training teachers/ caregivers in the use of IAI and delivering the program via radio/ MP3.

PHASE 1: PREPARATION

Preparing for an ECD IAI program in a new context involves the following steps:

- a. *Audience research*- a study of the social context into which an IAI ECD program will be infused;
- b. *Analysis of the educational context*, to ensure that the program is targeted at an appropriate population and that the content of the programs is appropriate and not in opposition to any existing curricula and teacher training programs or to national policies on early childhood education;
- c. *Assessment of technology options*, which ensures that the program will be cost-effective and implementable;
- d. *Program design*, which integrates the contextual research findings with curricular planning to map out the desired IAI development process and learning results. At the end of the preparation phase, design documents for each subject and grade level of instruction will have been created, including a scope and sequence and master plans for the programs, along with guidelines for evaluation of program quality.

Preparation for an IAI program should be highly participatory, engaging a range of stakeholders and building the capacity of host country counterparts in the theories and methods underpinning IAI in general and in the specific ECD domains that will be covered by the program. In contexts where early childhood education has not been as well resourced as other segments of the education and social service system, engaging in IAI program preparation provides both a professional development opportunity for participating government staff and a platform for broader discussion of the importance of ECD for individual and social development.

Sufficient resources need to be dedicated to the preparation phase to ensure that appropriate data are collected and conclusions and design decisions can be fully justified. Technical experts in participatory research for IAI program development should facilitate sample selection, protocol design, and data collection, alongside counterparts from whichever government agency will be leading and ultimately sustaining the ECD IAI program effort. Development of the design document, in particular, requires specialized technical expertise in instructional design for interactive audio, but it should be done in partnership with designated counterpart staff to build their capacity through supervised practice.

a. Audience research for ECD IAI

High-quality IAI programming links not only to national curricula but also to community contexts and resources, to ensure that it is meaningful for and appealing to users (both adults and children). Policies, structures, resources, and practices related to ECD vary widely across countries, and in many cases the aspirations of policy makers and early childhood activists, even if reflected in policy, are far from the practical reality of services for children and families. Audience research for an ECD IAI program provides an opportunity to

better understand current contexts and to begin and/or facilitate a dialogue among families, communities, and system actors about what good ECD in a particular context looks like and what the desired early childhood outcomes for children in that context are.

ECD IAI audience research should include information collection from:

- early childhood providers (including teachers/facilitators/caregivers);
- families and community members; and,
- young children themselves.

Surveys and focus groups with selected informants can provide important information on what these groups typically do in an ECD setting, and on the kinds of local resources available to inform the development of engaging and enriching IAI programming.

Questions in the research program should provide a social and cultural map of the opportunities and challenges that will be faced when implementing high-quality research-based ECD programming through an audio medium in a particular context.

Issues to consider may include:

- Language patterns and preferences: What languages are usually used for ECD programming? Are these languages with which children are usually familiar before entering ECD programs? What languages do families prefer to have used? Why? Are they languages in which early childhood teachers are comfortable and confident themselves? How much variation is there among dialects within the same language, and what is the relative perceived importance and credence of the dialects?
- Character development resources: Who are the role models for children in this age group? Are they different for boys and girls? What are their primary positive characteristics?
- Physical and cultural resources: What types of resources are readily available in ECD program centers (books or other types of materials, slates, chalk, etc.)? What local natural and reusable resources (such as sticks, stones, leaves, bottle caps, sacks or boxes) can be used in ECD games and learning activities? What songs or cultural activities would be well-received if integrated into the programs? What are the expectations about gender interactions in early childhood? Which activities are gender-neutral and which are gendered?

As scale is often a goal of IAI programming, it is important to use the audience research phase as a foundation for “discovering ways to reach [a] large and diverse audience without perpetuating negative stereotypes, while achieving a feel that the radio program is local” and for “integrat[ing] social and cultural connection points in ways that appeal to the diverse audience.”(Anzalone and Bosch, 2005: p.77) Early childhood experiences frame children’s

expectations for social interaction among people who are different from each other, and the pro-social messaging in an IAI program can be a strong contributor to a tone of tolerance and mutual respect among varied individuals and groups.

b. Educational context analysis for ECD IAI

ECD programming in developing country contexts is often a diffuse and complicated web of options, offered by multiple types of providers, overseen by multiple ministries, and responding to multiple sets of standards (or to none at all). Design of an IAI program for ECD needs to consider the existing framework and expectations and identify points of best alignment and integration with the system. Educational context analysis helps with this process through document review and analysis and qualitative interviews and focus groups that consider:

- Curricula: For what levels of early childhood programs are there established curricula (for example, is there an officially-endorsed kindergarten or nursery program)? Are these levels of education the appropriate target for the IAI program? To what extent can the proposed IAI program complement and enrich the existing curriculum?
- Teacher preparation, training, and practice: How are teachers for the target level prepared to work with young children? What kinds (if any) ongoing training do they receive? Do they use the official curriculum in their programs and/or are there other packages or resources that are more likely to be implemented? How do they perceive themselves within the education system? How are they perceived?
- Non-curricular objectives for ECD programming: What are the access goals for early childhood programs? Is there an explicit or implicit focus on gender issues that is being addressed by increasing ECD programming through IAI? Are there particular groups of children/communities that are priorities for investment through the IAI program? Why?
- Parent ability and willingness to pay: In what ways do families currently support ECD programming? Do they pay for services? If so, how much do they pay, on average? If not, do they contribute to center operation in any way? How much might they be willing to pay or contribute in order to obtain quality services?

