Centre for Budget and Policy Studies

Cost Effectiveness of Interactive Radio Instruction Program Karnataka

Basic & Program Cost Effectiveness

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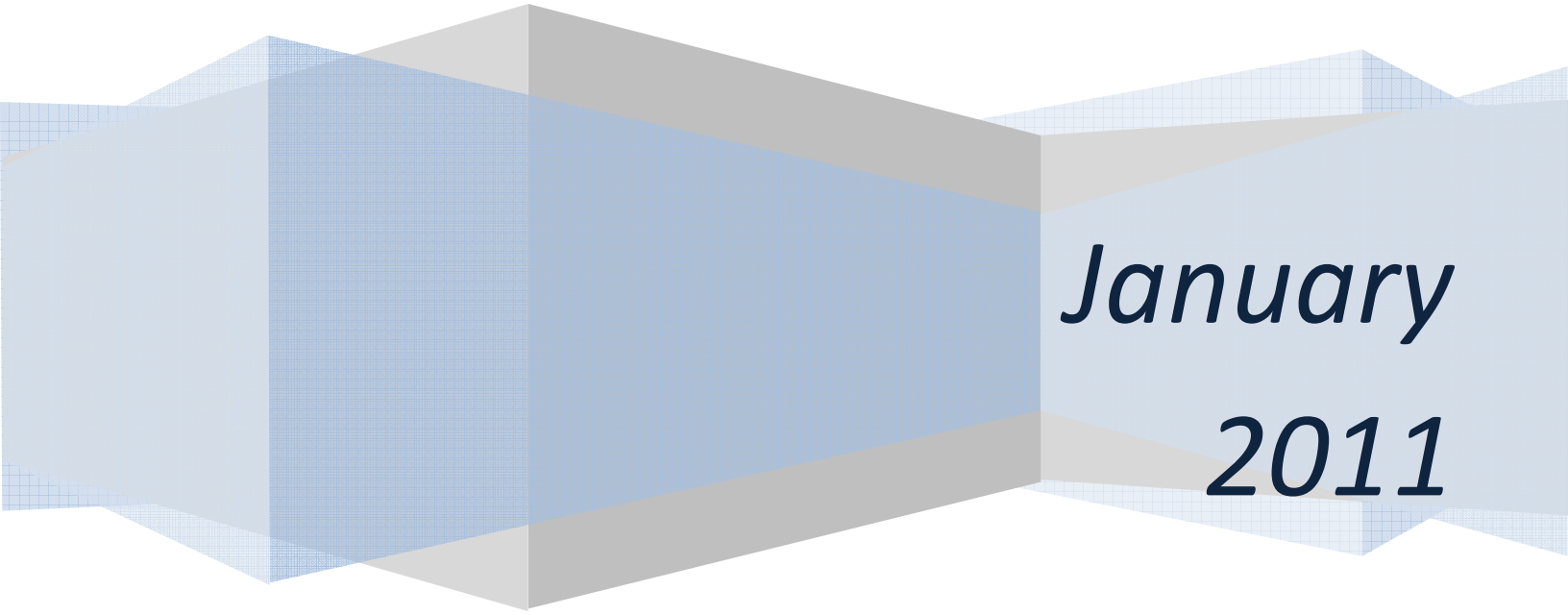

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Abstract

The Cost Effectiveness for the education sector in Karnataka aims at looking into the effectiveness of the expenditure on the Interactive Radio Instruction (IRI) intervention as done by the Government of Karnataka in collaboration with the Education Development Centre. This aims to do a Basic and a Program CEA. For the Basic CEA, it compares the per student cost of delivering the Radio Programs with the per child cost of the Interactive Audio Instructions (IAI) in the primary schools of Karnataka. Per child expenditure for the IRI program is Rs 31(approximately) which is much lower when compared to the per child expenditure of the IAI which is nearly Rs 126(approximately). However the very rational of using the radio programs was to achieve the scale effect and the use of offline medium was to target a smaller group of students where the use of radio was not cost effective.

The Program CEA extends to the study to an impact analysis of the Radio programs to assess whether the expenditure being made for this intervention is helping the students in improving their learning outcomes. This would then serve as a true measure of effectiveness[1] ie; linking the outreach with the outcomes. This requires tracking a cohort of treatment and control groups over a period of three years. Also the study would document the qualitative behaviour as observed in these groups. The baseline has shown mixed outcomes of the intervention. While certain groups are seem to benefitting in a statistically significant manner, other groups do not show significant differences in their learning outcomes. The next cycle of the cohort study will provide deeper insights.

[1] The efficacy of any intervention in the education sector is judged by its ability to improve learning outcomes of maximum students. Following this, one can say that any intervention is successful when it is helping students to improve learning outcomes on a scale basis.

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Acknowledgement

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None of these institutions necessarily share the views and opinions expressed in the report. The responsibility for the same are mine only.

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1. Introduction: Brief background information on the IRI

Looking at the nature of problems in the education sector, one finds that most of the Indian states battle similar impediments in achieving the twin goals of quality and equity on a scale basis. While states like Kerala and Tamil Nadu have largely managed attaining the access and enrollment targets, the actual learning outcomes are not very satisfactory. In the state of Karnataka also, the problems are one of quality and achievement of quality on scale basis as the GER and the NER are reasonably good. Interventions (GoK, Sarva Shiksha Abhiyaan, 2010) like teachers training, integrated education, girls' education and introduction of ICT techniques were brought to tackle the issue of quality in the state. However, the issue of rendering quality education in the primary education continues to remain elusive and a challenge for the stakeholders[2]. Various attempts are being made to ensure that while the goals of access, enrollment and retention are achieved, the quality of education is exhibited through the students' performance in terms of better learning outcomes.

The interventions need to be looked through the effectiveness lens. While expenditure has to be huge to meet the goal of universalisation on a scale basis, it has to effective in terms of delivering quality education. Tools like Cost Benefit analysis, Program Benefit analysis, Cost Effectiveness analysis and Benefit incidence analysis have been popularly used by evaluators and policymakers to judge the efficacy of public expenditure. These have been applied to the education sector as well. It is oft repeated stance that there is a need for more research on the effects of policy interventions on outcomes beyond access to a year in school and what they earn as a result, such as on what children actually learn. Such research should focus on ensuring that the interventions are attributable to outcomes (Patrinos, 2008).

The present paper proposes to study one such intervention implemented in the state of Karnataka namely the Interactive Radio Instructions and would apply the tool of Cost Effectiveness Analysis(CEA) to see how effective is the money spent on this intervention in improving the learning outcomes.

Interactive Radio Instructions are pre recorded programs for the students based on the school curriculum. They are aired through satellites and radio is used for the reception of the program. The issue of scale is resolved as these are able to reach millions of students and deliver the instructions to children. Radio is the equipment used to deliver the instructions. The content is designed after a detailed analysis of the requirements of the students targeted with the course curriculum, area/region of the student population.

Education Development Centre (Centre, 2010) (EDC), an international organisation, has been responsible for the development of the content and training programmes for the IRI being implemented in Karnataka, India. EDC is a global not for profit organization that designs, delivers and evaluates innovative programs to address some of the world's most urgent

[2] Stakeholders for the primary education would include students, teachers, parents/guardians, policy makers and all those who are part of the design, implementation and monitoring and evaluation of the school system from the local level to the national level.

challenges in education, health, and economic opportunity. In the education sector, EDC has been working with educators and administrators in a wide variety of settings across globe to improve learning outcomes of people of all age groups, especially through the use of technology where EDC designs and implements programs around various issues of literacy. Special investments have been made in education technology leading to implementation of projects by EDC where in multimedia and internet have been the medium of achieving education objectives. Radio has been a very popular medium identified by EDC to provide basic education to children in schools and also to those who are out of the school system. Among many, special mention requires of countries like Malawi, Sudan, Somalia, Pakistan and India where EDC claims to have been successful in using radio as a medium to improve learning outcomes (Centre, 2010).

Various studies around the world shows that radio has emerged as an effective tool to bridge gaps in education and it helps in improving the learning outcomes of the students. Several studies (Development Research Group, 2005) have shown that radio has been used as a tool to reach large audiences in Africa, Latin America and Pakistan (Thukral, 2009) etc at minimum costs. India has also experimented with utilizing the innovative tools in bridging the gaps in education sector. States have taken initiatives so as to popularize the usage of innovation in the education sector so as to meet the twin issues of quality and scale.

Education Development Centre was experimenting with the idea of using radio as a medium to help students and teachers improve learning outcomes on a scale basis across various parts of the world (Somalia, Sudan, Malawi, and Pakistan). Their proposal to do a similar pilot in Karnataka was well received by the state level representatives of Sarva Shiksha Abhiyaan (SSA) (GoK, Sarva Shiksha Abhiyaan, 2010) resulting in the collaboration between EDC and SSA, Government of Karnataka to design and implement the radio programs based on school curriculum for all government schools in the state. Government of Karnataka implemented the Interactive Radio Instructions (IRI) to improve learning outcomes of children through technology interface in a child friendly manner through the medium of radio.

IRI claims to be a time tested tool around the world to reach larger audiences in a cost effective manner (Centre, 2010). It has been used to teach basic primary subjects to diverse learners.
The need to supplement the text book teaching through radio lessons have been a popular and tested way in countries like Zambia, Guinea, Somalia, Sudan, Malawi (Tilson, 2009), etc. While the main objective of the IRI program would vary from country to country[3], some states in India adopted the IRI strategy to supplement the existing teaching system so as to help teachers teach and students learn the so called 'hard spots' as identified in the existing curriculum. Initiative like IRI was adopted to tackle the problems faced by teachers in teaching certain difficult portions of the school curriculum (*known as Hard Spots*) to the children effectively. It was a known and accepted fact that students too were finding it hard to tackle certain portions of the mathematics and science curriculum. With the existing infrastructure, it was felt that radio could be a cost effective tool to reach the government schools in the states with low expenditure and comparatively larger reach.

