Bridging the Early Childhood Education Gap: Exploring the Potential of Interactive Radio Instruction in Indonesia

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Summary
Studies conducted worldwide clearly demonstrate the role early childhood education (ECE) plays in developing school readiness skills in children; however, the majority of children in Indonesia do not have access to ECE. The primary beneficiaries of ECE services in Indonesia are children from high-income families and urban communities; children from low-income families and remote, rural areas are unlikely to participate in any sort of school readiness program prior to enrolling in primary school. There is great interest on the part of the Indonesian Government in providing services to bridge this gap. To this end, the USAID Decentralized Basic Education Teaching and Learning (DBE 2) Project has partnered with the Indonesian Ministry of National Education (MONE) to develop and implement an interactive radio instruction (IRI) pilot program for kindergarten teachers and students. The IRI pilot targets 5-6 year olds and follows Indonesia’s national Kindergarten B curriculum. The program, which builds on the success of Education Development Center’s IRI ECE programs in Honduras and Bolivia, is designed to address the needs of under and untrained kindergarten teachers in Indonesia while providing high quality content to learners.

For decades now Indonesia has explored a variety of distance education interventions, including radio, to tackle a range of basic education needs, yet to date no distance education model has been widely applied to enhance and expand ECE services. The DBE 2 pilot seeks to test the efficacy of the IRI model in bringing a high quality, relatively low cost ECE system to communities throughout seven provinces in Indonesia. Drawing on student assessment data collected over two years of implementation, this paper will discuss the potential of IRI as a model for bridging Indonesia’s ECE gap.

An Introduction to Interactive Radio Instruction
IRI is a distance education system that actively engages students in learning through carefully designed audio programs, either broadcast via radio or recorded on cassette, CD or MP3 player.1 The audio-based approach allows for high-quality and relatively low-cost educational programming to be widely distributed. Content is locally relevant as material is both produced and field tested in country and quality control is built into programming, ensuring all learners receive standardized content. IRI was developed in the 1970s to address the problem of poor achievement in mathematics in Nicaraguan primary schools. Since then, governments throughout the world have adopted the methodology to target a wide variety of subjects and audiences, including hard-to-reach and out-of-school populations. When successfully employed, IRI can be a powerful tool for simultaneously training teachers and teaching students, building teachers skills and enabling them to play a more active role in a student-centered, interactive teaching and learning process.

Studies of IRI programs in more than two dozen countries over the past 25 years clearly demonstrate consistent improvements in school achievement as well as an equalizing of

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1 In the case of USAID Indonesia’s DBE 2 project, IRI is referred to in-country as Interactive Audio Instruction, as programs are pre-recorded onto CD rather than broadcast on the radio.
equity gaps between urban and rural children and between boys and girls. Studies also consistently show that children who receive IRI in informal learning centers perform as well as or better than their counterparts in government schools. Research also indicates that children in government schools that use IRI perform better than their counterparts in non-IRI schools.²

IRI has proven to be an effective mechanism to train community educators with no prior teacher training as well as a way to turn under-trained teachers into better teachers. IRI can also provide education to those who are unreachable by other more traditional means — such as those in remote areas or those who cannot afford to attend conventional schools. Studies demonstrate that the level of achievement among rural students served by IRI programs has been as high or almost as high as for urban students.³ In recent years, IRI programs have been designed and implemented to reach pre-school, primary school and out-of-school children as well as teachers and community educators in a wide variety of countries, including India, Egypt, Zambia, Nigeria and Honduras.

It is important to note that IRI programs are not designed to alter existing education structures, but rather when successfully applied, as learning systems that compliment and reinforce national curricula. IRI programs are carefully designed so that they can be applied successfully in a variety of settings, including formal and non-formal, enabling participating governments to increase access to relevant systems of education.

The Early Childhood Education Gap in Indonesia

Studies conducted worldwide clearly demonstrate the role ECE plays in developing school readiness skills in children; however, in Indonesia, national enrollment rates in ECE services for 4-6 year olds are low, varying between 8, 15 and 24 percent.⁴ No matter which statistic one chooses to believe, they all tell a similar story - the majority of Indonesia’s children cannot access any sort of ECE service.