c. Technology options assessment for ECD IAI

The development of low-cost digital technology and the increasing penetration of mobile phones in Africa provide an opportunity to consider options for program delivery that supplement, extend beyond or replace radio (the traditional vector for IAI program delivery). However, radio broadcast should not be dismissed out of hand simply because it is old fashioned. Different modes of technology have different benefits, some of which are outlined below.

Technology Options for ECD IAI				
	Radio	Mp3 or CD	Mobile phone	Mobile phone using IVR technology
Description	Programs are broadcast over radio at a certain time. Listeners tune in to the live programs.	Programs are recorded on reusable media for playback on a specific device at the initiative of the teacher.	Programs are recorded on SD cards for playback on mobile phones with or without speakers at the initiative of the teacher.	Users call in to a call center to access pre-recorded programs on their own schedule. Playback is over mobile phones with or without speakers.
Costs (not including development of programming)	Broadcast costs; costs of radios for users; electricity or battery charging costs	Costs of playback devices and of digital media recording and distribution; electricity or battery charging costs	Costs of mobile phones and of SD card recording and distribution; battery charging costs	Costs of mobile phones and of toll-free line (if IVR is funded by the government) or of telecom use (if users must pay costs); battery charging costs
Convenience	Radios are widely accessible	CD/Mp3 players can be procured fairly easily; not tied to a broadcast schedule	High level of mobile phone availability; less bulky than radios/playback devices (some phones may include radios); not tied to a broadcast schedule	High level of mobile phone availability; not tied to a broadcast schedule
Coverage	Limited to number of hours of broadcast that can be secured/paid for; limited by	Limited by device availability and electricity availability (for charging, if not for playback)	Limited by device availability and electricity availability (for charging, if not for playback)	Limited by mobile phone network coverage, device availability, and availability of electricity for charging.

	radio network coverage and the availability of radios.			
Monitoring	Difficult to monitor usage	Difficult to monitor usage	Programs built in some software can track usage on the SD cards in phones. If SMS is available, can also use phones to collect data on usage, retention of information, impact and user satisfaction.	Easy to monitor usage through call logs; SMS addition can easily collect data on retention of information, impact and user satisfaction.
Other considerations	Engages a potentially large shadow/secondary audience when broadcasts are on-air, thus raising awareness of ECD issues and of what high-quality ECD sounds like; crank and solar-charging radios are available.	Crank and solar-charging devices are available.	Reach and volume may be limited without speakers, but recording can partially address these challenges.	Reach and volume may be limited without speakers, but recording can partially address these challenges.

Technology options assessment for an ECD IAI program should consider the pros and cons of the various possible technology configurations and collect data on the relative costs of implementing those that are most favorable in a given context. Existing household survey data may provide information on the availability of radios and mobile phones in targeted communities. If such data are not available, a scan of radio and mobile technology in the local market should be conducted, to ensure that the devices used to deliver the IAI programs will be cost-effective and rational for sustained use and capable of delivering the

desired content. Assuming that governments will not be able to assume recurrent costs of equipment for IAI programming, device selection should ensure that devices are locally-available and within the purchasing power of the average ECD provider.

d. ECD IAI design document generation

The design document pulls together the findings of the audience research, the educational context assessment, and the technology assessment; serves as the point of reference for all project activities; and ensures that the many moving pieces of an IRI program are coherently related and smoothly engaged. *The design document guides every aspect of program development and maps out the learning process for the students and teachers. It plots the curriculum, the characteristics of the programs that are designed to engage participants, the evaluation process, the connections of the I[A]I program to other instructional materials, and teacher training.* – Anzalone and Bosch (2005)

Design documents should outline the pedagogical foundations for the programs and the local contextual factors that will make them engaging and relevant. They should include a scope and sequence and master plans for the IAI programs and guidelines for evaluation of program quality, along with training strategies for teachers and identification of supplemental materials that are to be integrated with the IAI programs.

Similar to many early primary grade programs, an ECD IAI program is typically one full year of instruction, covering multiple subjects in a single daily lesson of around 30 minutes in duration. Usually, ECD IAI program content includes early literacy, early numeracy, and lifeskills such as health, safety, and hygiene; but additional subject matter such as social studies, science, and religious studies may be included if it is appropriate and can be feasibly delivered over audio in the available timeframe.

Design document generation should be a highly collaborative process that engages ECD experts and curriculum development experts, IAI specialists, production personnel, and evaluators. The process can take several months, and should not be rushed, as it provides the critical foundation for the production and use of the IAI programs themselves and sets the work up to be evaluable and to succeed. In contexts where investment in ECD has not been a government priority, capacity of government staff to contribute to design may be limited. Therefore, resources from the private and/or nonprofit sectors may also need to be engaged. However, it is essential to include government personnel in a learning-by-doing process of professional development to support IAI design, as sustainable local programming will need to be a government responsibility.