[3]Some African nations have used to supplement the existing teaching tools or as the alternative method to reach the hardest to reach groups

In 2004, the Sarva Shikhsa Abhiyaan, the DSERT (GoK, Department of State Educational Research and Training, 2010) and EDC (headquartered in Washington), through a USAID initiative, collaborated to produce the Interactive Radio Instruction (IRI) program, "Chukki Chinna" in Karnataka. Since 2005, the Government of Karnataka implemented the program for all the schools in the State. The IRI program is part of EDC's Technology Tools for Teaching and Training (T4) program.

The special features of this program include

- Instructional tool specially designed to deliver active learning by radio
- Identifies radio as a potential tool learning and dissemination
- Usually 30 minutes audio lesson making students and teachers react verbally and physically to questions and exercise posed by radio characters
- Use of imaginative local themes, songs, games, role plays and activities which unite the children at the local level so as to help students overcome difficulties in learning the curriculum and also enhances teachers' capacity of imparting the so called 'hard spots'
- Interactive session between teachers and students through pauses used in the radio programs
- Usually transmitted via live broadcasts(IRI) or lessons pre recorded onto CDs & mp3 format(Interactive Audio Instruction)
- Teachers are trained exclusively to deliver the contents in the IRI classes and are provided with guide books to conduct the IRI classes.

The initial effort was to test in a few pilots whether such a medium would help students and teachers in learning the *Hard Spots* easily. The positive response received by EDC and the GoK lead to the gradual scaling up and expansion of the coverage and curriculum in the entire state of Karnataka. Other state governments also became open to the idea of using radio as a means of imparting better learning outcomes in schools so as to supplement the existing teaching mechanism. Rajasthan, Jharkhand, Madhya Pradesh and Delhi have all implemented the IRI scheme. On getting a positive feedback of IRI, EDC started to experiment the idea of developing Interactive Audio Instruction *(IAI)* to provide lessons in Urdu schools of Karnataka. This was done so as to provide support in schools where the targeted group of students is not very large[4] to make the use of radio a cost effective medium.

[4] There are schools which cater to diverse population using varied mediums of instruction. Urdu schools are one such group which impart formal education in using Urdu language as the medium of instruction

2. Objectives of the study

The *basic objectives* of the present study would be

- To look into the cost of delivery of Interactive Radio Instructions (IRI) and alternate medium like Interactive Audio Instructions (IAI) for the state of Karnataka so as to suggest which is more cost effective in terms of beneficiaries covered.
- To look at the utility of IRI in terms of improving learning outcomes in a few schools of Karnataka by comparing the performance of IRI students(treatment group) and non IRI students (control group)
- To document the best practices in terms of classroom processes as observed in the IRI classes.

As part of the GDN commitments CBPS has set itself to do two types of CEA in the education sector namely a Basic CEA and a Program CEA[5]. All the analysis will be done for the state of Karnataka.

Cost effectiveness analysis is a tool for all evaluators who are trying to gauge how out of various programs aimed at achieving similar goals one can choose the most efficient program in terms of its outcome and costs. Cost effectiveness studies initiated in the 1960s to look into the defence expenditures followed by the health expenditures in the US, and later serious attempts were made to analyze the educational spending with this tool

Cost-effectiveness analysis refers to a method for combining appropriate measures of outcomes with costs so that program and policy alternatives can be ranked according to their effectiveness relative to resource use. Presumably the alternatives with the least cost relative to their results (or best results relative to costs) are the ones that are most attractive for adoption. This information should be viewed as helpful in guiding, but not determining, decisions. Other issues such as implementation feasibility need to be considered in the decision process (McEwan, 2000). However, Henry M. Levin has been honest to accept that few studies have been done on the CEA in the education sector. Yet they remain significant to evaluators in providing deeper insights.

[5] Details for the Basic CEA and Program CEA is presented in the following section

3. Basic CEA

The basic CEA would measure the cost effectiveness of two programs with similar goals. The analysis is just a comparison of unit costs of meeting the objectives through two alternate programs. CBPS analysed the unit cost of delivering the Interactive Radio Instructions (IRI) and Interactive Audio Instructions (IAI) in the state of Karnataka.

3.1 Background on IRI and IAI

Interactive Radio Instructions (IRI)

The IRI program as mentioned earlier is a technological intervention that serves as a dual audience training tool. It targets students and teachers[6] both. The importance of IRI as explained by EDC is based on certain assumptions regarding the strength and limitations of radio as a uni-sensory medium, as given below:

- Radio broadcast has the inherent strength to outreach the masses and is an affordable medium for both the distance education institutions and the students.
- Used at the local level it can cater to the area-specific needs of the students and involve them in selecting problem areas for discussion.
- The decentralized approach of local broadcasting can develop a sense of intimacy and warmth between the resource persons and the students.
- The disadvantaged groups- poor, physically and visually challenged, and women- who find it difficult to attend in face-to-face academic counseling sessions can be reached by the interactive radio counseling.
- As interactive radio interaction is designed in a decentralized way, follow-up interaction (either face-to-face or by telephone) with the resource persons and among the students can be strengthened. This can motivate the students to form self-help groups.

The programs were developed and implemented in Karnataka in 2005-06 after full audience research, interactions with the stakeholders namely teachers and educationists.

[6] Teachers are also learners and are guided through hands-on practice leading students in pedagogically strong activities, then are provided with explanations of how to adapt the activities on their own.(EDC's Concept Note on IRI)

Interactive Audio Instructions (IAI): Awaz-e-Ilm (Urdu)

Seeing the success of the IRI programs in the state, the Urdu school teachers demanded for a similar intervention for the Urdu schools. The Government of Karnataka supported EDC to develop a similar technological intervention which could help both the students and teachers in the Urdu schools.

EDC enquired about the curriculum needs of the teachers and students and had many participatory discussions with the Urdu school teachers so as to design programs for their needs. This resulted in the implementation of the **Interactive Audio Instructions (IAI): Awaz-e-Ilm (Urdu).**

This is an adaptation of the "*Chukki Chinna"(IRI)* series in Urdu. The series target students and teachers of classes 4 and 5 in Urdu medium schools of Karnataka and Andhra Pradesh to teach them several Mathematics, Science and Social Studies topics. The series include 50 lessons. The program reaches a total of 106,159 students of classes 4 & 5 of 2294 Urdu medium schools in Karnataka.

The Urdu school programs were limited in number due to the presence of fewer schools in the state. Hence there was no need to invest heavily in doing an online medium. As a result, the urdu programs were pre recorded and provided in CD formats. Government of Karnataka provided the multimedia players and the schools were given the recorded programs in CDs to be used in the classes.

The IAI are similar in their approach, contents and objectives. The only difference being the medium of dissemination. Unlike the IRI programs where a radio is used, the IAI program uses a multimedia player.

Steps for the design and implementation of IRI/IAI

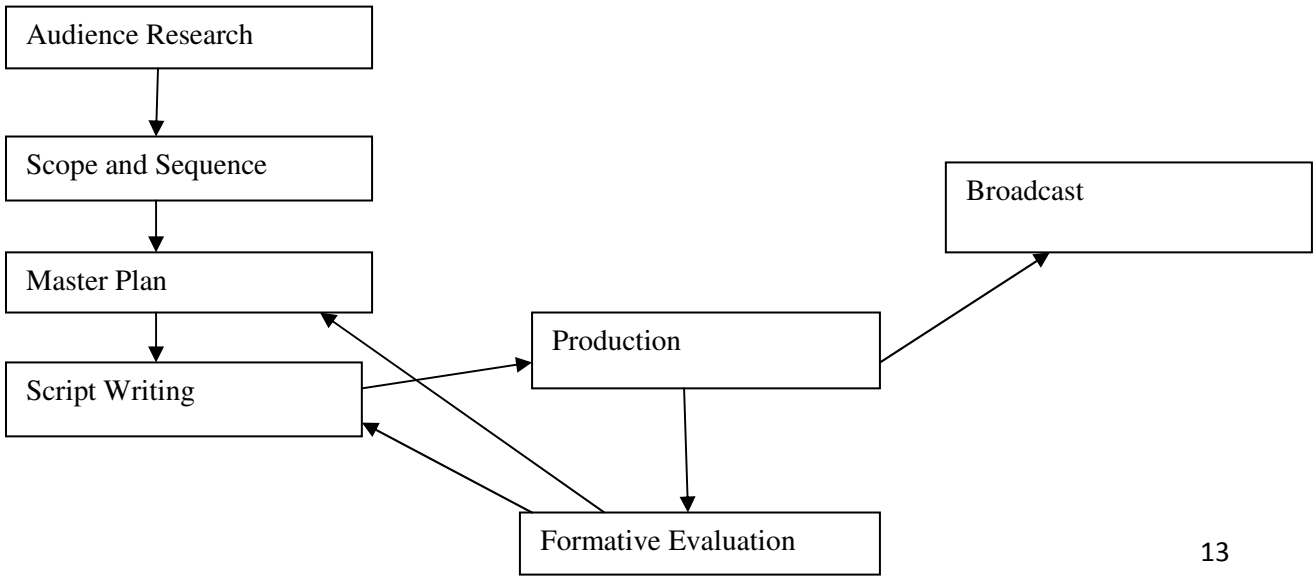

Table 1: IRI and IAI

Coverage in Karnataka	Interactive Radio Instructions (IRI)	Interactive Audio Instructions (IAI)
Schools covered	*47000 Primary Schools*	*2294 Primary Schools*
Students covered	*5725006*	*106,159*
Teachers covered	*68163*	*19587*
No. of Programs (Annual)	*290 Programs*	*50 programs*

3.2 Description of Cost Data

The development cost that has been incurred for the IRI/ IAI program has been borne by EDC and the delivery cost by the Government of Karnataka (SSA/DSERT). The expenditure which EDC bore is for the design and development of the programs, Master Teacher's training, printing and distribution of the schedules and TLMs, and for the monitoring and evaluation of the programs. The Government of Karnataka bore the costs for the broadcast fee which it paid to the All India Radio for airing the radio programs and for the printing costs. The following table shows the different ingredients that go into the implementation of the IRI programs and as borne by the stakeholders

Table 2: Costs Outline for IRI

Costs borne by Education Development	Costs borne by the Government of Karnataka (SSA and DSERT)
Design and Development of programs	Broadcast fee
Training for Master Trainers	Cost of Radio sets
Printing and Distribution	Printing costs
Monitoring and Evaluation	Content Development

The Urdu programs too have similar costs borne by EDC and Government of Karnataka.