² Education Development Center, “Proof of Concept Study: Testing the Use of Interactive Radio Instruction (IRI) for Entrepreneurship Training with Adults,” 2007.
⁴ World Bank, “Early Childhood Education and Development in Indonesia: An Investment for a Better Life,” Working Paper Series No. 2006-2, p. 24. According to World Development Indicators 2006 Indonesia’s gross enrollment rate in preprimary education (ages 4 to 6) was 22 percent in 2004. Indonesia’s EFA plan states that only 15 percent of children aged 4 to 6 have access to early childhood education services. The MONE reports that about 27 percent of children in 2005 had access to ECED services. Problems with double counting and the inclusion of parent focused services in these calculations mean that the actual participation may be as low as 8 percent. MONE 2007/2008 data indicates that the net enrollment ration for 4-6 year olds is 23.94 percent, http://www.depdiknas.go.id/statistik/0708/bukusaku_0708.pdf
Indonesia’s overall investment in education is extremely small compared with other like countries. Smaller still is its investment in early childhood, whose main services are provided nearly 100% by the private sector. The main beneficiaries of early childhood services, especially core education early childhood services, are children from high-income groups. The absence of public investment remains a major obstacle to bridging the access gap between the disadvantaged and the advantaged.  

Indonesian children from low-income families are unlikely to participate in any sort of school readiness program prior to enrolling in primary school. As there is a direct correlation between access to ECE services and lower dropout and repetition rates it is not surprising to learn that in Indonesia, districts with high dropout rates also have low enrollment in ECE services. 

With over 17,000 islands making up the Indonesian archipelago, core-periphery issues pose serious challenges to the consistent and widespread delivery of early childhood education. Children from remote and rural areas are far more likely not to have access to ECE services and according to the MONE, there is a 17.7% gap between urban and rural kindergarten enrolment rates. 

Recognizing the importance of ECE, there is great interest on the part of the Government of Indonesia (GOI) to bridge the service provision gap and extend access to children throughout the country. The MONE is striving to broaden equity and quality of access to ECE, its Strategic Plan dictating the existence of at least one ECE program in all sub-districts by the end of 2009. In an effort to expand equity of access and make ECE more affordable for lower-income families, the GOI plans to eventually fund more than 50% of the ECE institutions serving children from low-income families. Kindergarten and ECE educator training and upgrading is another important government priority; the Strategic Plan prioritizes the development of 65,000 kindergarten and ECE teachers and managers by the end of 2009. 

The DBE 2 IRI Kindergarten Pilot

Over the past 25 years, Education Development Center (EDC), the DBE 2 project implementer, has maintained its leadership in the field of IRI, having successfully employed the approach in countries throughout the world, including ECE programs in Honduras and Egypt. In Indonesia, DBE 2 built on both EDC’s and the MONE’s experience and expertise in order to create an IRI kindergarten pilot program that is in line with national ECE goals and meets the needs of Indonesian teachers and students. 

The pilot is testing the efficacy of the IRI model in 113 kindergartens (both secular and Islamic) throughout seven provinces in Indonesia over a three year period. Results seek to demonstrate that IRI is an effective and cost-effective approach to strengthening the quality of ECE services and promoting school readiness. 

Developed in collaboration with MONE institutions the Center for Educational Information and Communications Technology (PUSTEKKOM) and the Open University (UT), the DBE 2

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6 World Bank, “Early Childhood Education in Indonesia,” p. vi.
9 The DBE 2 project operates in Aceh, North Sumatra, West Java, Banten, Central Java, East Java, and South Sulawesi.
IRI kindergarten pilot consists of an audio and print-based materials package for participating schools as well as a series of teacher training activities. Using a series of 106 interactive, innovative lessons recorded on audio CD, the IRI program is designed to meet the needs of under and untrained kindergarten teachers and their students by guiding and supporting the daily instruction of an entire year of the Indonesian kindergarten curriculum. The program has been developed to enhance the quality of kindergarten teaching and learning and improve school readiness by:

- providing high quality content that follows the national kindergarten curriculum
- simultaneously training teachers and teaching students
- facilitating an active learning based approach with every lesson

Though all audio programs follow the same structure, there are three types of audio programs: an introductory program, core programs and review programs. Teachers are expected to complete three audio programs a week with their students.