PHASE 2: DEVELOPMENT

Once the design document has been developed, ECD IAI program development includes the following processes:

- a. *Scriptwriter training*;
- b. *Scriptwriting*, and
- c. *Formative evaluation* that prepare for the production of final use-ready episodes and supporting materials.

a. *Scriptwriter training for EDC IAI*

The quality of ECD IAI programming depends heavily on the quality of the program's scriptwriters. Ideally, scriptwriters should have a background in early childhood or lower primary education, to ensure that they understand the populations they will write for. Even with this background, however, intensive training of scriptwriters will be required to guarantee a quality end product. This training should be led by an experienced technical advisor who has produced IAI programs in the past.

The training should last from five to seven days and cover the following objectives:

- Gaining understanding of the concept of IAI and its application in an ECD classroom. Most writers arrive at the training with little (if any) prior knowledge of IAI. They may understand the concept of radio but will probably not have been exposed to an interactive audio program, especially not one designed for early childhood classrooms. To help them gain this understanding, it is advised that they experience ECD IAI through direct participation in an actual IAI program or by watching a video of it being applied in a classroom.
- Establishing a common understanding of quality ECD. Reviewing literature on best practices in ECD serves as a basis for drawing up collective profiles of the ideal ECD teacher and an average pre-primary student. These activities help scriptwriters develop an understanding of the population the programs will serve and the skills and competencies the programs will aim to build. These profiles, mapped against the national curriculum, will become the basis for program objectives. A typical pre-primary classroom setting in the target country should also be described in detail, including the materials that are readily available and used, typical classroom layout, average class size, etc. Scriptwriters need to understand a pre-primary classroom setting, and understand how it is different from (and often under-resourced in comparison to) primary classrooms. This shared understanding will also contribute to the development of the series' context and characters.
- Experiencing interactive activities to build learning and teaching objectives. The key to good scriptwriting is visualization -- when a scriptwriter is able to visualize what an activity looks like in the pre-primary classroom, it becomes easier to write down the steps it takes to guide the teacher to smooth execution of that activity. A good way to help writers develop this capacity to visualize is by having them experiencing the same activities they will thereafter learn to represent in scripts.

- Understanding the production cycle. Writers need to understand the process of program production from beginning to end, because scriptwriters often end up doing much more than just scriptwriting. In most cases, writers draft scripts, listen to programs for quality control, formatively evaluate the programs in actual early childhood centers and incorporate modifications to the scripts post-testing. Therefore, it is essential they familiarize themselves with the process.
- Learning to write scripts and practice writing and acting out scripts from master plans. Learning to write scripts is straightforward when quality examples and templates are provided. After writers have familiarized themselves with the production cycle, a 2-day writer's workshop using script templates and pre-developed master plans for an IAI ECD series should be undertaken. Writers should each produce at least one script during this portion of the workshop. After their scripts have been written, they should practice reading them aloud with a partner who will execute the instructions provided. This is to ensure that the instructions are clear, the necessary pauses are integrated, that interactivity is present in every segment, and that activities and language used are appropriate and engaging for this age level.

b. Scriptwriting

IAI scripts for an ECD program provide all of the information that will be needed for a studio to produce and record the programs. Dialogue, music, sound effects, and pauses needed for user response are detailed and timed, and represented in written form.

c. Formative evaluation of ECD IAI scripts

Formative evaluation of IAI scripts is an essential quality control element of the development process. Each script must be tested with actual potential users (teachers and children) to determine the following:

- whether the content is clear and at the right level of difficulty for the targeted users;
- whether the characters, music, sound effects, and story lines are engaging and understood as intended;
- whether the timing of the script (including pauses for listener response and activity) is effective;
- whether there is enough physical and oral activity and interactivity;
- whether the teacher is able to prepare and manage the resources and materials needed for the lesson;
- whether the teacher and students enjoy the program; and
- whether the teacher and students learned from the program.

Formative evaluation can be conducted by a range of actors, including program designers, scriptwriters, local government counterparts, and/or an external research team. All evaluators should be trained by an IAI evaluation specialist in the research methods

(observation, interview, focus group, skills assessment) used for formative evaluation prior to engaging in the process. **For an ECD application of IAI, it will be important for the training to include information on child development and best-practice ECD, as well as data from audience research and educational context assessment, to provide evaluators with a framework of appropriate expectations for teacher and student performance when using the IAI programs.**

Timelines for scriptwriting and formative evaluation for a year-long ECD IAI program can range from three to six months, depending on the skills and previous experience of the scriptwriters (and their availability, if they are government staff), the overall number of scripts to be produced, and the extent of changes required after formative evaluation.