Table 3: Costs Outline for IAI

Costs borne by Education Development	Costs borne by the Government of Karnataka (SSA and DSERT)
Design and Development of programs	Cost of multimedia players
Training for Master Trainers	Training for Urdu school teachers

3.3 Methodology of how costs were calculated or estimate

The discussions with EDC team and government officials gave an idea of all the ingredients that formed part of the costs for the programs. The cost for personnel for both the government and EDC is included under each expenditure head at an aggregated level. This has not been separately shown. Since for this particular technological intervention, personnel cost has been minimal so it has been included for all the expenditure heads and a separate head has not been provided. The cost picture for the IRI intervention is dominated by the broadcast fee which is nearly 90% of the total costs.

The costs were estimated by totaling all the costs as borne by the Government of Karnataka and by EDC for the year 2007-08. The reason for choosing year 2007-08 as the year for arriving the CE ratio is that while the IRI started functioning in the entire state since 2005-06, the IAI started functioning in all the Urdu schools is 2007-08. Hence the best comparison would happen when both the programs are compared for the same year. Also the onetime costs for the IRI is adjusted to that of the year 2007-08

Hence for both the IRI and IAI programs, the cost data and the beneficiary data are taken for the year 2007-08. The comparison then seems to be then meaningful.

Table 4: Costs incurred for the implementation of IRI programs

Cost Heads (Rs Lakhs)	**2007-08**
Design and development	2.2
Master Trainer's Training	0.15
Printing and distribution of Teachers Manuals	2.75
Monitoring Evaluation	1.1

Broadcast Fee	94.3
Purchase of radio sets*	70.5
Printing costs for schedules and manuals	3
Total costs for IRI	***174***

*Assuming the cost of a radio set being Rs 1500 in the year 2007-08.

Table 5: Costs incurred for the implementation of the IAI

Cost Heads(Rs Lakhs)	**2007-08**
Design and development	2.2
Master Trainer's Training	0.15
Purchase of multimedia players	10.3
Training of Urdu Teachers	0.7
Total costs incurred	***13.35***

The total costs for IRI is Rs 17.4 Millions in 2007-08 while it is Rs 1.335 Millions for the IAI program in the same year.

3.4 Description of Effectiveness Data

The effectiveness of the two programs is being measured in terms of the beneficiaries covered by the two programs. So for the IRI program the effectiveness of the program is measured in terms of the beneficiaries covered. Same holds for the IAI programme

3.5 Methodology of how effectiveness was measured or estimated

The measure of effectiveness is the number of students reached through the two programs. Hence, the estimation of number of students is based on the number of schools that have been

able to access the programs. Further data of enrollments were taken for each school in Karnataka that accessed the IRI/IAI program. This gave the total number of students accessed.

3.6 CE Ratio Results

The Cost Effectiveness ratio is arrived by dividing the total cost by the total number of students accessed by each program. This is nothing but the cost per child for the provision of the intervention.

CE Ratio for IRI

The CE ratio of IRI for a year namely 2007-08 is given by the following equation

CE= Total Cost of the IRI intervention

Total number of students benefitting from the program

= 174 lakhs

5.7 lakhs

= 30.53

Hence approximately Rs 31 is the cost of per child access to the IRI program

CE Ratio for the IAI

The CE ratio for the IAI program is calculated as:

CE= Total Cost of the IAI intervention

Total number of students benefitting from the program

= 13.35 lakhs

0.106 lakhs

= 125.94

Hence, the approximate per child cost of the IAI program is Rs 126

Hence one can propose that the IRI program has a better efficiency in reaching the 5.7 lakhs students in a cost efficient manner. But one should also keep the fact in mind that the very nature of these programmes is such that the marginal cost of adding more is low. Therefore, the programmes with larger coverage will have less unit cost. That cannot be the only basis for the

decision making. What is important is that whether the unit cost would have been the same, higher or lower for the same number of schools for both IRI /IAI.

However, it is worth mentioning here that a true comparison would mean comparing the costs for both the programs for same target groups. This means that one may compare either the costs for IRI and IAI either in Kannada or Urdu Medium for the same target groups to get a better picture on the per unit costs of delivering the interventions.

3.7 Brief preliminary discussion of results

The CE ratios for the two programs suggest that the Radio programs are definitely cost effective in terms of reaching students while the audio programs appear expensive. The per child cost of IRI program is nearly Rs 31 while that of the IAI program is Rs 126. The Government of Karnataka has been using the radio as a tool to attain the objective of scale. The entire state has now witnessed the technological interventions in its primary schools in a big way. The numbers in terms of schools covered, teachers and students benefitted just goes on to prove the above statement. But considering the diversity existing in the state in terms of its population and the need for providing primary education to all students preferring different medium of education, the radio in itself cannot help. While the radio programs are aired in the Kannada language, there is a presence of other schools whose medium of instruction is not Kannada.

Table 6 Schools in Karnataka by Medium of Instruction

Schools by Medium of Instruction	Number of Higher Primary schools in Karnataka
Kannada Medium	23631
English Medium	2944
Marathi Medium	613
Urdu Medium	1973
Tamil	144
Telegu	76

Source: District wise School Statistics [E.M.I.S 2007-08] the list includes government, aided, private unaided and other schools

As a result one can see that to benefit all the students, any intervention using just one medium of instruction does not help in a state that has a variety of medium of instructions used by its schools. Like the usage of the radio as a medium for Urdu medium or Marathi medium schools

will not be cost effective as the coverage is very small compared to the cost incurred on the broadcast fee. Hence it's preferred to link the coverage with the costs to choose any technological tool. While a radio is cost effective to always cost effective when the number of students is as large as 5.7 lakhs, offline mediums will be cost effective when a small number of schools/students are targeted.

A multi pronged approach is required where by all the different students who follow diverse medium of instruction are helped specifically through their respective languages. So the IRI is a Kannada medium program whereas the IAI is Urdu medium program. These have clearly different students group. Hence while the radio seems a cost effective measure to reach 5725006 students, the use of the entire broadcast mechanism for the 1 lakh Urdu school students does not seem efficient. For this, it is more efficient to utilize the offline medium that is the audio programs.

3.8 Plans for extensions or modifications in the next draft

CPBS plans to extend the present study as part of its larger work on education. The next level of analysis can be done for calculating the level of dependence of the government of Karnataka on external funding. This would help one to know how much support is the GoK taking of external agencies in running the program. Also for the audio instructions, a similar analysis can be done. This will help in knowing the costs borne by the all the stakeholders individually.

4. Program CEA

The *Program CEA* will look into the effectiveness of the public expenditure made in the IRI program.

4.1 Research Questions of the Program CEA

It would try to answer research questions like

- **a.** Does the IRI intervention improve the learning outcomes of the students of Treatment group in a statistically significant manner in comparison to the Control groups?
- **b.** What is the difference in learning outcomes of the students who are exposed to Radio Programs from year 1 to year 2 and from year 2 to year 3?
- **c.** What is the qualitative aspect of use of the radio in the classroom? The study would document the best practices of the classroom processes as identified by the classroom observations. Are the teachers using any learning device as used in the radio classes for their routine classes? Are classroom processes more activity centred?
- **d.** It would also look into the availability, functionality and use of radio resources, the maintenance of the equipment and the space for the lessons supported by the IRI. Teacher and student feedback with regards to the IRI classroom techniques will be documented.

4.2 Research Design

A case study has been designed to arrive at these findings. A longitudinal and comparative cohort study has been planned to track the learning of outcomes of children (of a sample) as they move from a junior to senior class. The study has a three year timeframe. February 2010 has been the first round of assessment which has already been conducted. Two more evaluations have been planned in February 2011 and February 2012. These will be conducted to track the same cohort which was chosen in February 2010.

Table 7: Cohort Study

Year of Assessment in Maths and EVS	**Classes for the Treatment Group (Raichur)**	**Classes for the Control Group (Chamrajnagar)**	**Number of schools per district**

February 2010	**Class II, III, IV**	**Class II, III, IV**	**10**
February 2011	**Class III, IV,V**	**Class III, IV,V**	**10**
February 2012	**Class IV, V**	**Class IV, V**	**10**

Regarding the choice of schools for the treatment and control group, CBPS discussed the quality of reception of the radio programs with the EDC team members and found that the reception is not uniform for all the primary schools spread over the entire geography of Karnataka. By experience, while Raichur gets the radio program, Chamrajnagar faces problems in receiving the radio programs due to technical reasons (Chamrajnagar has hilly terrains so schools are not able to receive radio signals. Hence CBPS decided to choose schools for treatment and control groups based on this reality. While students of Higher Primary Schools (HPS) Raichur will act as the treatment group, students of HPS from Chamrajnagar will be taken as the control group for the study. Also regarding the choice of the two districts, one can say that the two districts are quite similar[7] in terms of development indicators. Human Development Indicator as given by the state ranks Raichur 27 while Chamrajnagar is slightly better at position 25. In the Education Index, Raichur is 26 while Chamrajnagar is 27. So this makes them pretty comparable.