Textbox 2 outlines the materials included in DBE 2’s IRI kindergarten package. The printed teacher’s guide is designed to help teachers prepare for each audio lesson and contains information detailing the basic competency each audio lesson addresses, indicators to help teachers assess student and self progress, instructions and suggestions on what to do before, during and after the audio program, and lyrics for all songs included in the program.

To familiarize teachers with IRI, DBE 2 also provides a series of two 2.5-day teacher training workshops.10

Table 2. DBE 2 Partner Kindergarten Teacher Qualifications

<table>
<thead>
<tr>
<th>Highest Degree Earned</th>
<th>Percentage</th>
</tr>
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<tbody>
<tr>
<td>High School/Vocational School</td>
<td>43.9%</td>
</tr>
<tr>
<td>Diploma 1</td>
<td>2.6%</td>
</tr>
<tr>
<td>Diploma 2</td>
<td>34.6%</td>
</tr>
<tr>
<td>Diploma 3</td>
<td>4.1%</td>
</tr>
<tr>
<td>Diploma 4</td>
<td>1.5%</td>
</tr>
<tr>
<td>Bachelor’s Degree</td>
<td>13.3%</td>
</tr>
<tr>
<td>Master’s Degree</td>
<td>0%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

Cost Considerations

With most systems of distance education, a significant proportion of the overall program cost is associated with the development of the learning system. This was certainly the case with the DBE 2 IRI pilot, as demonstrated in Table 2 below. Once the development phase of the pilot concludes, remaining costs are those associated with the replication and distribution of materials, teacher training and recurring operational costs that participating kindergartens or ECE centers would incur. Studies worldwide indicate that IRI is a comparatively low cost way to provide high-quality education services. When compared to both conventional models of education delivery as well as other technologies, the IRI model proves to be more cost effective. The cost of television, for example, is typically more than ten times as high per student reached than that of radio.11

Table 2. The DBE 2 IRI Pilot Costs

<table>
<thead>
<tr>
<th>IRI Program Development Cost</th>
<th>$345,000</th>
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</thead>
<tbody>
<tr>
<td>Cost per School (IAI package)</td>
<td>$300</td>
</tr>
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</table>

School Readiness Outcomes of Students in DBE 2 Kindergartens

In the 2007/08 school year DBE 2 introduced a kindergarten student assessment instrument designed to measure both the number of students in DBE 2 pilot kindergartens achieving

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10 Education Development Center, “Upgrading Indonesian Primary School Teachers through Distance Education: Towards Systemic Improvement,” 2009.
11 The World Bank, “Improving Educational Quality through Interactive Radio Instruction.”
minimum school readiness standard as well as development gains a result of their participation in the IRI program over the course of one academic year. The instrument, which consists of a pre- and post-test, evaluates three major areas of early childhood development tied to standards for school readiness: gross and fine motor skills, language, and cognition.

The instrument has now been applied across two separate cohorts of students, in 2007/08 and 2008/09. Students tested each year were Level B enrollees—in their second and final year of kindergarten. This year represented the second year of testing, with the pre-test administered in August and September 2008 and post-test administered in May and June 2009 to 556 DBE 2 and 159 control kindergartners in the same school samples. In 2007/08, 525 DBE 2 and 141 control school students were tested. The discussion that follows pertains to those students who participated in both the pre- and post-tests.

Figure 1

<table>
<thead>
<tr>
<th>% of DBE 2 and Control Kindergarten Children that Meet Or Exceed School Readiness Measures Pre- and Post-Test</th>
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</thead>
<tbody>
<tr>
<td>DBE 2</td>
</tr>
<tr>
<td>Pre-Test</td>
</tr>
<tr>
<td>Post-Test</td>
</tr>
<tr>
<td>Pre-Test</td>
</tr>
<tr>
<td>Post-Test</td>
</tr>
</tbody>
</table>

- **General Trends**
  This year’s round of testing confirms last year’s finding that the majority of children graduating from Indonesia’s kindergartens are ready for school in the developmental areas assessed. The progress made over the course of the school year in the language and cognitive domains is substantial. While between 15% and 25% of children fail to meet school readiness standards in these two critical areas at the beginning of the school year, these proportions are reduced to fewer than 5% by the end of the academic year, suggesting that Indonesia’s kindergartens are well preparing children for primary school.