PHASE 3: PRODUCTION

Production includes the following aspects:

- a. Audio production*
- b. Supplementary materials production*

a. Audio production

Local production of IAI programs in a studio that has been built for the purpose, leveraged from the government's media system, or obtained from a private or non-profit source will both build local capacity and allow for intensive quality assurance on site during production. However, recent advances in digital transmission technology make it more possible to outsource editing if local costs are excessive, local capacity is limited, or timelines are short.

Performers with both appropriate vocal skills and the requisite accents of the language used in the IAI programs are much more likely to be available locally. Local musicians can ensure that the music used is appropriate for the context. The number and type of performers depends on the design of the scripts and is affected by the number of characters included in the program and the extent to which music is incorporated.

In any scenario, selection of a production facility and staff (producer, editors, and technicians) should be based on their ability to provide highest-quality audio product. If listeners cannot hear or understand the programs due to production quality issues, they will simply stop listening, and the value of the program will be lost.

Programs may go through at least two rounds of recording to accommodate changes due to formative evaluation, so appropriate budget for re-recording must be allocated in advance to ensure quality. Depending on program length and complexity, an average of 1 to 2 production days per episode should be budgeted.

b. Supplementary materials production

National teaching and learning materials for ECD are often in sparse supply, so additional resources can be produced to enhance and complement the IAI programs if budget allows. Supplementary materials may include a teacher's guide and supplementary activities packet; printed posters; and manuals for the development of learning resources using locally available low-cost or no-cost resources (such as manipulatives made from bottle caps and natural materials like sticks, stones, and leaves; and charts and games made from old sacks, boxes or other packaging). These can be produced at the same time that scripts are being written, to ensure close alignment between scripts and materials.

PHASE 4: DELIVERY

Delivery includes the following aspects:

- a. *Teacher/caregiver training*
- b. *Delivery*
- c. *Delivery can be through a number of different mechanisms, including:*
 - *Radio*
 - *CD or MP3*
 - *Mobile Phone IAI*
- d. *Marketing and engaging audiences*

a. Teacher/caregiver training

IAI programming is by design a dual-channel intervention, providing teachers with professional development while also providing children with high-quality instruction. Nevertheless, program effects are greatly increased when teachers are oriented to the content, the pedagogy, and the technology in advance. The length of training should depend on an assessment of the extent of teachers' prior training in best-practice ECD and their familiarity with the technology selected for the IAI intervention. In many contexts, ECD teachers have relatively little training when compared to primary teachers – some may have no training at all in education or in early childhood development. Depending on the profile of the teachers who will be using the programs, two to four days of training may be needed.

Training should provide teachers with an introduction to and explanation of the value of the active learning methods through which they will be guided by the programs; guidance on setting up early childhood environments to make best use of the IAI programs; initial training on creating no-cost/low-cost learning materials, as they will be asked to do in the programs; and experience operating the technology, to ensure that they will be able to effectively implement the programs. The latter point is particularly important when using a non-broadcast vector, as the delivery of content from a mobile phone, for instance, is different from simply making a phone call.

If teachers are unable to access a face to face training, guidance and orientation can also be provided by radio or another digital medium. Face to face training is preferable, but the

same principles of active learning and engagement that are reflected in the IAI instructional series can be used to create a distance-learning training package.

b. Delivery (possible through varying devices and technology)

Delivery of ECD IAI by radio

Radio delivery of IAI is the most traditional approach. If radio is selected as the desired technology, based on the technology assessment described above, program delivery will need to be coordinated to ensure adequate range of broadcast coverage; an appropriate broadcast schedule; and consistent delivery in line with that schedule. Regular programming depends on good radio station organization (scheduling and logistics), and a well-functioning intermediary (the radio station) is key to program distribution. If the government has an educational radio service through the Ministry of Education or an alternative national public broadcast network, these can be engaged to provide broadcast time at low or no cost as part of ongoing public service programming. If public radio is not an option, private and/or community radio stations will need to be used. Every effort should be made to ensure that the smallest possible number of stations required to provide adequate coverage is used – engaging with a large number of broadcasters significantly complicates broadcast scheduling, cost control becomes challenging, and it becomes increasingly difficult to monitor actual delivery. Ideally, no more than 5 stations should be broadcasting an IAI series at once. If it is impossible to achieve the desired coverage without significantly increasing the number of participating stations, alternative means of delivery should be explored. Distribution of supplementary materials can be coordinated during teacher training prior to initial broadcast.

Delivery of ECD IAI by CD or Mp3

CD or Mp3 files for use in a playback device are an alternative to radio broadcasts that allows for sharing of materials and for repeated use of programs by teachers on their own initiative. Distribution of audio files (and, if funded, playback equipment and supplementary materials) can be accomplished in coordination with Ministry officials who supervise early childhood facilities, at teacher training/orientation, or through designation of a central pickup point (such as a selected preschool, a clinic, a food distribution depot, or another commonly-accessed location) for teachers in regions where programming is being used.