Table 8: District Profile

Basic Statistic	Raichur	Chamrajnagar
Population	1,669,762	965462
Literacy (%)	48.81	51
School attendance (%)	73.27	90.86
Human Development Indicator	27	25

[7] "Nanjundappa Committee Report on Regional Imbalance –Karnataka" positions Chamrajnagar and Raichur as backward districts and thus CBPS chose the two districts so that for the sake of comparison the districts are positioned similarly. Chamrajnagar is located in south Karnataka while Raichur is located in north Karnataka. The two districts have similar profiles and thus make the impact analysis easier.

Education Index	26(0.55)	27(0.72)
No of schools	1403	902
No of out of school children(2003-04)	80105	13106
Enrollment (Class I to VII)*	208969	93530
No. of children per school[8]	149	104
Male-female gap in literacy (%)	25.6	16.55
Per child expenditure	Rs 1146.40	Rs 1744.50

Source: Karnataka State Human Development Report, 2005 * DISE data 2008-09

4.2.1 Sample Design and Tools Design

Regarding the choice of schools for sample, for both Raichur and Chamrajnagar, such schools were chosen which had a minimum of 150-180 students. Twenty schools[9] have been selected in both the districts where students from Class II, III, IV and V will be tracked from year I (February 2010) to Year II (February 2011) and Year III (and February 2012).

The schools for the treatment and control group have been chosen selectively based on the both the reception and non reception of the IRI program. Since the clear aim was to compare the performances of students based on the reception of the radio programs, so Higher Primary Schools have been chosen in similarly placed districts of Raichur and Chamrajnagar(in terms of their position in the Karnataka State Human Development Report, 2005)[10]. The aim was to get those schools which received Radio programs in Raichur and those which did not receive radio programs in Chamrajnagar. Information was procured regarding the schools so as to finalise the twenty schools for the selection of students for the treatment and control group. After this, the final selection of treatment and control schools was based on random sampling.

[8] Enrollment in Class I to VII divided by number of schools

[9] The list of schools is attached in the appendix. Also the list of village amenities in the schools is attached.

[10] Raichur and Chamrajnagar are ranked 27 and 25th in the Karnataka Human Development Report. This gives the context for the comparison.

The research will be focused around the child who is subject to the IRI program in comparison to the child who receives no such program. The tests are based on the curriculum and the subjects for the survey are *Mathematics and Environmental Science (EVS).*

The tools of the field survey includes testing of children in the class room, classroom observation, Teacher interviews, focus group discussions (FGD) with children and collection of details about the sample schools in the two districts. The assessment tools have been prepared for collecting information on village, schools, teaching practices for IRI and Non IRI classrooms. The test tools for students are prepared on the basis of content and competencies covered in the text books as well as the modules 'Chukki Chinna and Chinnara Chikki' [11]which are the curriculums for IRI programme. It would also conduct interviews with the members of School Development Management Committees[12] whose members are both parents and schools authorities in a Gram Panchayat[13] area. *Akshara Foundation* (Foundation, 2010), a Bangalore based organization is CBPS's partner in doing the field work for the study.

CBPS conducted a school/child survey in two districts of Karnataka namely Chamrajnagar and Raichur[14]in February 2010. The data has been tabulated. An excel sheet has been attached with has the details of all the 805 students who have been interviewed.

Table 9: Sample Design

District	Block	Cluster	Number of schools	Number of children assessed
Raichur	Devdurga	3	5	229
Raichur	Linsugur	4	5	248
Chamrajnagar	Hannur	4	10	328
Total		11	20	805

4.3 Description of Effectiveness Data

Effectiveness for the IRI study can be assessed in three ways

- Impact on learning outcomes- Direct improvement in learning outcomes as reflected through improvement in mean scores of the students when tracked over a period of three years. This will be part of the longitudinal cohort analysis where same set of students shall be tracked as they move from class II to III, IV and V

[11] Names for the Modules of IRI as designed by EDC in Karnataka

[12] School Development Management Committees are names for the village level committees with large representation of Parents in Karnataka.

[13] Administrative Unit of Indian decentralization as defined by the Constitution of India.

[14] District profile of Raichur and Chamrajnagar is attached in the appendix

- Outcomes of the IRI intervention- the IRI program must have had some effect on the behavior of children and teachers in the class. The child and teacher interviews and classroom observation would reveal as to how the teacher has improved as a class manager, how do the students feel and behave in the classroom environment; more child friendly atmosphere, rise in teacher sensitivity and energy level expressed in the classroom
- Efficiency of the system in relation to equipment usage and maintenance, broadcast quality etc.

4.4 Methodology of how effectiveness was measured or estimated

Effectiveness in the present Cost Effectiveness Analysis will be expressed in terms of improvements in learning outcomes of the students over a period of three years through the use of IRI programs. While the GoK implemented the IRI program with the clear aim of helping the students as well the teachers in improving learning outcomes, how has it been faring and whether the expenditures are justified? The effectiveness is also reflected through both the teachers ease in teaching the curriculum and students being able to learn the difficult portions easily. This will be measured though mean test scores of students. A comparison of the mean test scores of the treatment and the control group would provide a measure of effectiveness of the IRI program. Further the performance of the cohort when tracked over a time line of three years would provide answers to questions of efficiency. In short, the effectiveness would involve the following

- Conduct a comparative longitudinal child survey in Year I in sample schools receiving IRI(treatment group)and those not receiving IRI(control group)
- Compare the mean test scores of both treatment and control school students for class II, III, IV, V in Math and Environmental Science
- Repeat the tests in Year II and III and track the changes to see if there improvements in learning outcomes of the two groups.
- Apply Independent sample test to reject the hypothesis that the mean scores of the treatment and control groups are same.
- Collation of Best Practices of the program that is currently in place.

4.5 Methodology for the February 2010 Child Survey and the Analysis

The baseline child survey was conducted in February 2010. The steps that were followed are as follows.

- Selection of treatment group and the control group in Karnataka done on the basis reception of IRI program in Raichur district and its absence in Chamrajnagar district. Also districts were chosen with consideration of the development indicators of the districts based on the Nanjundappa Committee Report (al) on Regional Imbalance. This would make it technically comparable.

- Selection of the schools (ten in each district) was done on the basis of presence of Higher Primary Schools [15]having an enrolment for at least 180-200 students. This would provide enough students retained till the next two rounds of child survey namely 2011 and 2012. Chamrajnagar had all the ten schools from Hannur block and Raichur had five schools each from Devdurga and Linsangur block. Total of 805 students are being observed and tested for the study. Cohort analysis is being done with a database of these students being maintained for the study.
- The tools prepared to collect the data include:

    1. Village Format- mainly secondary data sources were used to map the basic village profile along with some additional details as provided by the local people
    2. School Format- details regarding basic infrastructure requirements for schools include, availability of separate HM room, drinking water and toilet facilities, Mid-Day meals, electricity, teaching learning resources like library, laboratory. also details on students enrollment and attendance were taken
    3. Semi-structured format for teachers- details on number of sanctioned teachers, trainings conducted for both IRI and non IRI classes, Pupil Teacher Ratio
    4. Semi-structured format for children- details on opinions of students on presence/absence of enabling environment for IRI classes. It would include questions like availability/non availability of the teaching-learning materials for radio class etc.
    5. Classroom observation Format for IRI class- class room environment, behavior of students and teachers regarding the equipment, IRI relays etc, space in the class, presence/absence of multi-grade teaching, discipline in the classroom, use of blackboard, Teaching Learning Material etc.
    6. Classroom observation Format for non-IRI class
    7. Assessment Tool for class 2 (Mathematics & EVS)[16]
    8. Assessment Tool for class 3 (Mathematics & EVS)
    9. Assessment Tool for class 4 (Mathematics & EVS)

- While secondary source of data will be utilized for District and village profile, primary data will be collected for teacher and students profile.
- Field investigators were trained to collect data with the help of above mentioned tools.

4.5.1 Data Sources

- Primary data as collected from the child survey
- Use of secondary data by accessing reports, publications and websites to gather the relevant information for the study

[15] Higher Primary schools are those with classes upto standard VIII

[16] Assessment tools are provided in Appendix

4.5.2 Unit of Effectiveness Analysis

The unit of analysis and the effectiveness variable is the learning outcomes as measured in terms of mean test scores of the school students over a period of three year.

Table 10: Measures of Effectiveness

Objective	Output	Tool
Learning outcomes	**Mean scores**	**Tests based on IRI curriculum through Longitudinal comparison**
Comparison of learning outcomes	**Mean scores, Median, Mode, standard Deviation, correlation and Independent sample T Tests**	**Test for both the treatment and control group(Longitudinal comparison)**
Documentation of Qualitative aspect of use of radio	**Set of identified good practices as observed**	**Classroom Observation, Teacher Interviews**
Documentation of good practices of IRI classrooms	**Set of identified good practices as observed**	**Classroom Observation**

4.5.3 Assumptions for the study

The study required making some important assumptions for the sake of the scope of the study. To begin with, the Program CEA is being done as an impact analysis study so while the Basic CEA shows the cost beneficiary ratio for the total costs borne to cover the students in Karnataka, the Program CEA looks into the effectiveness of the money spent by the government on the radio programs by measuring effectiveness in terms of the mean test scores for the sample size of 805 students in 2010. By taking a control and treatment group a research hypothesis is being tested. The statistical analysis will help in testing this hypothesis. This is further extended beyond the sample to the state level and can be used to take a stance whether the public expenditure done on the radio programs is meeting its objective by improving the learning outcomes or not.

One major problem would arise related to attribution. While there are other interventions also in place like teacher's training programs, textbook distribution etc, so it would be difficult to assign the improvements solely to IRI intervention. However, keeping other things unchanged, for the two districts, all improvements in learning outcomes can be assumed to be a result of the IRI intervention. In case all other interventions have been the same for the two districts, one could assume that any difference could be attributed to this intervention to some extent. Other factors that influence these outcomes such as class size, regularity of children, etc. should also be included in the analysis or their exclusion must be mentioned as a limitation of the study.

