

SSA

Nature and extent of use of ICTs in classrooms

Draft Report

**Dr Mythili Ramachand
RV Educational Consortium
January 2010**

Field Researchers

1. Ms. S K Prabha
2. Ms. Brinda Rao
3. Ms. Sunitha Amerchela
4. Ms. Akila.R
5. Mr. Sudhir.S
6. Ms. Suma
7. Ms. Rupa
8. Ms. Parvathi
9. Ms. Mamatha
10. Dr. Mythili.R

No.	List of Graphs
2.1	Nature of Sample Schools
4.1	Percentage of schools having Radio, Tape-Recorder, Television and Computers in working condition
4.2	Percentage of schools equipped with Educational CD, Internet connections and Backup power
4.3	Availability of power on an average school-day
4.4	Nature of server at sample schools
4.5	General qualification of teachers
4.6	Professional qualification of teachers
.7	% of teachers with working knowledge of computers
4.8	% of teachers who found lacunae in textbooks
4.9	Choice of resources for reference
4.10	Teachers who prefer resources-Books and Newspapers
4.11	Relative preference for resources-Television, Computer and Radio

4.12	Relative preference for CD ROM and Internet
4.13	Proportion of students in class who can operate computer
4.14	Level of interaction between teacher and students
4.15	Level of participation by students
4.16	Level of Teacher Intervention
4.17	No.of schools where teachers reviewed and summarised computer lessons
4.18	State at which radio lesson was broadcast
4.19	Level of interest and participation by students
4.20	Level of interaction between teachers and students
4.21	Seating arrangement of children
4.22	Whether instruction during lessons were followed
4.23	Participation by teachers
4.24	Effective time management
4.25	Summarisation of radio lesson by teacher
4.26	Stage at which TV lesson was broadcast
4.27	% of schools where TV screen was visible to all students
4.28	Classroom Environment of schools
4.29	Seating arrangement of children
4.30	Classroom management by teachers
4.31	Written work for children
4.32	Instructional techniques used
4.33	Use of Resources
4.34	Level of ICT use by teachers

<u>Chapter Headings</u>	<u>Pg.No</u>
1. Introduction	4 -7
1.1 Historical perspective	4
1.2 Literature on use of ICT in schools	5
2. Study Design	8 - 11
2.1 Objectives	8
2.2 Methodology	9
2.3 Sample	9
2.4 Tools	9
2.5 Data analysis	11
2.6 Scope and Limitations	11
3. Case studies	12-58
3.1 CAL, Radio and Edusat	12
3.2 Only Radio	23
3.3 CAL and Radio	25
3.4 CAL and Edusat	55
4. Data Analysis	59 - 80
4.1 Consolidation	59
4.2 Levels of use	74
4.3 Strategies adopted by teachers	76
4.4 Ways in which children learn	76
4.5 Perception of stakeholders	78
5. Conclusion	81 - 84
5.1 Issues and Concerns	81
5.2 ICT enabled pedagogy	82
5.3 Probable training module	83
References	85 - 86
Appendices	87 -118
1. List of Sample Schools	87
2. Tools	88-99
3. Time table for computer classes	100
4. Time table for radio lessons	101-104
5. Unit plans	105-117
6. School Time table	118

4 Data Analysis

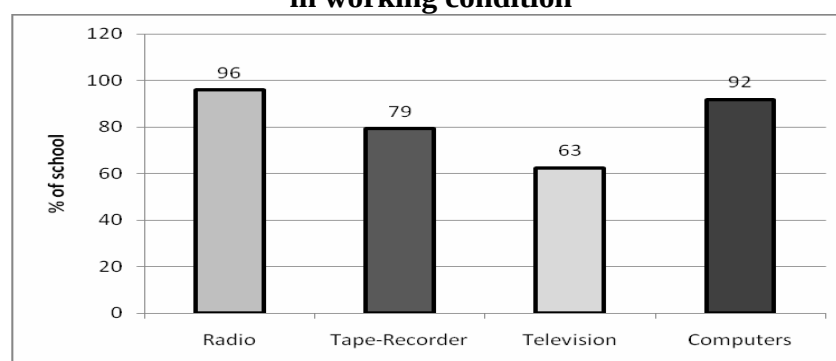
4.1: Consolidation

The quantitative data collected for the study in terms of school details/ basic availability of ICT related resources; teachers response to the questionnaire; and consolidation of class observations are given in this section.

School Details:

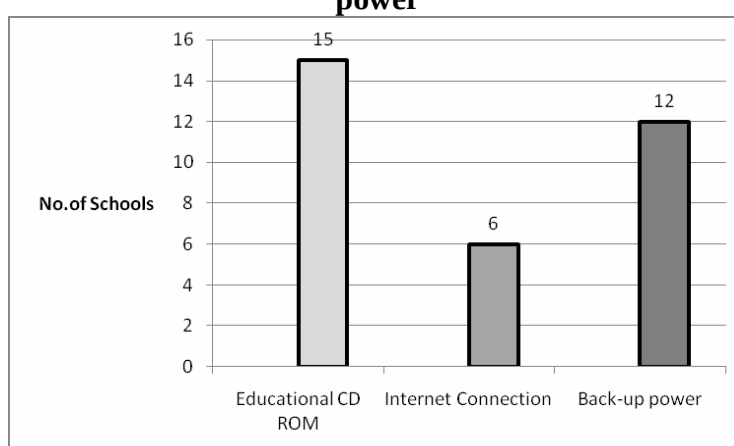
In our sample of 24 schools, the percentage of schools equipped with technology that are in working condition is given in graph 4.1.

Graph 4.1 Percentage of schools having Radio, Tape-Recorder, Television and Computers in working condition



Among the schools equipped with computers, Graph 4.2 gives details of availability of additional resources.

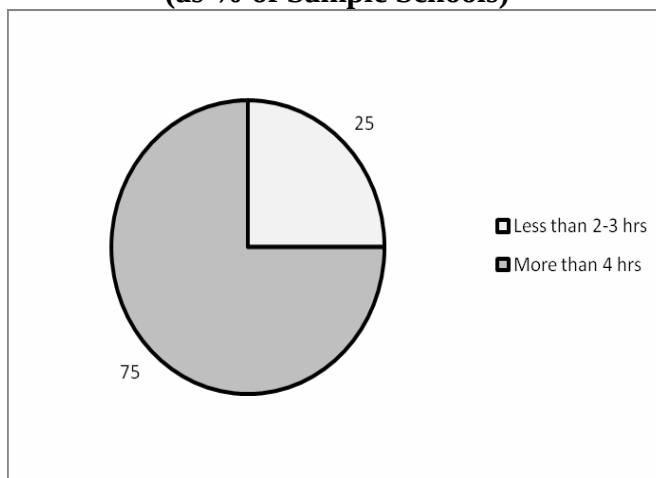
Graph 4.2 % of schools equipped with Educational CD, Internet connections and Backup power



6 of the 22 schools had Internet connection; two-thirds of them were equipped with educational CD's (majority of them were APF created) and half of them had back-up power. Interestingly,

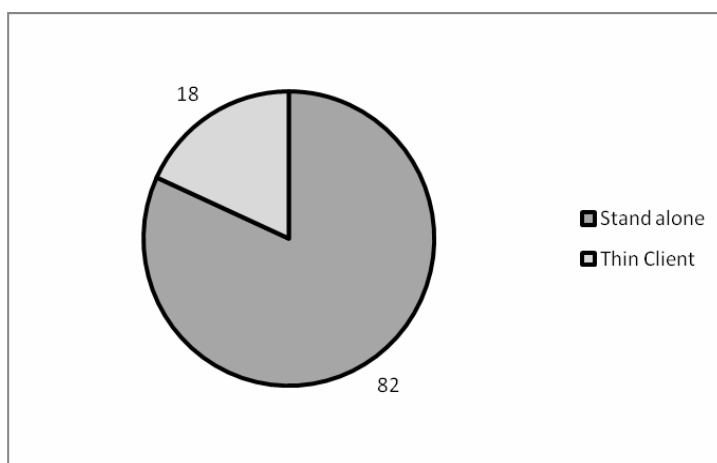
75% of the schools reported having power supply for more than four hours on an average, as seen in graph 4.3.

**Graph 4.3 Availability of Power on an average school-day
(as % of Sample Schools)**



Four of the 22 sample schools having computers had a thin client server. The rest were equipped with stand alone servers.