Delivery of ECD IAI by mobile phone

Mobile phone delivery makes IAI programming much more portable, and content creation tools like Stepping Stone allow for the integration of teacher guides with audio programming on the same device, and (like CD or Mp3 delivery) allows teachers to reuse programs as they need or desire. Loading programs and supporting materials onto SD cards for insertion into phones is fairly simple, and the cards can be delivered directly to teachers during training or distributed through mobile phone providers that also provide access to phone credits and equipment. Mobile phone volume may be increased with the use of portable speakers, if

desired, but recording at high volume can also largely compensate for the noise interference that may be encountered in ECD settings.

c. Marketing and engaging audiences

An IAI program should draw listeners to it, not be imposed upon them (indeed, the power of listeners to simply tune out if not satisfied cannot be overestimated). Planning for the marketing of a program is therefore an important part of its development. While primary school IAI may be easily marketed to potential users, given the established status of formal schooling and a desire to improve its quality in many contexts, early childhood IAI programs can require particularly nuanced and careful approaches. Where ECD programs are not part of the established educational landscape, or in contexts where early education is narrow in scope (for instance, focused on religious education), concerns about the purpose of the programs, the content, and their appropriateness for young children may be encountered. Marketing efforts should be developed with local advisors and draw carefully on the audience research of the program preparation stage, in order to allay concerns, highlight the advantages of the programming, and encourage interest in both the IAI intervention and ECD more broadly. Where possible, marketing should engage local champions (community and religious leaders, entertainers and public figures) to help convey the positive messages about the programs and encourage families to allow their children to participate.

MONITORING AND EVALUATION

Monitoring and evaluation of an ECD IAI program supports quality, ensures appropriate use of funds, and provides evidence for adaptation and/or expansion.

Monitoring of the fidelity of program implementation can occur through broadcast and listener logs (and for mobile phone users, usage tracking data) and periodic classroom observations that document whether the programs are being listened to as scheduled and whether teachers are using them as intended and directed. Monitoring visits should ideally be conducted by government ECD personnel, as part of a routine cycle of support to early childhood institutions. Training on fidelity monitoring will build the capacity of these staff to support their assigned schools. If government personnel are not available, community monitors from within the communities that house preschools can be trained, or outside contractors can be engaged to conduct site visits.

Evaluation of an ECD IAI intervention includes both the formative evaluation process that informs the development of the actual audio programs and supporting materials, and more summative assessments that track the effects of the intervention over time. The design of an evaluation framework for an intervention should reflect its particular context and goals, but potential measures of performance may include the following:

Student-level, teacher-level, and parent-level outcomes:

- Positive changes in student enrollment and attendance as compared to baseline

- Student and teacher retention and comprehension of IAI content (based on cohort pre and post assessment)
- Increase over time in student and teacher behavior that is consistent with IAI's active learning methodology, pro-social interaction modeling, and life skills messaging (observational data)
- Parent and teacher satisfaction

System-level outcomes:

- Accurate replication of process after piloting for uptake in other regions of the target country
- Government willingness to expand the program
- Generation of public and private resources for expansion
- Confirmation of low operating costs and high rate of return on investment (demonstration of value for cost relative to other possible interventions).

Costs for monitoring and evaluation activities will vary depending on the responsible parties, the scope of the intervention, and the size of the evaluation sample. Ideally, government counterparts should be involved from the start in the development and implementation of the monitoring and evaluation plan, to ensure their long-term commitment to the process of results documentation and quality control.

SUSTAINABILITY

The sustainability of an IAI initiative depends upon a number of factors, most important among which is the extent to which the program engages and pleases its users (as Anzalone and Bosch put it, “a quality I[A]I program will generate a following or constituency that expects the programs to continue.” [2005, p. 29]).

Sound pedagogical design; engaging and relevant characters, story lines and activities; and high-quality production set up a program for success and help it to build an audience that wants more of the same. In an ECD application, where not only the IAI methodology but also the principles and structures of early childhood education may be unfamiliar to many, quality of production and sensitivity to local needs and norms are particularly important. Careful audience research, thoughtful and engaging marketing to communities and families, and enlistment of program champions and advocates to encourage participation and help share positive results will support buy-in, use, and sustainability.

Indeed, engagement of stakeholders from the very start of an ECD IAI initiative is critical. Government and community counterparts and partners who are part of the development and implementation process and understand and support the concept of IAI for ECD will be better able to advocate for and sustain it moving forward. Training government counterparts through learning by doing throughout the project cycle builds their capacity to continue programming after external funding ends, promotes a supportive and enabling environment, and supports effective planning for long-term ownership and cost management.

Part 2

DRC Case Study

Context

Enrollment rates for pre-primary education in DRC country are currently very low (at 4.3%, according to the UNESCO Institute for Statistics), but the government has taken a number of steps to increase attention to early childhood development over the past 8 years, and is interested in expanding services and increasing their quality.

The country's most recent national education law (2014) guarantees preschool education for children aged 3-5, but does not fund its provision or mandate enrollment. Most preprimary education is still administered and provided by the non-state sector. Three ECD education interventions are implemented by the government, but they are neither mandatory nor free and they do not provide universal coverage. Clear learning standards and a coherent curriculum for three years of pre-primary education have been established, and professional requirements for teachers are in place. In the few existing pre-primary institutions, teachers generally meet the requirements for education and training, but the quality of training is variable.