4.5.4 Research Hypothesis for the Measurement of effectiveness for the February 2010 in control and treatment groups

For Class II/III/IV for EVS and Maths

- Null Hypothesis for the present case study is that the mean scores of the control and treatment group is same for a particular class in a particular subject(EVS and Maths)

  H_0:$\mu_1 = \mu_2$; where:H_0 = the null hypothesis

  And

  μ_1 = the mean of Treatment Group, and μ_2 = the mean of Control Group.

- Alternative Hypothesis for the present case study is the mean scores of Treatment Group are higher than that of the Control Group for a particular class in a particular subject.

  H_t: $\mu 1 > \mu_2$ where Ht is Alternative Hypothesis

In the present analysis, if the survey reveals that the Null Hypothesis is rejected then the Alternative hypothesis is not rejected. This would suggest that the IRI programs are having an impact in improving learning outcomes for the students.

4.6 Results and Discussions of the February 2010 Child Survey

The mean scores of the tests that were administered to students of Class II, III and IV in ten schools of the treatment and the control groups reveal a lot. The statistical analysis will be discussed following which the qualitative analysis will be presented based on the classroom observations as done by the field investigators in classrooms will be mentioned.

4.6.1Statistical Analysis

For all three classes in both the subjects, the mean test scores of the treatment group are higher than that of the control group. For the present, this certainly helps to reject the Null Hypothesis that the mean scores of the two groups are same for any class and any subject. This can be explained in a statistically significant manner by the use of T statistic[17]. As the tables imply, the treatment group is has a higher group mean score than the control group.

[17] Refer to Appendix I for details on Independent Sample T Tests tables

Measures of Central Tendency

Table 11: Class II

District	EVS					Maths				
	Mean	Median	Mode	Standard Deviation	Standard Error of Mean	Mean	Median	Mode	Standard Deviation	Standard Error of Mean
Chamrajnagar	**4.7**	5.0	5.0	1.42	.13	**2.67**	3.00	3.0	1.08	.10
Raichur	**5.65**	6.0	6.0	1.71	.13	**3.27**	4.00	4.0	.94	.07

For Class II, oral tests were administered on a one-on-one basis. The maximum scores were 8 marks in EVS and 4 marks in Maths. In EVS, the mean for control group is **4.7** while it is **5.65** for the treatment group. This is statistically significant when we run the Independent T Tests for the two groups. The detailed tables are provided in the Appendix I (Table 17). Similarly, in Maths the mean scores of the control group is **2.67** and that of treatment group is **3.27** which is higher in a statistically significant manner.

For Class III, a combination of written and oral tests was administered. The maximum scores were 12 marks in EVS and 10 marks in Maths.

Table 12: Class III

District	EVS					Maths				
	Mean	Median	Standard Deviation	Standard Error of Mean	Mode	Mean	Median	Standard Deviation	Standard Error of Mean	Mode
Chamrajnagar	**9.90**	11.00	2.48	.24	12.0	**6.54**	6.00	1.91	.18	6.00
Raichur	**9.98**	11.00	2.37	.19	12.0	**7.22**	8.00	2.62	.21	8.00

In EVS both the treatment and control group have similar mean scores. But only in Maths, the mean scores of control group are lower than that of the treatment group in a statistically significant manner. (Appendix I Table 18)

Table 13: Class IV

	EVS	Maths

Districts	Mean	Median	Mode	Std. Deviation	Std. Error	Mean	Median	Mode	Std. Deviation	Std. Error
Chamraj nagar	**8.00**	9.00	9.00	3.04	.30	**8.09**	8.00	8.00	3.93	.38
Raichur	**11.97**	13.00	14.0	3.52	.27	**9.25**	10.00	11.00	3.85	.30

For Class IV, written tests were administered for both the subjects for both the groups. The maximum scores were 16 for EVS and 14 for Maths. For both the subjects, the mean scores of the control group are lower than that of the treatment group in a statistically significant manner as proven by the T statistic. (Appendix I, Table 19)

4.6.2 Qualitative analysis based on classroom observations

The qualitative analysis tries to document all that happens at the classroom level in terms of facilities available in IRI classrooms, use of TLM, radio equipment, methods adopted for teaching and the IRI relay days. Also the role of School Development Management Committees for the IRI schools has been studied. The behaviour of the students and teachers in the IRI classrooms has been captured by the field investigators which the present section would discuss with respect to all these aspects in a detailed manner.

Facilities available in the classrooms

The basic facilities should be there in any school. These include the presence of a school building, number of rooms, separate Headmaster's room, drinking water, separate toilets for boys and girls, provision of Mid day meal[18] scheme, electricity supply, library facilities and provision of a science laboratory in High schools. For the treatment and control group, following statistics have been reported.

Table 14: Facilities available in Sample Schools

Particulars	Chamraj Nagar	Raichur
Separate HeadMaster's Room	2	3
Drinking Water	6	8
Girls Toilet	6	6
Boys Toilet	3	5
Mid day meal	10	10

[18] Government of Karnataka has implemented the mid day meal scheme namely Akshara Dasoha in All the schools in Karnataka.

Electricity	6	8
Library	5	9
Science Laboratory	0	4

The sample schools of Raichur have reported better in terms of provision of basic facilities available in schools. To extend the comparison, one must check whether the IRI classes have been equipped with the facilities required for conducting IRI classes. The classrooms of IRI schools are supposed to be more learners centric with better learning environment as compared to the non IRI classrooms. This would mean that there are few other facilities which must be there for the smooth functioning of the IRI classes.

The facilities include provision of working radio sets to all schools; presence of IRI trained Teachers, spacious classrooms, provision of TLMs to all the teachers. Teachers are integral to the successful implementation of the IRI intervention. This would mean that there should be a good Pupil teacher ratio, there should good attendance ratio of the working teachers and further, the teacher in the class should be trained to conduct the IRI classes. All this criteria must be fulfilled to ensure that the teacher is able to play its role of facilitator in the IRI classes. The field realities of the sample schools reveal a lot.

The Pupil Teacher Ratio of 6 schools in Raichur is less than 30:1. This is a good sign. But out of ten schools in Chamrajnagar, only two schools have such low PTR. A low PTR would mean that all students get adequate attention from the teachers individually and that the teachers are not overburdened. Still only three schools out of ten schools of control group have a PTR of more than 40:1. This is better as the State recommends a maximum PTR of 35:1.

Table 15: Pupil Teacher Ratio in Sample schools

Districts	PTR Range across schools		
	less than 30:1	30:1 – 40:1	above 40:1
Raichur	6	2	1
Chamrajnagar	2	4	3
Grand Total	8	6	4

The mere presence of a good PTR does not ensure that the teachers are present and that they are teaching well. One should also go a step further to see the number of sanctioned and of working teachers and whether these working teachers are trained in conducting IRI classes or not.

Table 16: Number of Working Teachers in sample schools

Schools with	Chamraj Nagar	Raichur
100% working Teachers	3	3

81-90% working Teachers	1	5
71-80% working Teachers	1	1
61-70% working Teachers	3	1
51- 60% & Below working Teachers	1	0
50% & Below working Teachers	1	0
	10	10

Deficit of teachers could be measured by looking at the number of teachers sanctioned for a particular school versus the number of teachers actually working in a school. The table above shows that in both Chamrajnagar and Raichur the status of teachers is being more or less same when one compares the number of schools having teachers working as per the sanctioned number of teachers. Three schools out of ten have 100 percent working teachers. In Chamrajnagar five out of ten schools have less than 50 % working teachers. This is not the case for Raichur as all the ten sample schools have more than 60 % working teachers. This deficit of working teachers will have direct impact on the implementation of IRI as well as on the general teaching. When one sees the number of teachers trained to conduct the IRI classes, the situation is reversed.

Out of ten schools in Raichur, 7 schools have no teachers trained in conducting IRI classes while no school has all the teachers trained. Only one school has at least one teacher trained and two schools have more than one teacher trained. For Chamrajnagar, the situation is different. It's a control group where IRI does reaches still its six schools have IRI trained teachers of which four schools have all the teachers trained in IRI.

Table 17: Teachers Trained under IRI intervention in sample schools

Schools with	Raichur	Chamraj Nagar
All Teachers Trained	0	4
At least 50-60% teachers Trained	2	1
At least 1 teacher Trained	1	1
None of the teachers being trained	7	4
	10	10

One can conclude that while teachers' training[19] has been conducted annually for initial years, the next level of training for others by these teachers has not happened. While Chamrajnagar cannot utilise the benefits of the IRI programs, it still has more teachers trained when compared to the number of teachers trained for IRI in the treatment group schools.

[19] Few teachers have been trained in a master training program whereby these teachers were trained to conduct IRI classes and were expected to train other teachers.

Use of Radio, Teaching Learning Material and Blackboards

The IRI program entails provision of a radio set by the government to the schools. Separate money is allocated for the battery, repair and maintenance of the radio to all the schools. All the sample schools of Raichur reported of having Radio sets procured by the Government for the schools. Some of the schools have two-in -one audio equipment and were found making use of the device for playing songs related to folk, rhymes and educational stories.

The IRI user manual contains the details like objective of the session, directions for the preparation of the session and the TLMs required for a specific session. The assumption made here is to help the teacher with all the pre-requisite of the specific lesson delivered on that day and to help her with lesson planning.

Twenty classroom observations were carried on the treatment group. In the ten sample schools of Raichur, teachers of five schools have been reported using TLM and were using local resources – drawing charts, paper made charts, paper balls, pencils, stones, blackboard, prepared by them and children on the day of visit. The teachers of 5 Class rooms of Devdurga and 2 classrooms of Lingsugur have been observed as not using any TLM.