- **Comparison of DBE 2 and Control Kindergartens**
  The scale of Figure 1 above obscures an important area of the impact of the DBE 2 IRI pilot in the area of language. With both years of kindergarten testing, approximately 3% of control school children (3.5% in 2007/08 and 2.5% in 2008/09) fall below school readiness standard at the time of post-test. Among DBE 2 kindergarten students, however, this figure falls by two thirds to roughly 1% (1.1% in 2007/08 and 0.7% in 2008/09), as illustrated in Figure 2 on the next page. At this stage of life, language development is critical for learning. Children

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12 In Indonesia, kindergarten consists of two years of schooling, Level A and B, targeting 4-5 year olds and 5-6 year olds respectively. Approximately eight randomly selected Level B students per kindergarten were tested. The project trained local kindergarten teachers as test administrators.


14 Ibid.
that fall below school readiness standard in language are at risk of falling further and further behind their peers in their ability to benefit from schooling. This group of children often has difficulty in language comprehension and reading in future school years, which if not remediated by Grade 3 or so, threatens further school success.

The relatively simple and low-cost DBE 2 kindergarten intervention demonstrates that the size of this small but vulnerable group of children can be reduced by two thirds at this early stage. Based on the large body of early childhood development research, the return on this investment in terms of improved primary school outcomes will likely be measurable and substantive.15

IRI: A Promising Option for Bridging the ECE Gap in Indonesia

The DBE 2 pilot experience makes a powerful argument for extending kindergarten access throughout Indonesia. Data collected shows that roughly 97% of students tested finish kindergarten at school readiness levels in the three measured domains. It remains, however, that some 80% of Indonesia’s children do not have access to ECE and it is highly likely that a significant portion of these children are not at school readiness levels when they enter primary school. These students will be at a tremendous disadvantage when they begin school – especially when compared to their peers who have had the benefit of kindergarten.

In addition to demonstrating the benefit of kindergarten in general in terms of preparing children for primary school, DBE 2 project assessment results strongly suggest that the IRI program, when properly applied, enhances the quality of existing ECE services. It is noteworthy that only 13.3% percent of DBE 2 partner kindergarten teachers have the equivalent of a bachelor’s degree16 and just 44% an educational background in the field of education. By providing untrained and under-trained teachers with on-the-job training in the

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15 Ibid.
16 This number is slightly higher than the national average, which is 11.16% (Bachelor’s and Post Graduate) 
most authentic of environments – their own classrooms – and the resources necessary to actively teach a year of the kindergarten curriculum, the IRI kindergarten program could be used as a means of increasing the quality of kindergarten and potentially extending access to ECE services throughout Indonesia.

Though the pilot program currently targets 5-6 year old students enrolled in a relatively small number of kindergartens and their teachers, it could easily, and with relatively low cost per school, be more widely distributed. This is in fact already happening: since early 2009, the MONE (Center for Teacher and Education Personnel Development and Empowerment, Kindergarten and Special Education Directorate General) has introduced the IRI program to kindergartens in nine new provinces and 57 non-DBE 2 target districts. In communities where limited ECE services exist, the IRI kindergarten program would also be a straightforward and affordable way for the public or private sector to start a non-formal ECE program, making use of parents and community volunteers to act as program facilitators and educators. The use of untrained “teachers” to facilitate IRI lessons, as discussed earlier in this paper, has been met with success in numerous countries around the world, at both the IRI pre- and primary school levels.

When carefully developed and effectively applied, IRI learning systems can assist governments in solving a host of education challenges. The Indonesian government is keenly aware that it must expand the provision of ECE services throughout the archipelago so that a majority of children have the opportunity to access some type of ECE program and develop the foundational school readiness skills that pave the way for a successful primary education experience, and beyond. The outcomes of the DBE 2 pilot, when combined with the sum of global IRI experience, make a strong case for IRI as a solution to bridging Indonesia’s ECE gap.