In general, children from disadvantaged social status and rural areas typically do not have access to high-quality pre-primary education due to the high cost of private services and lack of nearby schools. IAI for ECD is a potentially transformative intervention in such a context, offering a mechanism for significantly increasing student access and supporting teacher professional development and high-quality instruction in community-supported preschools.

Summary of the Pilot

The ECD IAI pilot in DRC was a small-scale effort undertaken to determine the potential feasibility of a large-scale IAI program for kindergarten in DRC and to inform decisions in other countries. The contractor, which was already implementing a primary-grade IAI program in DRC, was tasked with:

1. Engagement with government stakeholders around IAI as a means of delivering high-quality ECD, and identification of target communities for a pilot of such programming
2. In-country program organization and community engagement
3. Curriculum review and program development
4. IAI episode prototyping and feedback generation
5. Process documentation and recommendations for scale up

The contractor, EDC, worked with World Bank staff to undertake the following activities:

- Ministry personnel were introduced to the concept of the pilot and endorsed it;
- Communities and schools were identified for the testing of the pilot IAI episodes;
- A local market study was undertaken to identify appropriate and within-reach technology for distribution of programs;
- A scope and sequence, master plan, and set of 6 scripts were developed, translated, produced, and validated by the Ministry of Education;
- Community sensitization meetings and facilitator trainings were conducted;
- The IAI series and supporting materials were field tested in 4 ECD centers in July 2014;
- Modifications identified from the testing were integrated into the IAI programs and the accompanying materials; and,
- Interviews with individuals participating in the testing groups—children, parents, and teachers—were conducted to better understand their needs and interests relative to the pilot. Overall, feedback from these stakeholders was positive and they were hopeful for a continuation of programming.

The entire scope of work was completed in five months, due to the minimal scale of production and the skipping of some key steps in the production process because contractor personnel were already highly-trained. Recommendations for scale-up of a program in DRC include the incorporation of those skipped steps, to ensure the development of government capacity and the sustainability of the program.

PHASE 1: PREPARATION

1. ***Engagement with government stakeholders and identification of target communities for the IAI program (audience research and educational context analysis)***

From the beginning of the project, government stakeholders were engaged to ensure that they understood and agreed with the purposes of the proposed IAI pilot and the selection of communities in which the programs would be piloted. Meetings were held with Ministry of Education personnel responsible for early childhood programming and educational media. The responsible counterparts expressed enthusiasm and appreciation for the partnership and commitment to providing support and authorization as it moved forward.

Educational context analysis confirmed the initial selection of Equateur province and Kinshasa as the pilot sites and Lingala as the pilot language for program development. Equateur is the Ministry's designated pilot province for many of its current initiatives and the focus of GPE interventions, so establishing a profile for ECD in this context builds on other momentum for education development and will ensure attention to the work. Lingala, the regional language of Equateur, is also the language of the capital, Kinshasa, and is closely related (and thus easily translatable to) another national language, Kikongo. A program at scale in Lingala and Kikongo would provide significant coverage to children in both urban

centers and rural areas of disadvantage who are currently not served by existing programs. Using Lingala (a familiar language/mother tongue) rather than French (a national language) is also consistent with good practice for early childhood, in which instruction should preferably occur in a language that children already understand and speak.

Criteria for school site selection, including a balance between rural and urban sites and the use of Lingala as a formal or informal language of instruction (or willingness to explore doing so as part of a revised preschool program), were shared with the Ministry and a set of possible sites that met those criteria developed.

This step of the process was successful in beginning a dialogue with government counterparts about the benefits of investment in ECED in general, sensitizing them to the potential of IAI as a delivery mechanism, and gaining their initial buy-in for a longer-term ECED IAI initiative as a follow-on to the pilot.

Lessons learned and considerations for replication:

- ✓ Government counterparts were excited about interest in and support for ECD, and appreciated their inclusion in school selection and program design.
- ✓ They also affirmed the great potential of IAI for providing high quality ECD programming across the DRC.

2. In-country program organization and community engagement (audience research, educational context analysis, technology analysis, design)

Based on the agreements with the Ministry described in Step 1, above, sites for the testing of the prototypes were identified. Participating schools were:

In Mbandaka (Equateur):

- a) Bon Depart Community School (Peri-Urban Area)
- b) Buprof Pre-School (Downtown Area)

In Kinshasa:

- a) Les Rachetes School (Mikonga Commune)
- b) Ecole Maternelle Kibunzi (Ndjili Commune [Peri-Urban])

A scan of mobile technology in the local market was also conducted, to ensure that the devices used to deliver the IAI programs would be cost-effective and rational in long-term implementation and capable of delivering the desired content. While devices were provided to schools as part of the pilot, this may not be an option when moving to scale. Therefore, device selection was designed to ensure that devices were locally-available and within the purchasing power of the average Congolese.

Devices selected for the pilot included:

- Telephone: Nokia 112
- Speaker: GOgroove SonaVERSE BX Rechargeable Portable 3.5mm Stereo Speaker
- Charging source: FatCat FC-SOLII Solstice Portable Solar Battery Pack

Lessons learned and considerations for replication:

- ✓ The technology, albeit local, required more training than originally anticipated.
- ✓ Therefore, more time should be allocated to training on use of technology in the initial training on IAI.