In Chamrajnagar, two classroom observations were done for all the ten sample schools. In the control group schools, though the teachers were trained by the government for the IRI classes, yet due to non reception of the program, it was a regular class for them. They were not using the skills imparted to them for the IRI classes. The investigators had an impression that though teachers were trained by IRI, very few[20] seem to be adopting the broader framework of IRI methodology of activity based, learner centric and interactive process. All the ten schools observed gave an impression that there was no lesson plan with the teacher. The teachers were using the books. In one school Teacher was found using the teaching learning materials like-chart for Social Science. In three schools teachers were teaching the lessons without any interactions with students. The lessons were not made attractive to the children. Homework was given to students at the end of the lesson.

Group activity is one of the core elements of the IRI intervention. Group activities tend to bring enthusiasm in the learning process as students are involved through games, narrations, storytelling etc. thereby breaking the monotony of traditional learning process. It was observed that for seven classrooms in Devdurga and nine in Lingsugur, teachers were organizing the group activities as per instructions of the IRI relay. These activities were continued even after the relay

[20] Out of 2 classroom observations on language classes, only four teachers were found explaining the lessons through the activities, by reciting actions songs and involving all the students. Rest six teachers hardly incorporated the skills in their teaching style.

of IRI program in 4 classrooms in Devdurga and 9 classrooms in Lingsugur. On the other hand, organising of group activities were not noticed in 3 class rooms of Devdurga and in one classroom of Lingsugur.

Teaching Methods

The very rationale behind the implementation of IRI programs was to make the whole teaching learning experience a fun filled enjoyable experience. The teaching learning process is activity oriented by learning through games, investigation, songs, enacting, experiences, drawing, painting, writing, questioning, solving problems and so on. Hence one should expect that since schools of Raichur are a treatment group, the classroom environment of these schools should be better as they are exposed to the radio programs and have all the necessary enabling facilities in place.

Also classroom observations were carried for one IRI class and one non-IRI class so as to find out the suitability of the classroom for administering IRI programme, teacher's preparedness for the programme. Also it was observed whether the teacher had internalized the core elements of the IRI like teaching methodology, her/his role more as a facilitator, teaching through activities, interactive classroom practice etc. It was also attempted to observe whether the teacher carried out some of the practices of interactive and activity based teaching methods to her/his non-IRI classroom.

Also one must mention the externalities that have been created by airing the program simultaneously for all the primary school students across Karnataka. Discussions with the students and teachers revealed that there was a sense of positive camaraderie generated amongst them as the students felt being a part of a State level program and experienced a sense of positive regional integration. They were all thrilled to be part of a state level program that binds them in a psychological manner. The two way interactions as in built in the radio programs are definitely well taken by both the students and teachers.

Table 18 : Enabling Facilities for IRI classes

Details	**Raichur**	**Chamarajnagar**
No. of schools/classrooms with Multi grade teaching	6	3
Spacious classroom	20	12
Availability of TLM in	20	16

classroom		
Discipline in classroom(children following teacher's instructions)	20	12
Teacher using Blackboard	19	17
Co-ordination between teacher and students	20	16
Verification of class work by the teacher	15	14

Out of ten sample schools, there are 6 multigrade schools in Raichur while only three in Chamrajnagar. Use of blackboards is a common in both the treatment and control schools. All the sample schools of Raichur had TLM available though at least four schools of Chamrajnagar had no TLM available to them.

Role of SDMC in the IRI schools

Karnataka has been a pioneer in setting up The School Development and Management Committee in every school of Karnataka. Since 2001, every school has a SDMC[21]. This is meant to ensure proper participation of parents in school activities. The IRI has a community component[22] which has the following specific objectives:

- SDMC must take efforts to ensure the continuous implementation of IRI
- Ensure IRI class is conducted with elements of creativity
- Increase the enrolment and attendance of children by showcasing the programme to community and there by pursuing parents to send their children to school.

Though the IRI has spelt out these objectives for SDMC members, it seems to be practically not happening in the field. Some of the reasons also include the capacity of the SDMC members in participating in the teaching learning process. Many studies (K.Vaijayanti, 2005) have shown

[21]SDMC consist of three bodies—the executive body, which consists of parent representatives, teachers and headmasters; the ex officio member body, which consists of members from gram and taluka panchayats, anganwadi staff and health officials; and a third body of all those who are interested in school activities.

[22] Community Participation, Chukki Chinna ,Teacher Guide

that the capacity building of SDMC members in the academic activities though minimal should be part of the trainings of academic programmes like IRI also.

The field investigators interviewed 10 members the SDMC members and found that members of three GPHS schools namely Narakaladinni, Bendoni and Teerthabhavi schools, were unaware of the programme. For other schools, the school staff claimed that the SDMC members knew about the relay of IRI program and many members also take initiative to provide support in terms of bearing the cost of battery cells and repairs etc. But this does not provide full information on the role played by the members based on the IRI's community component. CBPS will look into this with a special focus in the February 2011 study.

IRI Relay Days

The investigators found that the programs were being relayed as per the schedules. The school teacher is required to operate the radio based on the IRI schedules already provided to them in advance. The schedules for every class are provided to the teachers at the beginning of the academic year. The teachers supposed to record the learning levels of the students and it was found that in majority of schools teachers did this soon after the radio program ended.

In an academic year, there are 270 relay days for the IRI program. Ideally a classroom must follow the schedule of the radio programs and go with the sequence of the radio program. This is based on the fact that for every subject, there are a number of radio programs designed which must be aired in a sequence. Only then a student can be helped to progress through the curriculum. Like for Maths and EVS, Class II has 16 programs. Now the programs are based on the order of progression in the regular curriculum. Hence, the students will benefit only when they are exposed to all the 16 programs sequentially in full continuity. Hence, any gaps in the IRI relays would imply that the students have not been given the full benefit of airing all the programs.

Looking into the number of relay days for the sample schools of Raichur, out of ten treatment schools, only four schools have more than 50% of relay days while none of the schools have 100% relay days. This is a real issue of concern as if schools have less than 200 relay days; this suggests that lots of IRI lessons have been missed. The whole purpose of the IRI intervention is lost when it fails to help students while the cost of implementation is still being incurred. Due to schools lack of initiative, the students are not getting the full benefits of the IRI program. So it's a clear case of under utilisation of resources.

Table 19: IRI Relay Days in 2009-10

Block	School name	Number of days IRI classes being conducted	%(out of total number of 270 IRI relay days)
Devadurga	GHPS, Galeradoddi	200	74
Devadurga	GHPS Marigemman Tanda	183	68
Devadurga	GHPS, Gundagurthi	180	67
Devadurga	GMPHPS Koppar	130	48
Devadurga	GHPS Joladahedagi	120	44
Lingasugur	GHPS, Bendoni	120	44
Lingsugur	GHPS, Narakaladinni	194	72
Lingsugur	GHPS, Maraladinni	136	50
Lingsugur	GHPS Adavibavi	135	50

Data was not available in GHPS Teerthbhavi School

However, there is some problem in the way the school teachers record the number of relay days and the actual number of relay days as given by the government. In a one to one interview with teachers, field investigators found that the teachers were not trained enough to follow a reporting mechanism as a result they were recording together for other programs along with IRI in the same register. Government officials say that teachers club all the programs which are run by the Sarva Shiksha Abhiyaan for all the classes and report under one head. Ideally IRI has a format to be followed by the teachers and that should be referred for seeing the IRI program relay at any given day for any given class. CBPS will try investigating the issue further in the next cycle of observations in February 2011. It will look into the reporting mechanisms followed by teachers and see how these gaps in the relay if any, affect the learning outcomes of the students and the reason behind these gaps in relays. CBPS would then be in a position to flag the implementation issues with empirical evidences.

Students' opinion on IRI programs

Ninety five students of class III and IV from the treatment group were interviewed to gauge their opinion about the IRI programs. Students seemed to have responded in a positive manner as 95% students seemed to be getting a chance to participate in the IRI classes. They all seemed to get an opportunity to ask a question and get an answer. However, it seems that they are enjoying the experience of singing songs in comparison to the traditional classroom teaching.

Table 20: Students opinion on IRI programs

Opinions	% of response
Getting chance to participate in IRI activity	95
Able to answer the question asked during IRI	95
Kannada as a Subject liked by children delivered by IRI	37
Mathematics as a Subject liked by children delivered by IRI	46
EVS as a Subject liked by children delivered by IRI	26
Scaled IRI as very good programme	54
Scaled IRI as good programme	46
Availability of the teaching-learning materials for radio class	72

The students preferred the radio programs for Maths more in comparison to Kannada or EVS. When asked to students about the teacher using the TLM, 72% of the students interviewed answered in affirmative while rest never saw the use of TLMs in classrooms.

Also one must mention the externalities that have been created by airing the program simultaneously for all the primary school students across Karnataka. Discussions with the students and teachers revealed that there was a sense of positive camaraderie generated amongst them as the students felt being a part of a State level program and experienced a sense of positive regional integration. They were all thrilled to be part of a state level program that binds them in a psychological manner. The two way interactions as in built in the radio programs are definitely well taken by both the students and teachers.

One must caution that the students are finding the change good but that would not mean that they are actually gaining from the program. While the monotony of regular classroom teaching has been broken, the actual benefits would take place only when the gaps in relays days are removed and the teachers use proper TLMs and group activities in a continued manner for the IRI classes.

4.7Challenges in conducting this work

The major challenge for conducting any impact analysis of a technological intervention is finding a suitable treatment and control group. Only when there is a control group which is similarly placed in terms of other parameters of comparison can one do an impact analysis. For the radio interventions, while the government claims that the intervention is aired all over the state in all the government schools, there are few areas which don't receive the radio signals due to their geographical locations. Hence CBPS chose such schools as the control group.

Conducting child survey in remote areas was difficult as the areas don't command good connectivity. Accessing schools which are far from district headquarters on the hilly terrain has

been a difficult task for the field team. Even once the team reached the schools, conducting the tests was not an easy task.

Collection of cost data from the government was also not an easy task. CBPS has been working with the government on other assignments and used the opportunity to access required data.

