Technical Cooperation Abstract

I. BASIC PROJECT DATA

Country:	Paraguay
TC name:	Preschool Radio Science
TC number:	PR-T1182
Team leader/members:	Emma Näslund-Hadley, Team Leader, (SCL/EDU); Mercedes Mateo (EDU/CCH); Livia Mueller (SCL/EDU); Marta de Corvalan (CSC/CPR)
TC Taxonomy	Client Support
Number and name of Operation Supported by the TC:	n/a
Reference to request:	IDBDOC#39050912
Date of TC abstract:	22 January 2015
Beneficiary:	Ministry of Education and Culture (MEC)
Executing agency and contact name:	Paraguay Educa
IDB funding requested:	US$700,000
Local counterpart funding:	US$140,000
Disbursement and execution period:	Execution : 30 months; disbursement: 36 months.
Required start date:	June 2015
Types of consultants:	Firm and individuals
Prepared by unit:	SCL/EDU
Unit of disbursement responsibility:	CSC/CPR
Included in Country Strategy (y/n);	No
TC included in CPD (y/n):	Yes
GCI-9 Sector Priority:	Yes, social policy for equity and productivity

II. JUSTIFICATION AND OBJECTIVE

2.1 **Justification.** 21st century skills are those that students need in order to be competitive in an increasingly globalized world in which knowledge is expanding rapidly, technology is changing ever faster, and job descriptions are constantly shifting. These are the skills students need to help them make sense of an increasingly complex world and to navigate it effectively. Because these skills are in such high demand, it's no longer enough for instruction to focus on imparting facts and isolated bits of knowledge that appear to have no context or relation to the everyday world the students live in (Darling-Hammond and Adamson, 2014).

2.2 Perhaps no other subject area focuses as much on the development of 21st century skills as natural science. Yet, early grade science education in Latin American classrooms is largely limited to the memorization of the history of science and scientific facts. Paraguay is no exception: a recent study found that in 6th grade classrooms only 3 percent of lesson time is spent on making connections and only 6 percent on students' practical activities (Näslund-Hadley et al 2014). As is the case in most of Latin America, at the pre-primary level science is left out of the curriculum altogether.

2.3 The limited interest in pre-primary science is a concern for several reasons. Inquiry and problem solving help children build confidence, and gives them a framework to understand the world. Also, children begin to develop interests in subject areas early and "we should pay close attention to children's early exposure to science" (Tai et al

2006). Additionally, the literature shows that by developing pre-science skills students can build on those skills in subsequent grades (Valverde & Schmidt 2000).

2.4 Against this background, the Government of Paraguay wishes to develop and test a pre-school science curriculum. Based on the positive results from a bilingual intercultural radio education pilot (ATN/JF-12570-PR) a pre-primary mathematics pilot that the Japan Special Fund of the IDB financed in the past (ATN/JF-11945-PR), the Ministry of Education and Culture (MEC) wishes to adopt an interactive radio science methodology. Interactive radio science education has been tried previously in Asia with very positive outcomes, but never at the pre-primary level (World Bank 2005).

2.5 Great educational programs will be useless if kids are not enrolled or do not attend formal education centers. Neuroscience has shown that precisely in those early years the brain develops at a much faster pace than at any other stage. All stimulation received in this period of life will shape cognitive and socio-emotional skills that a person will carry for the rest of her/his life. Yet, the statistics show that it is precisely those kids needing preschool more, who use it less. In Paraguay, the gap of attendance between low and high income levels (quintiles I and V) in 5 year-old children is almost 40 percentage points. If early education has to contribute to close learning gaps and level the playing field, then we need to get the right kids into the right programs. MEC is currently working on a large expansion of formal education for children 3 to 5 and they need to know which households are not bringing their children and why.

2.6 **Objective.** The general objective of the proposed TC is to develop and field-test pre-primary radio science curricula that aim to enhance early problem-solving skills learning in a context of large teacher pedagogical and content gaps. For this program to benefit the most of the Paraguayan youngest generations, it will provide strategies for the government to bring vulnerable children into formal education.

2.7 **Specific Objectives.** The specific objectives are to: (i) develop a bi-lingual pre-primary science curriculum, didactic materials and radio lessons in Spanish-Guaraní; (ii) conduct an experimental pilot of the curriculum in 401 pre-primary classrooms in 292 schools in a Paraguayan department to be determined; (iii) conduct a rigorous evaluation of the pilot; (iv) conduct an experimental pilot to identify the best strategies to bring children of the lowest income quintiles to these preschool programs; and (v) disseminate the results.

2.8 **GCI-9 Alignment**. The 9th General Capital Increase (GCI-9) sets out five priority areas. This TC is aligned with the first priority area on social policy for equity and productivity.

III. DESCRIPTION OF ACTIVITIES AND OUTPUTS

3.1 To achieve its objectives, the TC will finance five components: (i) development of a bilingual science curriculum and learning materials for pre-primary; (ii) implementation of a Radio Science Pilot; (iii) assessment of children's pre-science abilities; (iv) study of early education demand; and (v) dissemination of results. A group of consultants will be contracted, including experts in the development primary science curricula, design and editing of didactic materials, primary teacher training, and experimental evaluation.

3.2 **Component 1 – Development of Preschool Bi-Lingual Science Curricula and Inter-active radio lessons (US$160,000).** The TC will finance the creation of preschool bi-weekly science curricula that focuses on the development of critical thinking and problem solving skills. The curricula will offer teachers a sequenced and in-depth coverage of pre-science concepts. The TC will also finance the development of inter-active radio lessons for the implementation of the curricula in vulnerable and communities. Both the curricula and the didactic materials will be developed in close collaboration with teachers and JICA volunteers, using their feedback and suggestions to change, rearrange and add activities. Based on the experience from the Little Mathematician pilot in Paraguay, it is estimated that the curriculum and didactic materials can be developed and validated in a period of 10 months.