**Graph 4.4 Nature of Server at sample schools
(as % of Sample Schools)**



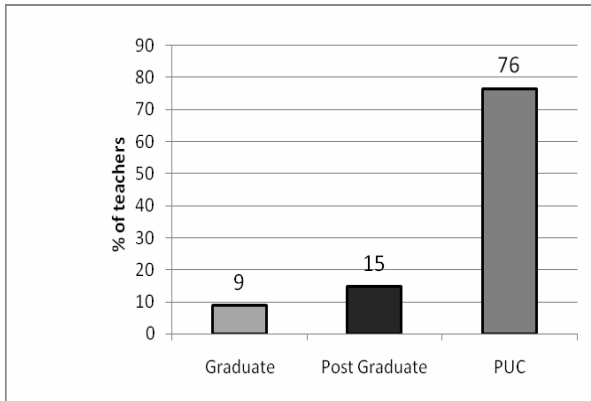
Three schools with CAL programme had a separate computer instructor.

Teachers' details

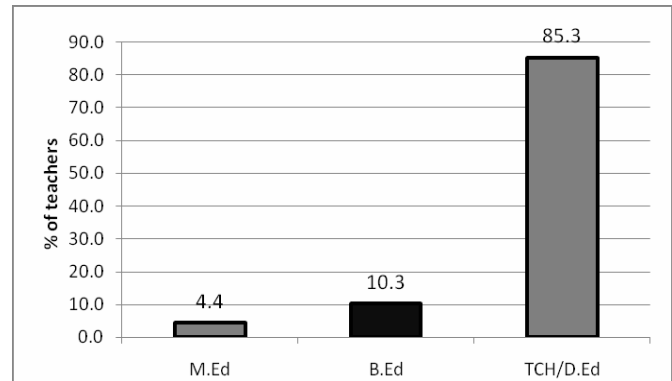
Our sample comprised of 68 teachers, 50 of whom were females. The total mean age of teachers was 42.

Teachers' general and professional qualification is given in the following figures

Graph 4.5 General qualification of teachers

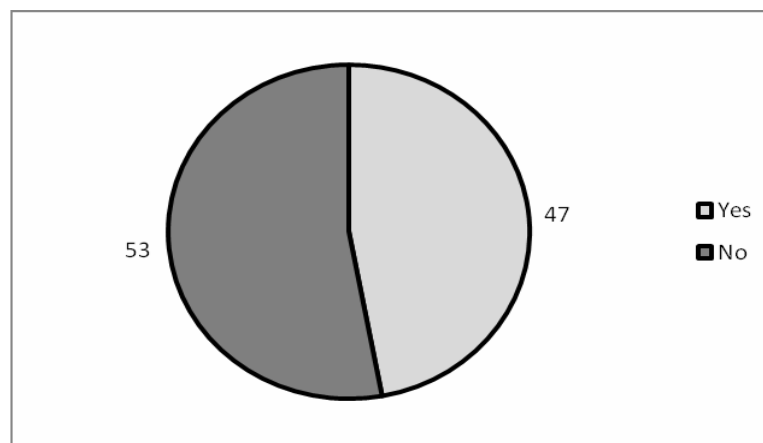


Graph 4.6 Professional qualification of teachers



Nearly half of the teachers we interviewed (32 of the 68) said they have a working knowledge of computers.

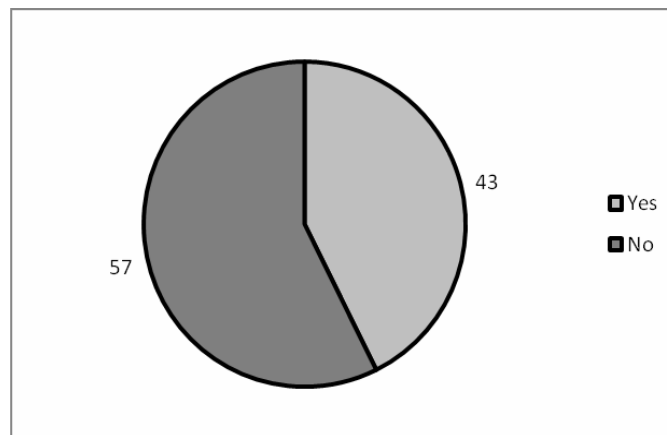
Graph 4.7 % of teachers with working knowledge of computers



Among these 32, 26 of them have computers in their house and 13 of these 26 have Internet connection.

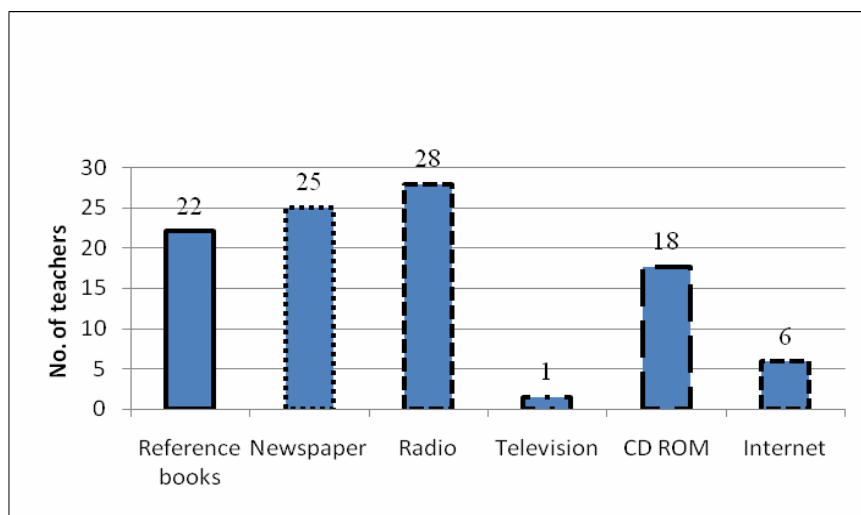
Teachers were asked if they found any lacunae in the content covered by prescribed textbooks. Only 29 of them said they did.

Graph 4.8 % of teachers who found lacunae in textbooks



When asked to rank their choice for various resources, this is what they reported.

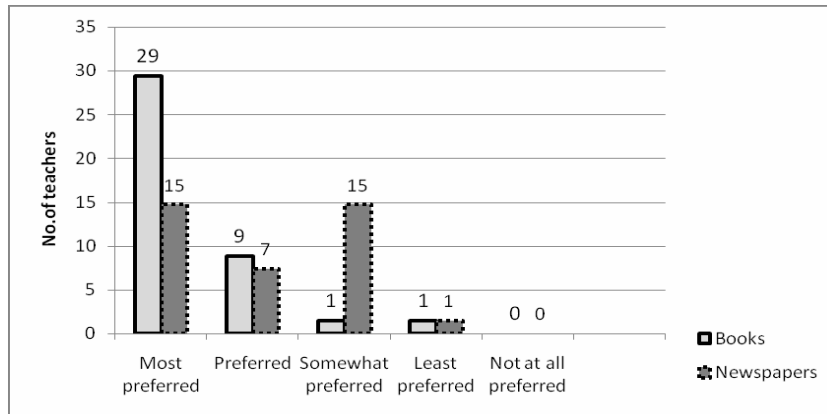
Graph 4.9 Choice of resources for reference



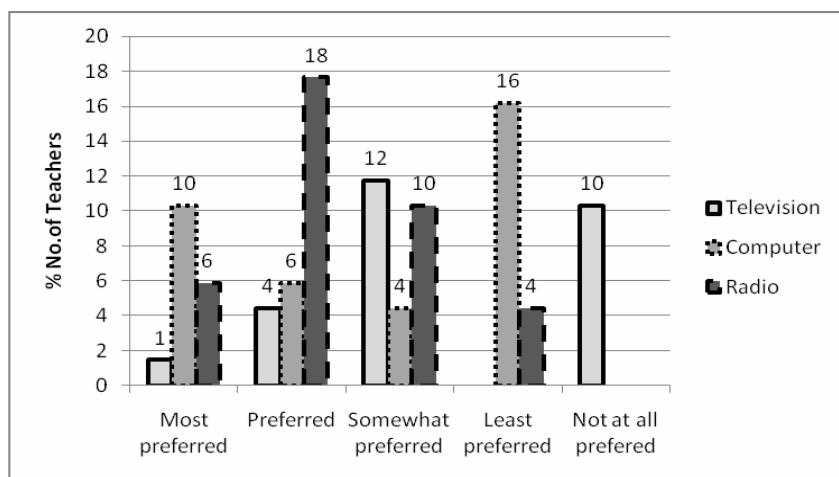
They were given this exercise to indirectly ascertain teachers' level of comfort about using various resources for their personal reference. Radio tops the list and television is at the bottom.

Teachers were asked to rate their preference for using different resources for teaching. These are enumerated below.