4.8 Possible extensions

The present study will be extended for a cohort study where by the students of the present survey will be tracked for next two years. The longitudinal study can be useful in finding out how the learning outcomes have improved for the treatment and the control groups. Also the study can be extended by doing a gender analysis of the treatment and control group performances in the two subjects. It can be seen that for the present year also the performances vary for the boys and girls for the two groups in the two subjects. This can be taken up in the future depending on the funding.

4.9Plans for dissemination

CBPS plans to share the results of the cost effectiveness analysis with all the stakeholders. It will share the findings with the partner organisations namely Education Development Corporation and Akshara Foundation. It will take the results to the government by organising a workshop where by it will discuss the research findings with the bureaucrats and educationists. Also we will share the research with other academicians and researchers who share similar interests.

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6.1: Appendix I Independent T Tests Tables

Table 21: Independent Samples Test for Class II

Independent Samples Test

EVS	Levene's Test for Equality of Variances		t-test for Equality of Means						
								95% Confidence Interval of the Difference	
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Equal variances assumed	5.792	.017	-4.920	275	.000	-.95390	.19388	-1.33558	-.57222
Equal variances not assumed			-5.071	269.570	.000	-.95390	.18811	-1.32425	-.58355

Independent Samples Test									
Maths	Levene's Test for Equality of Variances		t-test for Equality of Means						
								95% Confidence Interval of the Difference	
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Equal variances assumed	2.491	.116	-4.947	275	.000	-.60088	.12146	-.83999	-.36177
Equal variances not assumed			-4.835	225.885	.000	-.60088	.12428	-.84577	-.35598

Table 22: Independent Sample Test for Class III

Independent Samples Test for EVS

EVS	Levene's Test for Equality of Variances		t-test for Equality of Means						
								95% Confidence Interval of the Difference	
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Equal variances assumed	.119	.731	.269	264	.789	.08077	.30079	-.51148	.67302
Equal variances not assumed			.266	227.758	.790	.08077	.30327	-.51681	.67835

Independent Samples Tests for Maths

Maths	Levene's Test for Equality of Variances		t-test for Equality of Means						
								95% Confidence Interval of the Difference	
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Equal variances assumed	6.212	.013	2.328	264	.021	.68159	.29278	.10509	1.25808
Equal variances not assumed			2.455	263.684	.015	.68159	.27764	.13491	1.22826

Table 23: Independent sample Tests for Class IV

Independent Samples Test for EVS

EVS	Levene's Test for Equality of Variances		t-test for Equality of Means						
								95% Confidence Interval of the Difference	
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Equal variances assumed	1.508	.221	9.397	260	.000	3.97484	.42300	3.14191	4.80778
Equal variances not assumed			9.694	239.401	.000	3.97484	.41005	3.16708	4.78260

Independent Samples Test for Maths

Maths	Levene's Test for Equality of Variances		t-test for Equality of Means						
								95% Confidence Interval of the Difference	
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Equal variances assumed	.549	.459	2.369	260	.019	1.16419	.49151	.19635	2.13204
Equal variances not assumed			2.359	214.909	.019	1.16419	.49353	.19142	2.13697

6.2 Appendix II: Details on Sample schools

Table 24: List of sample schools

Chamrajnagar	Raichur
GHPS Dantahalli	GHPS Galeradoddi
GHPS Dinnalli	GMPHPS Koppar
GHPS Gopinatham	GHPS Marigemman Tanda
GHPS Gorasane	GHPS Gundagurti
GHPS-Gundimal	GHPS Jolad hedagi
GHPS Kombudikki	GHPS Adavibavi
GHPS Minyam	GHPS-Maraladinni
GHPS Ponnachi	GHPSNarakaladinni
GHPS Tolasikere	GHPS Teerthbhavi
	GHPS Bendoni

GHPS: Government Higher Primary School

Table 25: Basic Amenities in Villages of sample schools

Amenities in villages	Chamrajnagara		Raichur	
	No.of villages	Percentage	No.of villages	Percentage
WATER	7	70	9	90
BANK	0	0	1	10
POST Office	4	40	3	30
LIBRARY	3	30	3	30
PUBLIC HEALTH CENTRE	4	40	3	30
ADULT EDUCATION CENTRE	1	10	5	50
ANGANAWADI	9	90	10	100
LOWER PRIMARY SCHOOL	3	30	3	30
HIGHER PRIMARY SCHOOL	10	100	10	100
HIGH SCHOOL	2	20	2	20
TOTAL SANITATION VILLAGE	0	0	4	40
ROAD	5	50	3	30
PUBLIC TRANSPORT	4	40	7	70
ELECTRICITY	8	80	10	100
YASHASWINI	6	60	1	10
SUVARNA AROGYA SURAKSHA	1	10	1	10

RSBY	0	0	1	10
UHIS	0	0	1	10

Table 26: Enrolment and Attendance in on the day of visit in Sample Schools

Table 27 : Multigrade schools in IRI schools of Raichur

Multi grade Classes	Number of sample schools in Raichur
Class 3, 4, 5,6and 7	1
Class 4 & 5	2

	Enrolled	Attended	%
Raichur	1797	1219	68
Chamrajnagar	1121	924	82
	2918	2143	73

Class 3 & 4	3
Class 4	4

Table 28: Teacher's opinion about the radio programs

Opinion on IRI Program	% of Teachers
Good	77%
Very Good	23%

6.3 Appendix III- Assessment Tools

Tool 1: Class Supervision Information Format

Name of the school	Head Teacher's Name
Taluk	Teacher's Name
Cluster	Standard which the teacher is teaching

Tool 2: Radio Programme broadcast during the survey

Subject **Module No**

Sl. No	**Information regarding class inspection**	
1	**Is this a multi graded class**	
2	**Is the class room sufficient/comfortable for all the students to be seated?**	
3	**Is the class room safe for the students to sit? (safe roof, strong walls, well ventilated windows)**	
4	**Is there availability of teaching materials in the classroom?**	
5	**Do the students maintain discipline and cleanliness?**	
6	**Is there a black board in the class?**	
7	**Does the teacher use the black board during radio lesson?**	
8	**Was there a good co-ordination between the teacher and students**	
9	**If yes, which were the classes handled by the teachers?**	
10	**Has the teacher checked the written materials prepared by the students?**	

Radio lesson class supervision

11	• **Teaching materials of teachers** • **Pupils learning materials** • **Has the teacher written the song (pertaining to the radio lesson) on white sheet or black board** • **Have they kept the radio in the elevated place** • **Is the teacher ready with teaching materials mentioned in the chukka china guideline book prior to the broad cast of radio programme**	
12	**Do all children (boys and girls) participate equally with enthusiasm**	
13	**Did the teacher guide the pupil when they sing the songs with action?**	
14	**What are the learning materials used for teaching with locally available resources?**	
15	**Have they made the arrangements for all the pupils to perform group activities?**	
16	**Did the activities pertaining the radio lesson continue after the broadcast of radio lessons?**	
17	**Has the teacher maintained a record after checking the students learning and progress?**	
18	**The teacher provided opportunity for the pupils to express their views frankly?**	

Tool3: Section C

Duration	**Details**
First 15 minutes	Preparation for radio lesson
30 minutes	During the broad casting of radio lesson

Last 15 minutes	End

Name of the social worker & Signature

Mobile Number

Date

Tool4: Teacher's opinion about Radio Lesson

District	Taluk
Name of the school	Cluster Vilage
Teacher's Name	Standard

1. How long have you been working in this school?
2. Which standard do you teach?
3. Which subjects do you teach?
4. Have you under gone training for radio programmes?
5. For which class do you take radio lesson?
6. Which subject do you take up for radio lesson?
7. Which year did you undergo radio lesson training?
8. Quality of radio lesson training

   (a) Excellent (b) good) (c) satisfactory
9. Does the guideline book pertaining to radio programme contain sufficient information?
10. Do you (school) posses all learning materials required for radio lessons?
11. If yes, are you using it?

    (Using =1, not using =0)
12. If not, why?
13. Do these programme paves way for effective teaching practice?
14. If yes, justify
15. If not, explain
16. Do you feel the duration of radio lesson sufficient for you and students?

    (Yes = 1, No = 0)

17. If not, what period /duration do you prefer?
18. Do you feel radio programme is convenient?

    (Yes = 1, No = 0)
19. Has the radio programme helped in enhancing student learninglevel

    (Yes = 1, No = 0)
20. Do all the students participate in the radio programme with interest and creatively

    (Yes = 1, No = 0)
21. Do you prepare the learning materials

    (Yes = 1, No = 0)
22. Your opinion/suggestions about radio programme

Teacher's name and signature

Date

Test for Class II

District	Taluk	Cluster
Name of the School		
School Code		Date of Examination

Instructions to the Evaluators

Details of all the 2nd standard students who are present to be filled in (A-6a)

All the students of II standard should be questioned individually

All the students present on that day should be tested

Enter 1 for correct answer and 0 for wrong answer according to the answer given by the students in the marks sheet provided

Make the students understand the question by repeating the answer but do not give the anwer

Environmental Science

Sl.No	**Questions**
1	What is the name of your school?
2	Which is our state?
3	Which month is this?
4	Which is the next month?
5	Say true or false 1. Do not stop if the water is flowing in the street tap? 2. Do not throw the garbage in the street? 3. Make noise when the teacher is teaching in the class
6	When do we celebrate Republic day?