PHASE 2 DEVELOPMENT AND PHASE 3 PRODUCTION

1. *Curriculum review and development (educational context analysis, design, and scriptwriting)*

The contractor reviewed the existing *maternelle* curriculum for the DRC and developed a scope and sequence and master plan for the IAI programs that align with, and enhance, this pre-existing government-approved content. The scope and sequence focuses on the basics of play-based early childhood programming, through coverage of selected concepts in early literacy, numeracy and lifeskills (health and safety) that are particularly effectively delivered through IAI. This combination of content and pedagogy demonstrates the power of the medium for delivering curriculum and improving instruction.

Six scripts based on the IAI master plan were written in French and translated into Lingala with local validation and review. Teacher guides and simple instructional materials and manipulatives linked to the lessons were also developed in line with the scope and sequence and master plans.

The scope and sequence, master plans, and scripts were reviewed and validated by the early childhood education staff of the Ministry of Education in a collaborative process that ensured that curricular concerns and priorities were identified and addressed and that the pedagogical principles of IAI were clearly incorporated.

Lessons learned and consideration for replication:

- ✓ Because EDC already had well-trained scriptwriters in DRC, as well as high-level technical personnel with significant experience in the design and supervision of IAI, no scriptwriter training was needed within this pilot. Ordinarily, program development would include this type of training.
- ✓ For scale-up, thorough and careful scriptwriter training will be needed to ensure an appropriate number of high-quality scriptwriters for a full-length IAI curriculum for ECD.

2. Prototyping and feedback generation (production, teacher training, and formative evaluation)

Performers (actors and musicians) for the IAI episodes were identified, and production of the episodes took place from June 2 to June 20.

The IAI programs were tested in the selected schools according to the schedule below:

Site	Kinshasa	Mbandaka
Activity		
Parent sensitization	July 18	July 20
Training of teachers	July 19	July 21
Testing of 6 programs	July 21 to 26	July 22 to 29

Participants in pilot sessions were as follows:

School	# Children (male/female)	# Teachers (male/female)	# Parents/ Community Members (male/female)	# Other (Ministry) (male/female)
Mbandaka				
Bon Depart Community School	7 girls 12 boys	2 women 1 man (director)	15 parents (no sex disaggregation)	1 woman
Buprof Preschool	5 girls 10 boys	3 women	15 parents (no sex disaggregation)	1 woman
Kinshasa				
Les Rachetes School	13 girls 7 boys	3 women	18 women 3 men	2 women
Ecole Maternelle Kibunzi	8 girls 12 boys	3 women	10 women 3 men	2 women

Teachers selected for the pilot were oriented to the IAI methodology, to the technology being used, and to the ECD principles and content covered in the prototype episodes in a one-day training. They were also trained in the creation of simple instructional materials like counters and name cards and in how to set up an effective early childhood classroom.



Teachers being trained on how to use the IAI guide



Teachers being trained on how to use the technology

Community members and parents were provided with an orientation session to explain the purpose and goals of the pilot, share some examples of the IAI content, and provide answers to any questions that attendees might have.

Parents' concerns largely revolved around the language employed in the IAI programs (Lingala) because many desired their children to learn in French, which is perceived as the "language of success." To address this concern, Ministry personnel accompanying the team responded by presenting research on the importance of children's early learning in a language they understand and how this contributes to school success later on. Parents seemed satisfied with this response.



Parents gathered to learn about IAI

Some parents also brought up the cost of preschool. As preschool in the DRC is optional and cost-prohibitive, many parents do not send their children. Parents wanted to understand whether or not this type of preschool would be cheaper or what they would have to contribute. The question was turned back on them in order to better understand what parents would be willing to pay or contribute. Many said they would provide the learning materials and be willing to contribute around \$5 per month.

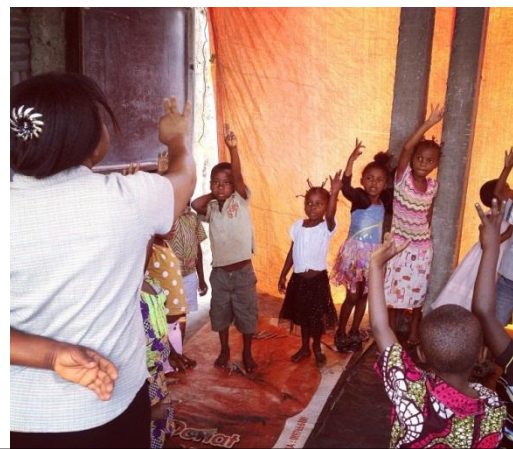


Ministry representatives talking to parents about the potential of IAI

The episodes were then tested in the selected classrooms with groups of 4-5 year old preschool children and their teachers. Testing for each program was followed by a group interview with the children to understand what they liked about the program and what they learned. Teachers were also interviewed to obtain their feedback on each lesson, to integrate into the modifications made to the program post-testing.