3.3 **Component II – Pre-primary Radio Science Pilot Implementation (US$238,000).** The TC will finance the application of the curricula in a group of schools offering pre-primary science education in socio-economically disadvantaged communities [1] (Group I). The teachers will receive training and on-going technical assistance to help them understand the concepts and implement the curriculum in their classrooms. To ensure sustainability, also Ministry of Education specialists will participate in the training. Didactic and pedagogical support materials for the pilot will be produced. The Pilot will be implemented twice weekly during one school year.

3.4 **Component III – Assessment of Children's Pre-science Abilities (US$190,000).** The TC will finance an experimental design of the pilot, contrasting any changes in learning of children in the treatment group with children from a group of comparison schools (Group II). To make possible the study of an accumulative impact, the beneficiary schools will be the same as those in the Little Mathematician pre-school pilot. The collection of the baseline and data processing will take place during the first three months of the school year. The second application of the evaluation instruments will take place during the last two months of the school year. Throughput pilot the quality and intensity of the implementation will be systematically monitored.

3.5 **Component IV – Early Education Demand Study (US$250,000).** The TC will finance an experimental design of a pilot, that will provide detailed information to families about: (i) convenience and quality aspects of formal educational services (distance, transportation, infrastructure, provision of meals, service hours, etc); and (ii) benefits for children (future returns) of attending early education. Provision of information packages that emphasize different aspects of early education services will help understand why families do or don't bring their children. These should then translate into different information strategies to educate potential demand and to be used by the government in the context of the expansion of formal education for young children. The collection of baseline data will be done before the beginning of the school year on eligible households. The follow up will be done during the first weeks of the school year, to see which families enrolled and which information strategy was more effective at convincing families. The analysis of selective take up will be performed using the data gathered in the baseline.

[1] The department will be determined during preparation.

3.6 **Component V – Dissemination of Results (US$2,000).** The results of the Pilot and the Daycare Demand Study will be disseminated workshops in Paraguay and at the Bank headquarters in Washington DC. These two half day workshops will take place once the pilot evaluation and the daycare study have been completed. As has been the case with the dissemination of the Little Mathematician pilot, the support of the Government of Japan and the JICA volunteers will be promoted in all videos, newsletters and reports.

IV. BUDGET

4.1 The total cost of the TC is US$840,000, US$700,000 which will be charged against a TC Fund. The remaining US$140,000 will be provided in kind by the Government of Paraguay.

Table iv-1: Indicative budget in US$

Activity/Component	Description	IDB Funding	Counterpart Funding	Total
Comp. 1. Curriculum	Consultant	150,000	-	160,000
Comp 2 Pilot	Consultant	238,000	-	238,000
Comp 3 Evaluation	Consultant	190,000	-	190,000
Comp 4 Daycare Study	Consultant	110,000	140,000	250,000
Comp 5 Dissemination	Consultant	2,000	-	2,000
Total		**700,000**	**140,000**	**840,000**

V. EXECUTING AGENCY AND EXECUTION STRUCTURE

5.1 **Executing agency.** The executing agency is the foundation Paraguay Educa. MEC has requested that Paraguay Educa execute the TC since MEC has a long trajectory of collaborating with non-governmental organizations to support the execution of projects on behalf of the MEC. The Paraguay Educa foundation was established in 2008 and has already spearheaded several innovative projects (www.paraguayeduca.org).

5.2 **Execution period.** The TC will have and execution period of 30 months and a disbursement period of 36 months.

5.3 **Procurement.** Standard Bank procurement policies will be followed.

VI. PROJECT RISK AND ISSUES

6.1 The execution of a pilot based on an experimental design in a context such as Paraguay presents logistical challenges. However, Paraguay Educa has many years of experience in working with schools in remote geographic areas with difficult terrain. Paraguay Educa also has experience from implementing education technology projects in rural and urban marginalized areas, including distribution, maintenance and technical assistance. Through a one laptop per child project, the organization has trained and supported teachers in 37 schools over a period of several years.

VII. ENVIRONMENTAL AND SOCIAL CLASSIFICATION

7.1 The Pilot is not anticipated to have direct environmental or social impacts. No Bank resources will be used to finance investments in infrastructure.

References

Darling-Hammond, L. and Adamson, F. 2014. Beyond the Bubble Test: How Performance Assessments Support 21st Century Learning. San Francisco, CA: Jossey-Bass.

Näslund-Hadley, Emma, Loera, Armando and Hepworth, Katelyn. 2013. "What Goes On Inside Latin American Math and Science Classrooms: A Video Study of Teaching Practices" in Global Education Review 1(3): 110-128.

Tai, R. H., Liu, C. Q., Maltese, A. V., and Fan, X. 2006. Planning Early for Careers in Science. *Science*, 312(26): 1143-1144.

Valverde, G. A., and Schmidt, W. H. 2000. Greater Expectations: Learning from other nations in the quest for "world class standards" in U.S. Mathematics and science. *Journal of Curriculum Studies,* 32(5):651-687.

World Bank. 2005. Improving Education Quality through Interactive Radio Instruction: A Toolkit for Policy Makers and Planners. Africa Region Human Development: Working Paper Series. No. 52. Washington, D.C: World Bank.