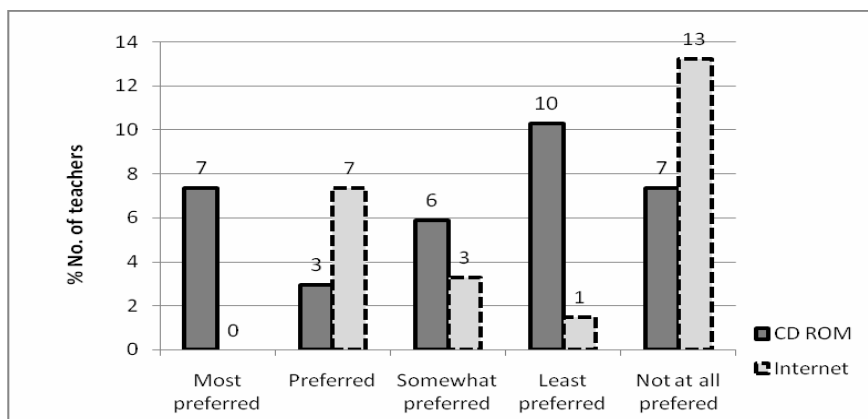
Graph 4.10 Teachers who prefer resources - Books and Newspapers



Graph 4.11 Relative preference for resources - Television, Computer and radio



Graph 4.12 Relative preference for CD ROM and Internet



A majority of teachers who reported preference for radio as a resource for reference have found the English lessons under Chinnara Chukki and Chukki Chinna especially useful. Many of them also said the activities suggested in these two programmes are interesting.

Books appear to be the most preferred resource. We had deliberately not specified the nature of books in our questionnaire. When queried, they said they prefer textbooks. Teachers' rating of ICT-related resources for classroom teaching is interesting. Among TV, computer and radio, computer garnered a greater rating as the most preferred resource. On the other end of the scale, more number of teachers have indicated they do not prefer TV at all. Within computer, eight teachers have said they prefer CD most while a greater proportion have indicated they do not prefer Internet at all.

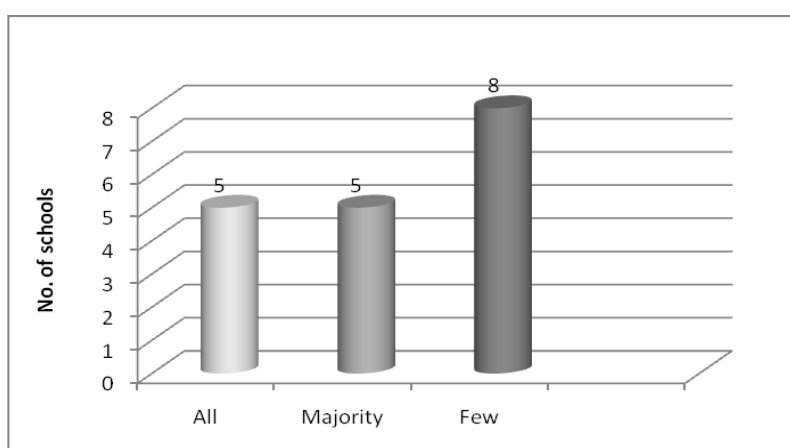
Through our interactions with teachers, we ascertained that they are not familiar with the Internet. Popular media reports also seem to have prejudiced them against this media. Very few teachers appear to value the Edusat programme.

Greater probing is needed to understand these preferences.

Observation of Computer Class

Of the 24 schools we studied, 22 of them had computers. CAL programme was operational in 18 of them, at the time of the study. Two classes have been allotted for computers for each class per week in the time table in most schools (vide: Appendix 3). Observation of a computer class in these 18 schools are presented here.

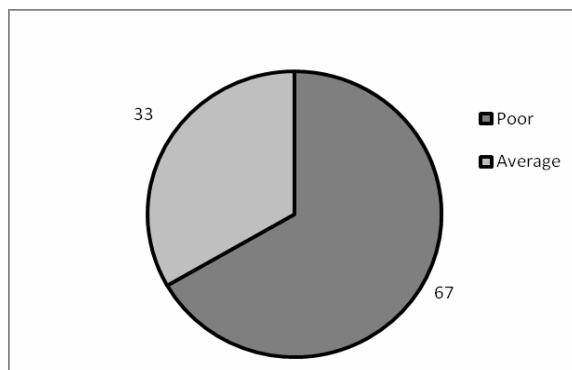
Graph 4.13 Proportion of students in class who can operate computer



In 5 schools all children were able to operate the computer independently. In 5 schools more than 75% of the students could handle the computer on their own. In 8 schools less than 40% of students were able to operate the computer.

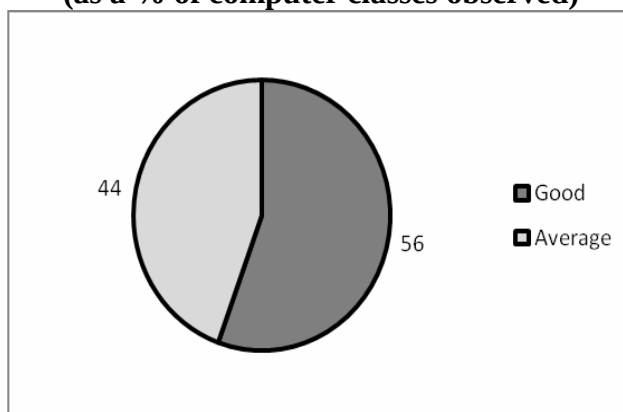
Our researchers observed that the level of interaction between the teacher and students in the computer class was about average, i.e, teacher did not go beyond technicalities of viewing CD's.

Graph 4.14 Level of interaction between teacher and students (as a % of computer classes observed)



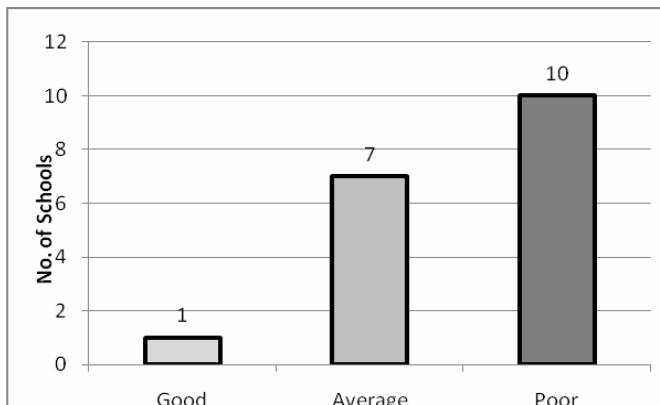
By contrast, level of participation by students was quite good. This was gauged by the interest shown by students in using the computer, and engagement with the activities on computer. In 10 schools, all children were actively participating. In the remaining 8 schools, while few children were operating, the others were content to watch.

Graph 4.15 Level of participation by students (as a % of computer classes observed)



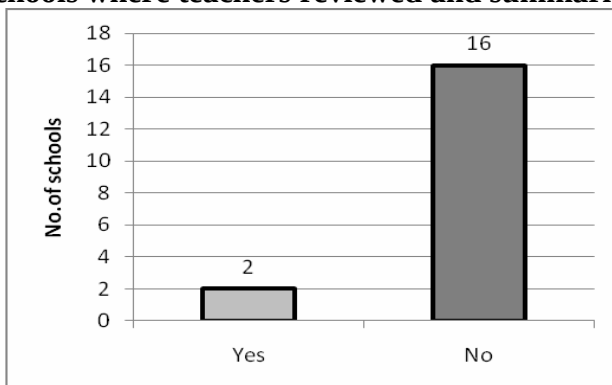
Researchers also documented if teachers intervened when students had problems either in proceeding with the activities or with conceptual understanding. In only one school did teacher actively go around the class and intervene when she perceived children were facing conceptual difficulties while doing the activities. In 7 schools teacher intervened when there was a technical problem or when children could not follow the instructions to proceed with the activity.

Graph 4.16 Level of Teacher Intervention



Only in 2 schools did the teacher review and summarise the activities done by children on computers.

Graph 4.17 No.of schools where teachers reviewed and summarised computer lessons



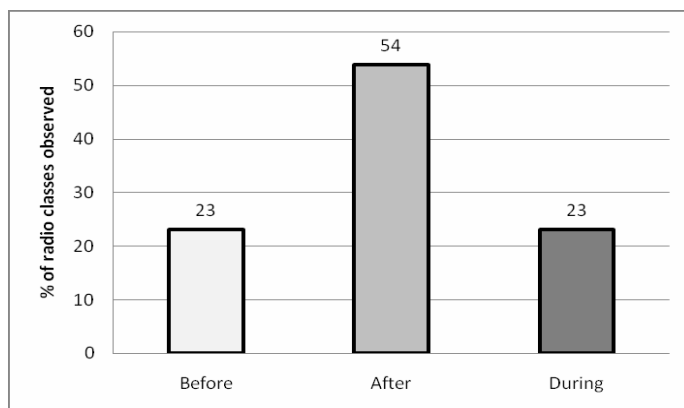
Observation of Radio Lesson

All but one school in our sample had at least one radio in working condition. Radio programme of course, is extended to all schools across the State. Radio lessons are

broadcast for different grade levels at previously specified time which is notified to the schools at the beginning of the academic year (vide Appendix 4).