Children using manipulatives during IAI piloting



Children responding during IAI program activity

During each of the steps of this formative evaluation process, EDC staff recorded observations on the implementation of the programs and collected stakeholder feedback. These data were analyzed and incorporated into episode revision. Adjustments based on the feedback were made to the scripts and a final version of the series was re-recorded.

Lessons learned and consideration for replication:

- ✓ **Studio quality and availability-** Due to difficulties completing the work at the government recording studio, the project was compelled to requisition studio time at an alternative site to ensure that the recording was accomplished to an acceptable standard of quality.

- ✓ **Language selection-** Lingala as spoken in Kinshasa and as spoken in Equateur are slightly different. Production of the IAI episodes was done in the Equateur dialect because it is recognized as the “authentic” version of the national language that is used for education. Some concerns were raised about the use of Lingala as a medium of instruction, especially by those parents whose children speak French at home. This was mostly the case in Kinshasa where the Lingala dialect is largely interposed with French words. Indeed, many children and teachers in Kinshasa learned new Lingala terms through the pilot IAI programs. Careful linguistic analysis and assessment of the potential advantages and risks of selecting particular languages/dialects for IAI production will need to be done when taking this initiative to scale.
- ✓ **Teacher training-** The brief initial face-to-face training for teachers on the basics of child development, on appropriate early learning environment configuration and management, and on active learning was a valuable springboard for this program. However, the content of the training program was necessarily limited to the episodes being piloted. Full program development should include the development of a teacher guide for use with all episodes; accompanying low-cost, locally-sourced materials to be used as student stimuli and manipulatives; and a teacher training package that provides a more comprehensive orientation to the principles and practice of ECED and IAI instruction.
- ✓ **Teacher training on use of technology-** Technology will also need additional focus in the training if programming is rolled out at scale. Teachers grew more familiar with the technology as they used it during the pilot testing, but some experienced significant challenges at the beginning, even after the one-day training. Scaled-up implementation of an IAI program would benefit from more guided training time for teachers to experiment with using the phones to deliver the programs.
- ✓ **Importance of Ministry involvement-** The presence of Ministry representatives during the pilot provided a strong positive statement of support and engagement with the pilot. Parents, community members and teachers were pleased to see Ministry personnel engaged. For scale-up, it is suggested that local preschool (*maternelle*) Ministry representatives (i.e. IPAM) be involved in the initial training or sensitization activities.
- ✓ **Parental willingness to pay-** World Bank staff had requested information on parents’ willingness to pay for a preschool program delivered through IAI, but project staff felt that this question was difficult to ask in a context where no clear guarantee of an actual program was present. Parents in some sensitization groups were willing to talk about payment, as described above, and proxies for willingness to pay were also developed from responses by program staff who have children and from analysis of for-fee preschool programs offered by UNICEF (in which communities contribute resources and pay a small fee). Prospectively, communities might be predicted to be

willing to pay about \$5 per month as well as contributing locally-available materials such as bottle caps for materials production. However, this issue will need to be explored further with government stakeholders and a broader sample of potential parent beneficiaries prior to scale up.

RECOMMENDATIONS FOR SCALE UP

Because this was a small-scale pilot, community preschools through which IAI programming would be offered were not established as part of the project (the pilot programs were tested in existing schools). In order to provide wider access to preschool, IAI interventions need to be embedded in a more accessible context. Community preschools provide an inexpensive and proven method of reaching increased numbers of children, particularly in marginalized communities, and our general recommendation is that any scale-up include their establishment and support as a “home” for a full year of IAI-based ECED programming.

To support such a community IAI preschool program at scale, the following points need to be considered:

- A private studio with local actors needs to be contracted to ensure high quality IAI program production.
- Local scriptwriters need to be trained to develop the IAI programs at a high level of quality that is pedagogically sound for ECED implementation, integrated with and supportive of the Ministry curriculum, entertaining, and locally-relevant.
- Local personnel need to be trained in the formative evaluation methodology that will ensure high quality and utility of the IAI programming.
- A planning calendar needs to be drawn up and validated by the Ministry for the integration of the expanded set of IAI programs into the daily lesson activities of the *maternelle* curriculum.
- A linguistic analysis by province needs to be undertaken in order to appropriately target IAI programming to the provincial contexts.
- An official liaison mechanism needs to be created between community preschools and the formal system in order for community teachers to be recognized by the system.
- Communities need to identify safe spaces within walking distance of the children’s homes in which preschool activities can be held.
- Communities need to identify appropriate teachers to lead these activities and negotiate how to support their work. It is important to recognize that these supports may vary according to contexts.
- Intense start-up support will be required in order to ensure community preschool set-up. This support can begin to be reduced as communities and teachers become accustomed to their roles and responsibilities. This support can be provided by local Ministry officials responsible for preschool and other local organizations.

Appendices (in French)

- DRC Pilot Master Plan and Scope and Sequence
- DRC Scripts (final versions in French and Lingala)
- Teacher guides for DRC episodes
- Piloting (formative evaluation) documents: protocols and Q+A document
- Criteria for establishing community preschools