Maths

7	Identify the following numbers **Instructions to Evaluators – Ask the child to point out each number and read out (only if the child identifies all the numbers Enter '1' if not '0'** **7 19 80 66 25 34**
8	Measure the length of the table in span Ask the child to measure the length one part of the table with his/her hand. Observe the child measuring with its hand and do not give prominence to for the approximate measurement. Just check whether the child know the concept of span, help the child if necessary by showing the hand, when measuring check the child's skill of counting and enter '1' if it is correct '0' for wrong

Test for Class III

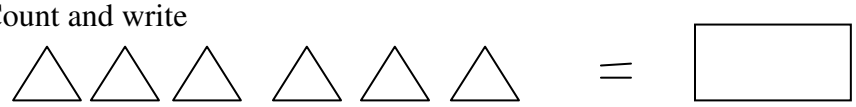
District	Taluk	Cluster
Section		
School SSA Code		
Student full Name		
Gender	Caste	Student code
Father's name	Mother's name	
Date of Examination		Time : 45 mts
Evaluators name		

EVS

Sl. No	**Questions**	
1	Circle the odd one Eye, Head, leg, comb, forehead	
2	Match the following	
	A	**B**
	Banana Egg Fish	
3	Mark ( )for right and (X) for wrong 1. Wash your hands before having food 2. Take bath daily 3. Wear dirty cloths	

4	Match by drawing lines	
	A	**B**
	1. Woolen cloths 2. Umbrella 3. Very hot	Rainy season Summer season Winter season
5	Fill in the blanks 1. We get mangos in _____ season (winter, summer, rainy) 2. Grass is grown in plenty during _____ (rainy, past tense,summer)	

Maths

6	Count and write 
7	Write the following in descending order 8,1,5,9,3,2
8	Write the following in ascending order 19,13,17,14,12
9	Fill up the blanks 1. 1 kg is equal to _____ grams 2. 500 grams is _____ (1/4kg , 1/2kg, kg)
10	Give the place value of 1. 238 → 3 is in ___ place 2. 406 → place value of 4
11	Mark ( )right (X) wrong

	1. Cotton is measured in litres 2. Water is measured in kilometers
12	Find the sum of 8 litres + 3 litres

Test for Class IV

District	Taluk	Cluster
Section		
School SSA Code		
Student full Name		
Gender	Caste	Student code
Father's name	Mother's name	
Date of Examination		Time : 60 mts
Evaluators name		

EVS

Sl. No	**Questions**	
1	Circle the odd one Walking , flying, writing, chain	
2	Mark ( )right (X) wrong 1. Do not take bath daily 2. Wash the face neatly 3. Wear clean and tidy dress	
3	Match the following	
	A	**B**
	Cotton dress Wollen cloths Rain coat	Rainy season Summer season Winter season
4	Answer in one sentence	

	Who should protect the private property?
5	Answer in one sentence What are the nutrients in the food?
6	Fill in the blanks 1. We need _____ to work 2. _____ is the source of human energy 3. The change of water into vapour is known as _____
7	What is the average amount of water consumed by an individual for (washing face in morning, bathing, washing cloths)
8	Mark ( ) for the right answer:- 1. Which of the following group of nutrients are energy giving nutrients? A) Carbohydrates and Iron. B) Water and minerals. C) Vitamins and salt. D) Minerals and fibre. 2. Which of the following contains Vitamin 'C' ? A) Rice . B) Wheat. C) Gooseberries. D) Carrot. A) Which of the following food items is the best example for a "Balanced Diet"? A) Coffee. B) Water. C) Milk. D) Cooking Oil.

Mathematics

9.	Give the place value of:- 1. What is the face value of 3 in 5430? 2. What is the place value of 4 in 1489?
10.	Fill in the blanks:- 1. 1litre is equal to _____ Millilitre. 2. If you measure 100ml beaker 10 times, it is equal to _____ litres.
11.	Add:- 237 + 136
12.	Subtract:- 307 _ 287
13.	Solve the problem:- 632 bricks and 276 bricks were brought for the construction of school room. What is the total number of bricks brought fir the construction?
14.	Solve the problem:- There are 365 students in a school, out of which 163 are girls and what is the number of boys in school?
15.	Work Out the following:- 103 ml - 55 ml
16.	Circle the equivalent fractions:- ¼, 2/3, 9/5, ½, 7/6

17.	Circle the Improper fractions:- 3 ¼, ½, 2 ¾, 8/6,
18.	1) 3.5 – write in words. 2) 0.25 _ write in words.
19.	What is the place value of 5 in 54.32?

Tool 5: Interview with the children regarding their opinion on radio lessons

District: Taluk: Cluster: Village:	Name of the school: Name of the student: Class: Student Code: Gender:

1. Which row /bench do you sit during the radio lesson?
2. When was the last radio lesson held in your class?
3. Which subject did the radio lesson pertain to?
4. Do you like the radio lesson?
5. If yes, why?
6. If no, Why/
7. What is the name of your teacher who conducts the radio lesson?
8. Is the radio lesson conducted by your teacher audible to you?
9. Are you able to understand whatever is taught in the radio lesson?
10. Do you have the opportunity to participate in the activities/answer the questions asked during the radio lesson?
11. Are you capable of giving right answers to the questions asked during the radio lesson?
12. Which of your classmates answer more questions asked during the radio lesson?
13. Do you participate in the activities during the radio lesson?
14. Which of your classmates participate in most of the activities during the radio lesson?
15. Which subjects in the radio lesson do you like the most?
16. If you like, why?

17. Are the learning materials required for the radio lesson available in your school?

18. If yes, do the teachers use them?

19. Your opinion about the radio lesson.

    A) Very good. B) Good. C) Not good.

20. Give reason for the above question.

Signature of the student and date

Interviewed by

Name and signature.

Tool 6: SCHOOL INFORMATION FORMAT

District	Taluk
Cluster	Village
Name of the School	Date of visit
Address of the school	

PART- A – GENERAL INFORMATION ABOUT THE SCHOOL

1	Year of establishment	
2	Ownership of the school (government/rented/others) (mention)	
3	Number of working days in the previous academic year	
4	Sanctioned post of teachers (including head teacher)	
5	Number of teachers working in the school (including head teacher)	
6	Number of teachers who have attended the training in radio programme	
7	Number of teachers conducting radio lessons	
8	Classes /Standard taught in the school	
9	Is there a separate room for the head teacher? Yes /No	
10	Number of rooms in the school used for teaching (mention the numbers)	
11	Does the school have internet facility? Yes/No	
12	Does the school have a library? Yes/No	
13	Is there a science lab in the school? Yes / No	
14	Does the EDUSAT programme being conducted in the school? Yes / No	
15	Is drinking water facility available for all the children in the school? Yes / No	
16	Is there the availability of lavatory facility (with water) for girls in the	

	school? Yes / No	
17	Is there the availability of lavatory facility (with water) for boys in the school? Yes / No	
18	Is the mid-day meal facility (Akshara Dasoha) available in the school? Yes / No	
19	Does the school have electricity?	

PART – B – INFORAMTION REGARDING RADIO LESSONS

20	Does the school conduct radio lessons ? Yes/No	
21	The year in which the radio lesson was started in the school?	
22	How many number of days of radio programmes were held during the Previous year in the school (2008-09)	
23	How many number of days of radio programmes were held during the Present year (2009-10)	
24	Is there a separate room available for conducting radio lessons? Yes/No	
25	Does this room have electricity? Yes ? No	
26	How many students can be accommodated in the room (average)mention the number	
27	Is there supply of electricity during the radio lesson? Yes / No	
28	If not, what is the alternate measure taken ?	
29	Is the radio lessons conducted in the respective classes? Yes / No	
30	If not, how many students are accommodated in the room provided for the radio lesson (mention the number of students)	
31	Where is the radio placed during the radio lesson?	

32	Is the radio used for only the radio lessons or for other purposes? Yes ?No	
33	If yes, for which other programme is the radio used?	
34	Is the radio working in good condition? Yes ? No	
35	If not, how do you get it repaired?	
36	Does the SDMC have information/knowledge about the radio lessons? Yes?No	
37	What measures are taken by SDMC if there is power shutdown during the radio lesson or if the radio is under repair?	

PART C – INFORMATION REGARDING STUDENTS

DETAILS OF ADMISSIONS (2009-2010)

Gender	Std 1	Std 2	Std 3	Std 4	Std 5	Std 6	Std 7	Std 8
Boys								
Girls								
Total								

DETAILS OF ATTENDANCE –(DATE OF VISIT)(COUNT THE CHILDREN AND MENTION)

Gender	Std 1	Std 2	Std 3	Std 4	Std 5	Std 6	Std 7	Std 8
Boys								
Girls								
Total								

Name and signature of Volunteer

Mobile/Phone No

Date

Tool 7: INFORMATION OF THE VILLAGE

SELECTED BY THE GRAMA PANCHAYAT

District Taluk Grama Panchayat Name of the village Information given by

PART – A - GENERAL INFORMATION

1	**Population (Population according to 2001 Population Censes)** **Men Women** **Total**
2	**Families** **SC ST Others** **Total** **Men -Women Men -Women Men -Women Men -Women**
3	**Number of families possessing ration card** **Sl. No Ration Card Color No. of Families**

4	**Main occupation of the village** **1.** **2.** **3.**
5	**Major crops grown in the village** **1.** **2.** **3.**

Status of drinking water

6	**Do you have water facility in the village Yes =1 No=2**
7	**Is there a situation in the village where drinking water is purchased by paying money? Yes =1 No=2**
8	**If yes, how much money is spent? (approx)**

Infrastructure availability

9	**General Information** **Sl. No Facilities Response Yes =1 No=2** 1 Bank 2 Post Office 3 Public Library 4 Primary Health Centre 5 Adult Education Centre 6 Anganavade 7 Lower primary school (1-5 classes) 8 Higher Primary school (1-7/8 std) 9 High school 10 Is this village warded as a complete clean village

Transport

10	Does the village have good roads (All seasons)
11	Is the public transport facility available in the village

Electricity

12	Does the village have electricity
13	Availability of power (duration in hours)

Health

14	Information of health projects/programme Sl. No Facilities Number of beneficiaries in the village 1 Yashasvini 2 Suvarna Arogya Suraksha 3 RSBY 4 Universal Health insurance scheme-UHIS 5 Others (please mention)

Name and signature of the volunteer

Mobile No.

Date