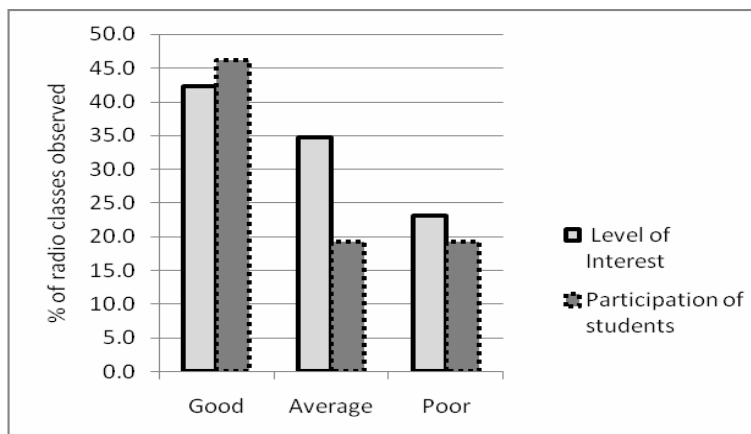
Where possible, our researchers observed a radio lesson for a lower primary class and a higher primary class. A total of 23 radio lessons were observed. Half of the radio lessons that were observed were based on content that children had already learnt.

Graph 4.18 Stage at which radio lesson was broadcast



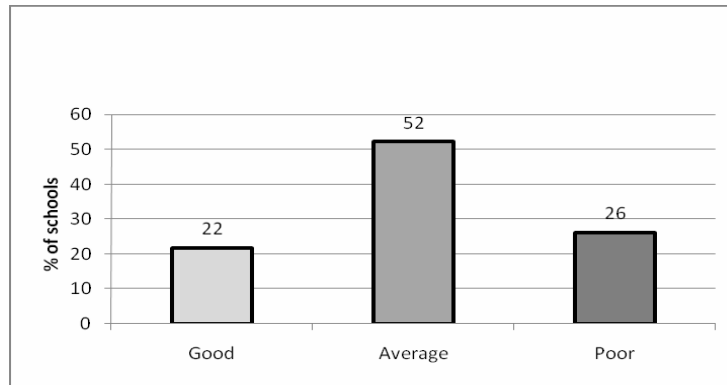
The level of interest and participation of students during the radio lesson is about average. A majority of the 40% of the students who showed interest and were actively participating in the radio class, were from lower primary class.

Graph 4.19 Level of interest and participation by students



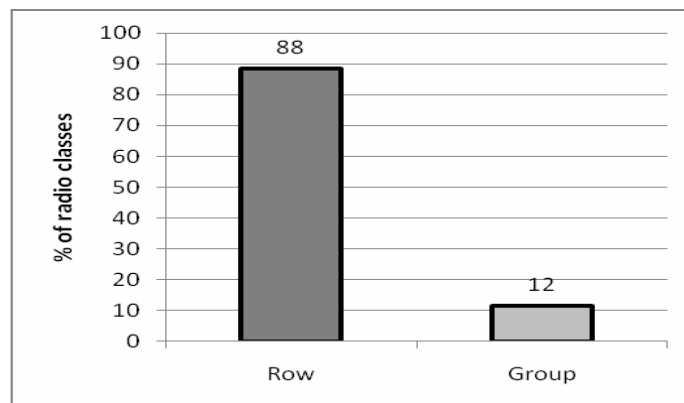
In 5 schools where we observed radio lessons, there was good interaction between the concerned teacher and students.

Graph 4.20 Level of interaction between teacher and students



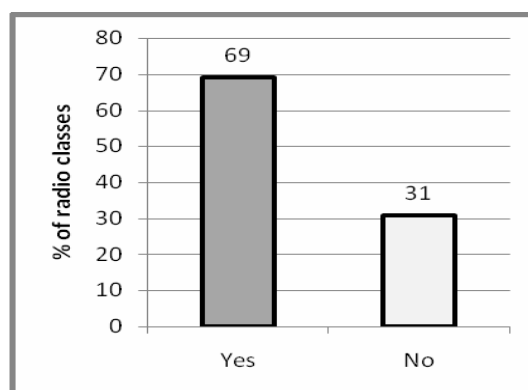
Only in 3 classes were children seated in a group during radio lessons.

Graph 4.21 Seating arrangement of children



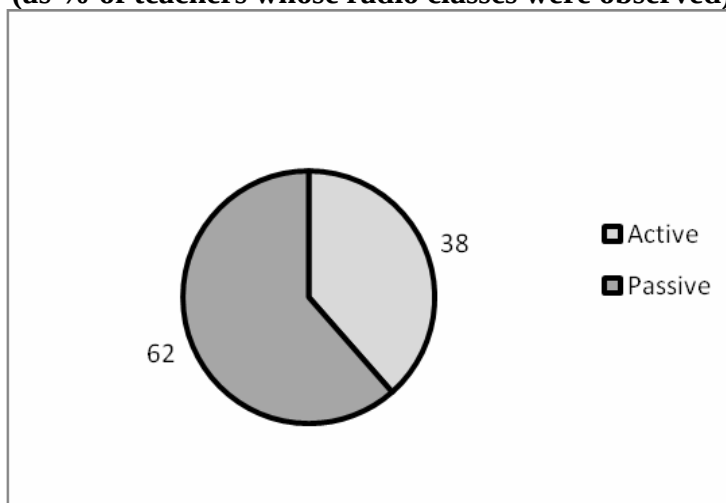
In two-thirds of the classes observed, teachers were not following the instructions accompanying the radio lessons

Graph 4.22 Whether instruction during lessons were followed



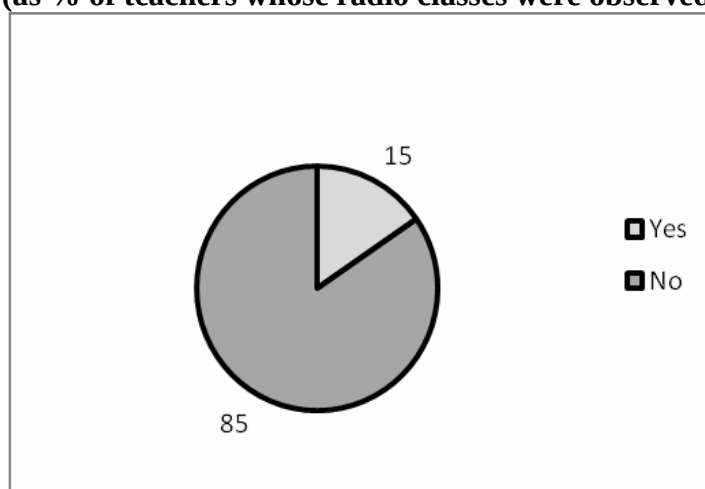
Teachers were passive in a majority of the radio classes we had observed.

Graph 4.23 Participation by teachers
(as % of teachers whose radio classes were observed)



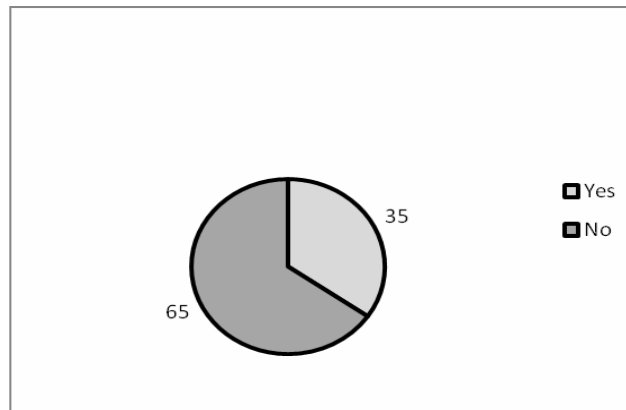
In 4 radio classes did teacher manage their time effectively during radio lessons in terms of transition from one activity to another; distribution of materials for activities, if any; and helping children with the activity, if need be.

Graph 4.24 Effective time management
(as % of teachers whose radio classes were observed)



In one-third of the classes, teacher summarized the radio lesson for the children.

**Graph 4.25 Summarisation of radio lesson by teacher
(as % of teachers whose radio classes were observed)**

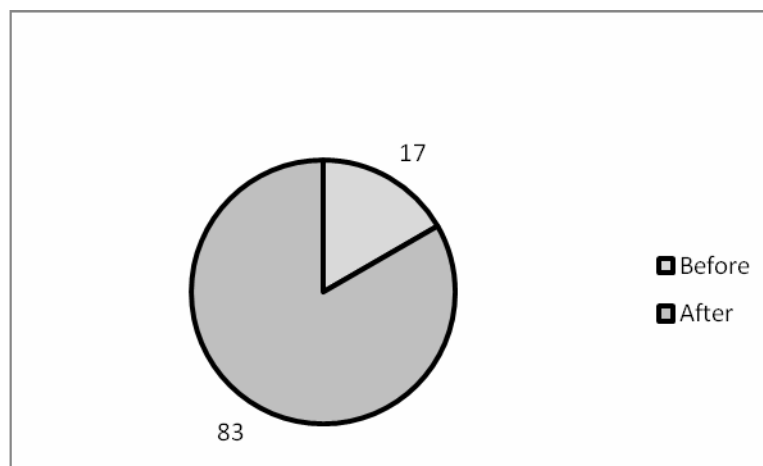


Observation of Edusat Lesson

We were able to observe 6 schools having Edusat programme. Like the radio programme, the Edusat programmes are also broadcast at fixed time for different classes and subjects. These timings are intimated to schools beforehand and hence factored into the school time table (vide: Appendix 5)

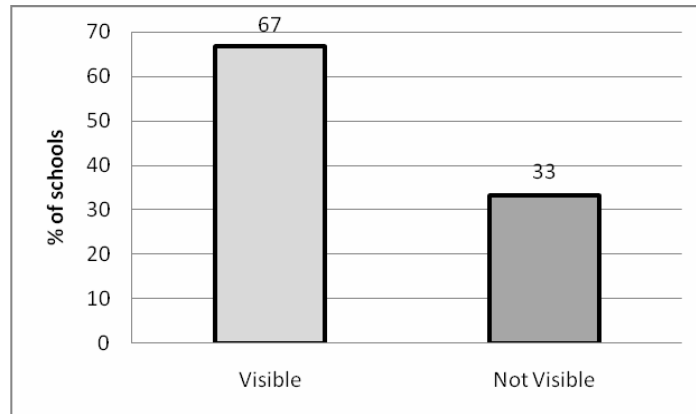
In a majority of the TV lessons observed, the content had been covered by the teacher, during classroom teaching, as can be seen in the graph below.

**Graph 4.26 Stage at which TV lesson was broadcast
(as % of schools with Edusat)**



In 2 of the 6 schools where Edusat programme is operational, the TV screen was not visible to all students.

Graph 4.27 % of schools where TV screen was visible to all students

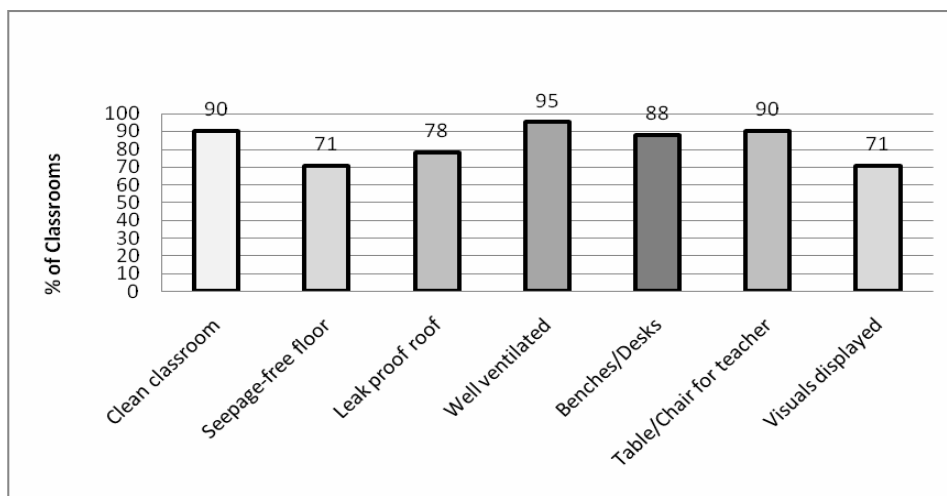


Classroom teaching observation

Researchers observed atleast one lower primary class and one upper primary class, preferably of the same teacher who had conducted computer/radio/TV lessons. A total of 41 regular classroom teaching were observed.

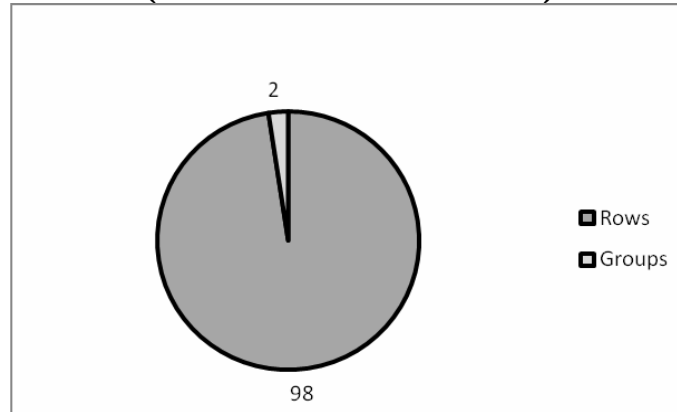
A majority of the classrooms are reasonably conducive to learning as the following graph shows.

Graph 4.28 Classroom Environment of schools



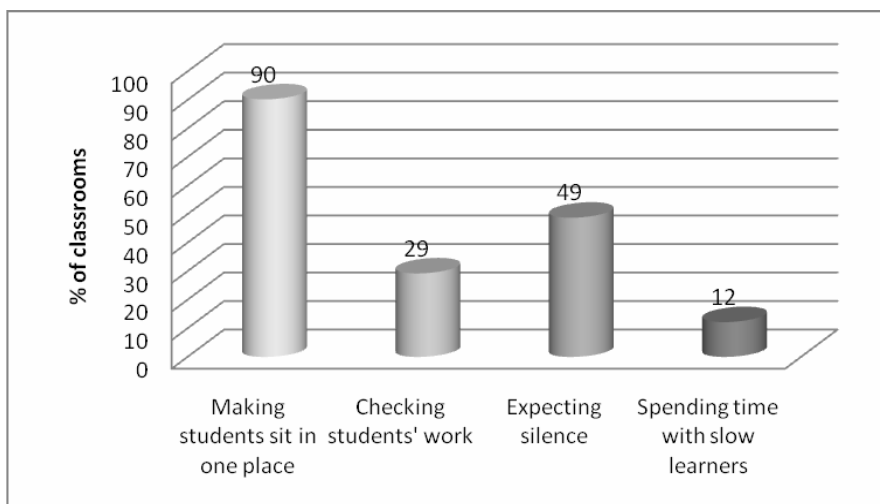
In a majority of classrooms, included lower primary classes, children were seated in rows.

**Graph 4.29 Seating arrangement of children
(ss % of classrooms observed)**



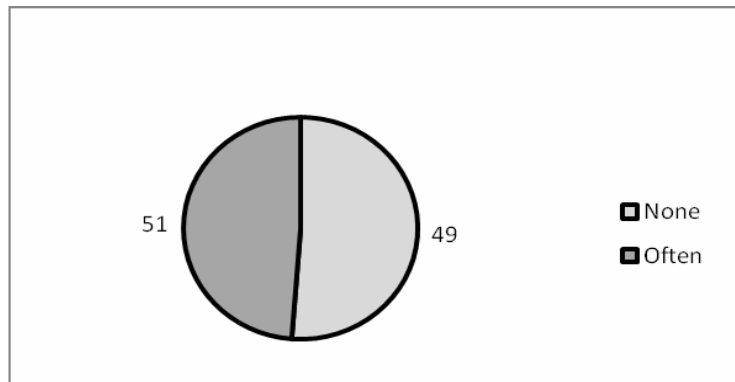
The following graph gives further indication of how teachers manage their classrooms.

Graph 4.30 Classroom management by teachers



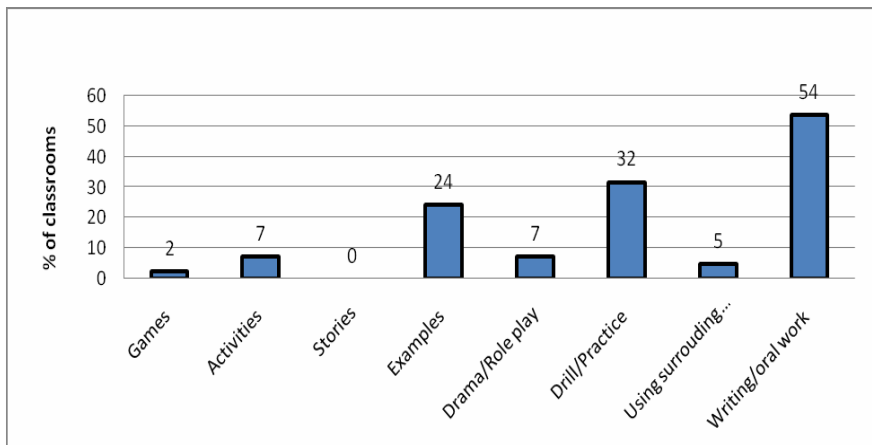
In 90% of the classrooms, children were seated in one place throughout the class. 12 of the 41 teachers whose classes we observed went around checking students' notebooks when written work was given. Half the teachers expect complete silence in the classroom and only 5 teachers spent atleast a little time with slow learners.

**Graph 4.31 Written work for children
(as % of classroom observed)**



Teachers either made the students write most of the time or not at all during one period of 40 minutes..

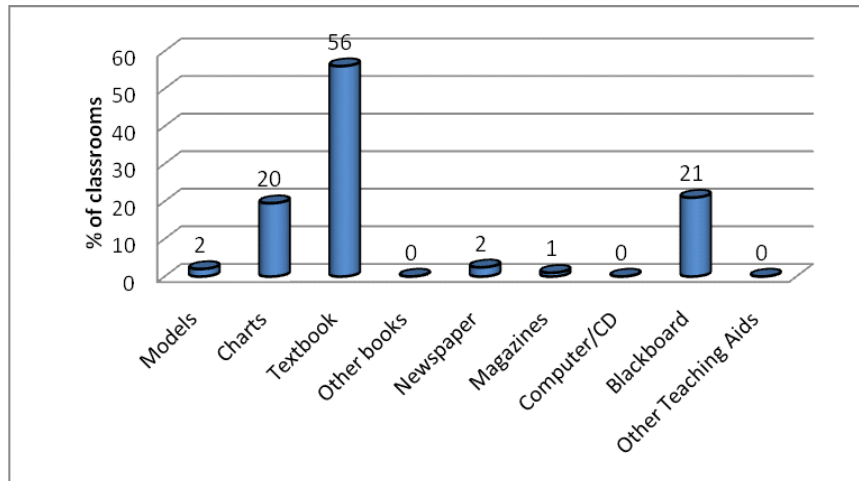
Graph 4.32 Instructional techniques used



Drill and practice and written/oral repetitive work are the predominant techniques used by the teachers.

As to the use of resources, textbooks and blackboard find favour with a majority of teachers followed by charts.

Graph 4.33 Use of Resources



4.2: Levels of ICT use by teachers

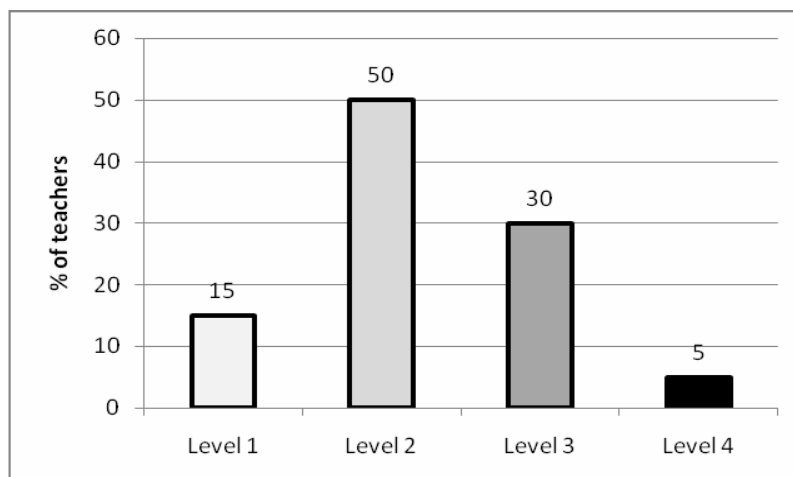
Initially at the time of conceptualizing the study, we had planned to identify the levels to which teachers integrate ICT in their classrooms. As we did not find a single instance of integration as defined for this study (vide, chapter 2), we mapped their levels of use instead.

The UNESCO Report (2002) on *ICT in Teacher Education* has defined levels of ICT use by teachers as:

- 0 - Non – use : Not involved with ICTs
- 1 - Orientation : Begins to find out about ICTs
- 2 - Preparation : Gets ready to use ICTs
- 3 - Mechanical : Focuses on rote aspects of ICTs
- 4 - Routine : Uses ICTs in a basic way
- 5 - Refinement : Considers changes in use of ICTs
- 6 - Integration : Works in collaboration with colleagues to create interactive and meaningful classroom experience and find ways to use ICTs in subject-based teaching/learning
- 7 - Renewal : Considers improvements and innovations in use of ICTs

Based on teachers' response to the questionnaire and interviews; as well as our classroom observations; teachers would fall between levels 1 and 4.

Graph 4.34 Level of ICT use by teachers



The rationale for this categorization is given below:

Table 4.1 Basis for Categorising teachers vis-à-vis levels of ICT use

Level	Explanation	Evidence
1	Begins to find out about ICTs	<ul style="list-style-type: none"> • Does not know to operate computer • Somewhat prefers ICT-related resources • Perfunctory participation in ICT based classes
2	Gets ready to use ICTs	<ul style="list-style-type: none"> • Knows to handle computers • Prefers to use ICT-related resources • Interacts with children once in a while during ICT based classes
3	Focuses on rote aspects of ICTs	<ul style="list-style-type: none"> • Familiar with basic computer operation • Prefers ICT-related resources and occasionally uses them for reference • Follows basic instructions given in ICT-based lessons • Summarises in a mechanical manner at the end of lesson
4	Uses ICT in a basic way	<ul style="list-style-type: none"> • Comfortably uses computers • Prefers ICT-related resources most and periodically refers them • Orients children before ICT-based lessons; provides guidance and questions once in a while during the lessons; summarises at the end of the lesson

The following section lists the strategies used by teacher in level 3 and level 4 while handling ICT-based classes.

4.3: Strategies adopted by teachers

There was no evidence of transfer of learning across the three technologies nor was there a conscious effort on the part of the teachers to relate radio/edusat/computer lessons.

Hence, our observations of what teachers did in each of the three classes are listed separately.

Radio class

- Prior preparation in terms of arranging for necessary materials
- Orienting students before the lesson
- Following instructions given during the course of the lesson
- Guiding children once a while, if they have difficulty in doing the activities instructed
- Summarising at the end of the lesson

Computer class

- Questioning children while viewing CD's
- Guidance provided in the form of instructions
- Interacting with children once in a while

Edusat class

- Asking a few questions to help children recall some of the facts conveyed in the lesson
- Briefly summarizing what was broadcast

4.4 Ways in which children learn

Children are of course curious and open to learning through different means.

Some of the ways in which they are learning through radio, computers and television as discerned through our classroom observations and interactions with children are listed below:

Through Radio lessons:

- Children are able to gather information
- Variety of examples provided is useful
- Additionally, children of classes 1 to 4 are able to imagine the characters and scenario and identify with characters
- Children enjoy the activities if teachers make children do these activities in the course of the lesson
- English lessons for higher classes are too fast for children to follow

- Recall and retention of previous radio lessons is not good. Children were only able to reproduce title songs

Through Computer lessons:

- Computers help children in visualisation
- Where teachers summarise/reinforce after lesson was taught, children have retained what they saw
- Learning has improved among slow learners
- Peer learning happens
- Children have learnt English better
- Children find computers useful to link what they view with what they hear in radio where same lesson is repeated (for eg: Fractions in mathematics)
- Exposure has improved their confidence
- Children enjoy using computers

Through Edusat lessons:

- Mostly passive and silent viewing
- In schools where teacher asked questions (factual recall) children answered in chorus
- Children enjoy English lessons and watch with rapt attention
- Quiz time on Saturdays is enjoyed by most children;
- Visualisation has helped in a few cases (for eg: Historical places in Karnataka)

4.5: Perception of Stakeholders

We interviewed teachers and engaged children in discussions to ascertain their views on the ICT programmes

Teachers' Perception

- There are too many activities for us
- We are given too little freedom
- Multiple programmes are launched in same school by NGOs. These programmes fizzle out after a year
- ICT is an additional burden

- Computer training is inadequate
- No follow-up/ refresher programme for computers
- We are afraid of using computer, in case we spoil them
- Where staff strength is low, ICT is affected
- Mismatch in time-table given and lessons broadcast
- When HM is non co-operative, there is very little we can do
- Audio problem occurs many a time during radio broadcast
- Listening comprehension is poor among students. Hence radio lessons are not very effective
- Radio lessons for higher classes are too packed in terms of content

Children's Perception

Our researchers interacted with randomly selected children from a lower primary class and from an upper primary class separately. We found them articulate and in most cases expressed themselves freely as we ensured their teachers were not present.

- Children from lower primary classes seem to prefer radio, computer and Edusat lessons equally. However, a majority of higher primary class students told us they find radio lessons boring.
- Children articulated the following problems in radio lessons:
 - Pace is too fast
 - Sound is not clear
 - Following English is difficult
 - Noise from outside or neighbouring classrooms is disturbing
- The major difficulties that children find in using computers are frequent breaking down of systems and limited number of systems available for use
- Almost all boys play computer games. A sizable number of them go to browsing centres to play games
- In the schools with CAL programme, children have learnt to use "Paint". Only in five schools do they view CD's
- Children like interactive CD's rather than passively watching video's/CD's
- They enjoy English rhymes on CDs
- All children having Edusat said they find TV lessons interesting. They found the visuals

appealing. None of them find any problems while viewing TV lessons. Interestingly, even in the two schools where we found the TV screen not visible clearly to all children. The same children who complained of noise creating disturbance while listening to the radio, did not find it so while viewing TV.

- A few children felt they understand English on TV better than radio or computer

When asked if they prefer technology to their teacher only three students said “Yes”. The reason given by these three students: Technology-based lessons are more interesting; Technologies do not beat them like their teachers sometimes do!

The others felt they can clarify their doubts from teachers; they get better guidance from teachers; teachers talk slowly and they can follow them better; they learn values from their teacher.

A personnel from the organisation that creates ICT-based content was interviewed. The gist of the interview is reported below:

Frame work for content development:

Audience (teachers and students) research across Karnataka was done to find the difficult aspects of various subjects for both teachers and the students. On the basis of this survey, the teachers were hand picked from various districts of Karnataka and were asked to specify the most imperative concepts and content to be developed. These contents then are framed to be the basic structure for their programme.

Script writing

Teachers from various districts undergo a training programme (for 10 days) wherein the master plan is explained to them. They are also given the framework within which they have to write the script. All these teachers teach state board curriculum. The content development team then ensures that the script is within the structural requirements.

Formal evaluation of the programe:

Once the script is ready and approved by the organisation’s members they are recorded for 35 minutes. These recorded programmes are first piloted in six schools to ascertain the students’ and teachers’ reaction. They then edit the programme as per the requirement and the programme gets

ready to be telecast.

Every year a formal evaluation is done by a pedagogue and analysed by a research team. The final evaluation gets its approval from a technological expert from MIT, USA.

Language

In order to avoid the problems faced by various regional slangs and dialects in Kannada while broadcasting the programme, they follow cinema Kannada as it has been widely accepted.

The next chapter delineates some of the issues thrown up by this study and probable suggestions to address them.

5 Conclusion

“Unless we know where we are going, there is not much comfort in being assured that we are on the way and travelling fast” – Boyde Bode

5.1: Issues and Concerns

Some of the recurrent issues culled out from the previous two chapters are listed here.

- Teachers are unable to visualize integration because of the top-down approach adopted
- Management of class and time is a problem for many teachers, especially where class size is large
- Summarisation is for most part mechanical
- There is little scope to encourage thinking/ reflection among children
- There is no scope for teachers to adapt ICT to suit their classroom requirements
- Teachers generally view radio/CAL/Edusat as programmes and not as resources
- Teachers are feeling overwhelmed with too many programmes
- For higher classes radio lesson are only an extension of traditional teaching
- There is better acceptance and usage of radio by teachers probably because they are an extension of their traditional lesson
- Recall and retention by children of radio lessons is not good. Children are only able to reproduce title songs
- Whenever one-day international or T-20 cricket matches are going on, radio programme are not broadcast
- There is a mismatch between school programme and programmes that are broadcast (both TV and radio)
- Both Children and teacher are taking notes diligently during radio and TV programme in most schools
- Edusat lessons do not adequately harness the power of the visual medium
- Not many teachers are comfortable handling computers
- Where staff strength is low, ICT programme is affected
- Training and orientation for teachers in computers is inadequate

The issues point to a pedagogical pattern that reflects an authoritarian, didactic approach to classroom teaching, largely due to the way ICT use has been conceptualized.

As the position paper of the National Focus Group on Educational Technology points out technology should make education dynamic and responsive to children (NCERT, 2005). This is clearly not the case in the schools we studied. ICT programmes appear to augment and reinforce

teachers' pedagogical beliefs rather than challenge them.

The second point of concern relates to teacher training or the lack of it. Finding optimal ways to use technology for students will take time, exploration and experimentation on the part of teachers. They are simply not getting the time or wherewithal for this. Training programmes need to veer around practical and pedagogical issues instead of only ICT applications. These programmes have to encourage teachers to reflect on and make decisions about ICT use. Training must adapt to teachers needs if we expect them in turn to adapt to their students' needs. Also, teachers need to be empowered to recreate content, collaboratively.

This points leads to the third concern namely, the centralised nature of planning and implementation of ICT programmes.

An attempt has been made to address these concerns. But the last one namely, centralisation would preclude specific suggestions. A generic framework for pedagogy and training is outlined below. Wide-ranging consultations and discussions with stakeholders are needed to evolve locale-specific solutions.

5.2 ICT enabled Pedagogy

The starting point for technological innovation must always be goals and requirements of pedagogy. The primary aspects of media pedagogy namely its dynamism and non-linearity need to be harnesses to cater to constructivist pedagogy, expected of today's teachers. Research and experience show that it is through interaction with other people, ideas and new experiences that we all construct new knowledge.

Some of the ways in which content delivered through ICT can help children construct knowledge is by:

- Including instructions and giving opportunities for children to discuss/reflect/think/reason out
- Tapping the networking opportunity provided by computers to help children learn collaboratively
- Providing more activities/projects making use of local environment
- Evolving strategies with the help of teachers, subject experts, pedagogues and content developers, to identify where in the curriculum ICT is best used
- Identifying how to effectively integrate ICT into different pedagogical environments

Research on ICT and Pedagogy provide pointers to pedagogical frameworks for integrating ICT

into teaching/learning (Becta, 2008):

- Understand relation between a range of ICT resources and concepts, processes and skills in each subject
- Use ICT resources in challenging students' thinking and extending their learning in a subject
- Prepare and plan lessons using ICT
- Recognize kinds of class organisation for effective ICT use

It is essential that teachers are given freedom to choose technology suitable to topics and their children, after training them to become discernible.

A suggestive teacher training module is discussed in the next section.

5.3 Probable Training Module

A review of literature suggests three models of integrating ICT into classrooms within a constructivist framework:

1. Integrating an interesting ICT application into existing instruction for the teacher
2. Providing teacher access to complete and comprehensive multimedia curriculum wherein the teacher selects and sequences those she wants to use
3. Helping the teacher construct a unit around a theme or topic using a variety of resources

We adopted the third model in designing the training module. This module has been piloted by RV VSEI Resource Centre (a joint collaboration of RVEC and VSEI) for over 150 Government school teachers and 40 student teachers. The twin objectives of this ICT training programme were to equip teachers with basic computer literacy and to help them select and organize ICT resources in their classroom teaching. Accordingly, the five-day workshop included the following activities:

Sessions	Skills	Content	Activities
1	Typing	Word Processor; Kannada Font	Creating unit plans of their choice
2	Integrating	A variety of educational CDs and videos	Evaluating, selecting and organizing suitable resources to teach the unit
3	Presenting	Presentation software	Preparing a presentation for the unit selected and giving a demo lesson
4	Maintaining records	Spreadsheet and Word Processor	Initiating the process of creating question bank; using spread sheet to enter students' records and analyse students' marks

All sessions involved extensive discussions and reflections. It was impressed upon the teachers that there is no absolute best way of using ICT in teaching/learning. It was for them to evolve ways, think and reflect upon them and share them with other practioners. To help with this, we have mooted forming local networks and seeking continued support from the resource centre.

ICT is here to stay. Rather than trying to prove use of ICT is better than other methods of teaching, focus should be on progressively improving use of ICT by teachers. This can be achieved not by pumping in funds and large scale projects but by empowering a large number of teachers to make use of ICT collaboratively and research their own use. Unless ICT use in schools conceptualized differently from what is being practiced now, NCF's vision of constructivist classroom would remain a distant dream in Karnataka.

References

- Afi, 2008. *An evaluation of CAL*. www.learn-direct.co.in
- Azim Premji Foundation 2002. *A Study to Evaluate the Impact of Community Initiative*, www.azimpremjifoundation.org
- Azim Premji Foundation, 2002. *A study of Evaluate Impact of Community Learning Centres*. APF, India
- Becta, 2008. *ICT and Pedagogy – A Review of the Research*. ICT in schools Research and Evaluation series – No.18
- Kennewell, S .2001. *Using Affordances and Constraints to evaluate use of ICT in teaching learning*. Journal of Teacher Education (10) PP 101-116
- Kumar,M & Sarangapani, P (Eds), 2005. *Improving Government Schools*. Books for change, India
- Linden et al. 2003. *Computer-Assisted Learning: Evidence from a randomized Experiment*. Poverty Action Lab
- Linden, Letal. 2003. *Computer Assisted Learning: Evidence from a Randomized experiment*. Poverty Action Lab Paper No.5
- Martin Wendy and Shulman, Simon, 2006. *Impact of Intel Teach on Teachers' Instructional Practices and uses of Technology*. Education Development Centre, U.S.A
- Mikis, M. 2007. *Defining Innovative Pedagogical Practice*. National Institute for Public Education, Hungary
- Mythili.R, 2007. *Integrating Computers in Classrooms* Paper presented upon invitation at Rajiv Gandhi Foundation, New Delhi
- Nancy Law (Ed). 2006. *The use of ICT in Teaching and Learning*. IEA Second Information Technoogy in Education Study, www.sites2006.net
- National Focus Group, 2005. *Position Paper on Educational Technology*. NCERT, India
- NCERT, 2006. *Position paper: National Focus Group on Educational Technology*, www.ncert.nic.in
- Passi, B.K. 2000 *Knowledge-Construction and Media Pedagogy*. Perspectives in education 16(1) pp 5-12.
- Reeves, Thomas, 2003. *The Impact of Media and Technology in Schools*. The Bertelsmann Foundation, U.S.A.
- Rishikesh, 2005. *Computer Aided Learning – A Longitudinal Study in Karnataka*. A qualitative report, Azim Premji Foundation, India
- Rishikesh, S.B. 2005. *Computer Aided Learning Program - A Longitudinal study in Karnataka A Qualitative Report*. Azim Premji Foundation, Bangalore
- Teachers' ICT Skills and Knowledge needs, Final Report to SOEID.2007*. The Robert

London University, United Kingdom

UNESCO, 2002. *ICT in Teacher Education. A Planning Guide*. www.unesco.org

UNESCO, 2003. *Experts' Meeting on Teachers/Facilitators Training in Technology – Pedagogy Integration*. Final Report, unesco.org.in

UNESCO. 2003. *Building Capacity of Teachers/Facilitators in Technology-Pedagogy Integration for Improved Teaching and Learning*. www.unesco.org

Usha Reddi & Vineeta Sinha, 2004, India: UNESCO Meta Survey on the use of Technologies in Education. www.unesco.org

Venezky and Davis. 2002. *Quo Vademus? The Transformation of Schooling in a Networked World*. OECD/CERI

Windschith, Mark, 1998, *The www and Classroom Research: What path should we take?* Educational Researcher 27(1), pp 28-33.

World Bank Report. 2003. *Challenges for developing countries*. World Bank, Washington, D.C

RV Educational Consortium
RSST, Jayanagar 2nd Block, Bangalore 560011

Appendix -1

List of Sample Schools

Radio	CAL/Radio	CAL/Edusat	CAL/Radio/Edusat
1. GHPS, Sri. Gandhakavlu, Sunkadakatte 2. GHPS, Basavangudi	1. GMPS, Srinagar 2. GMPS, Mathikere 3. GMPS, Jeevanabhimannagar 4. GMPS, Gottigeri 5. GLPS, Murugeshpalya 6. GHPS, Yeshwanthpura Santhebeedhi 7. GHPS, Kadirenahalli 8. GHPS, Bytarayanapura 9. GHPS, Banjarapalya 10. GHPS, Kagalipura 11. GHPS, Tavarekere 12. GHPS, Yediyur 13. Shri Raja Rajeshwari 14. GMPS, Attikuppe 15. GHPS, Uttarhalli 16. GKBMS, Chamarajpet	1. GHPS, Tagachagere	1. GHPS, Nagavara 2. GMPS, Harohalli 3. GMPS, Bashettahalli 4. GHPS, Kachuvanahalli 5. GHPS, Dalimba

Form 1: School Details

1. Name of school: _____
- 1.1 School DISE Code: _____
2. School strength: _____
3. Nature of school: HPS / LPS
4. Does the school have a radio? Yes No
5. Does the school have a tape-recorder? Yes No
6. Does the school have a television? Yes No
7. How many computers are there in the school? _____
- 7.1 How many are in working condition? _____
- 7.2 How many of them support multimedia? _____
- 7.3 Are there educational CD ROM titles in the school? Yes No
- 7.4 Does the school have internet connection? _____
- 7.5 Nature of server a. Stand alone b. Thin client
8. For how many hours during the school-day do you get power, on an average? a. Less than 2 hrs b. 2-3 hrs
c. 3-4 hrs d. > 4 hrs
- 8.1 If no, is there a working back-up power supply? Yes No
9. Is there a separate computer Instructor/Teacher Yes No
- 9.1 If yes, her/his training details _____
10. In which year was: _____
- 10.1 CAL programme introduced? _____
- 10.2 Radio programme introduced? _____
- 10.3 Edusat programme introduced? _____

Form 2: Teachers' Questionnaire

Instructions: Please fill in your answers in the underlined space provided. In place where you find a box, please put a cross X in the appropriate box(es) and leave the remaining blank.

1. Name _____

2. Age _____

3. Gender _____

4. General Qualification

a. Graduate

b. Post Graduate

c. Any other _____
(Please Specify)

5. Your subject of specialization _____

6. Professional Qualification

a. B.Ed

b. M.Ed

c. Any other _____
(Please Specify)

7. No.of years of teaching experience _____

8. Which subject(s) do you teach? _____

9. Classes that you handle _____

10. Do you have a working knowledge of computers? Yes No

11. Do you have a computer in your house? If yes, do you have Internet connection at home?

Yes No

Yes No

12

12 a. In the course of your teaching, have you ever found any lacunae in the content covered by the prescribed text books? Yes No

12 b. If your answer to the previous question is yes, which one of the following resources do you use to fill up the lacunae?

1. Reference books	Yes <input type="checkbox"/> No <input type="checkbox"/>
1.1 If yes, is/are the books(s) that you use:	

<p>2. Newspapers</p>	<p>Yes <input type="checkbox"/> No <input type="checkbox"/></p>
<p>2.1 If yes, please mention the name of the newspaper(s)</p>	<hr/> <hr/>
<p>2.2 Please mention any three activities for which you use the newspaper, in your classroom</p>	<hr/> <hr/> <hr/>

<p>3. Radio</p>	<p>Yes <input type="checkbox"/> No <input type="checkbox"/></p>
<p>3.1 Mention the programmes that you felt were most useful</p>	<hr/> <hr/> <hr/>
<p>3.2 Why do you find them useful?</p>	<hr/> <hr/>
<p>3.3 Please describe briefly how you use the radio</p>	<hr/> <hr/>
<p>3.4 Do you use audio tapes in your class room?</p>	<p>Yes <input type="checkbox"/> No <input type="checkbox"/></p>
<p>3.5 If yes, please specify the context in which you use them.</p>	<hr/> <hr/>

<p>4. Television</p>	<p>Yes <input type="checkbox"/> No <input type="checkbox"/></p>
<p>4.1 If yes, please mention the name of the channel(s) that you use</p>	<hr/>
<p>4.2 Do you use a television programme to:</p>	<p>a. Discuss what you saw on TV with the students?</p> <p>b. Ask the students to view the programme, at home?</p> <p>c. Any other _____</p>
<p>4.3 Do you have Edusat</p>	<p>Yes <input type="checkbox"/> No <input type="checkbox"/></p>
<hr/>	<hr/>

<p>4.4 If yes, what programmes did you find most useful?</p> <p>4.5 Why do you find them useful?</p> <p>4.6 Please describe briefly how you use the Edusat programme</p>	<hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
<p>5. CD ROM's</p>	<p>Yes <input type="checkbox"/> No <input type="checkbox"/></p>
<p>5.1 If yes, please mention the titles that you use</p> <p>5.2 Do you use the CD ROM to:</p>	<hr/> <hr/> <hr/> <p>a. Gain information for yourself <input type="checkbox"/></p> <p>b. Allow students to gather additional information <input type="checkbox"/></p> <p>c. Develop activities for the students <input type="checkbox"/></p> <p>d. Any other _____</p>
<p>6. Internet</p>	<p>Yes <input type="checkbox"/> No <input type="checkbox"/></p>
<p>6.1 If yes, do you use the internet as:</p>	<p>a. A source of information <input type="checkbox"/></p> <p>b. A means of teaching <input type="checkbox"/></p> <p>c. A medium for communication with experts <input type="checkbox"/></p> <p>d. Any other _____</p>
<p>6.2 Do you validate the information on the internet?</p>	<p>Yes <input type="checkbox"/> No <input type="checkbox"/></p>
<p>6.3 If yes, are the criteria for validation</p>	<p>a. Self-developed <input type="checkbox"/></p> <p>b. From other source <input type="checkbox"/></p> <p>c. Any other _____</p>
<p>6.4 Please list any three criteria that you use to evaluate the web sites</p>	<hr/> <hr/> <hr/>
<p>6.5 Are you a member of any on-line group?</p>	<p>Yes <input type="checkbox"/> No <input type="checkbox"/></p>
<p>6.6 If yes, please provide the name(s) of the new group(s)</p>	<hr/> <hr/>

<p>13.1 Have there been instances when children have learnt a topic through one of these resources programme without you having to teach it in the classroom?</p> <p>a. CD b. Radio lesson c. Edusat</p>	<p>Yes <input type="checkbox"/> No <input type="checkbox"/></p>
<p>13.2 If yes, please mention the class(es) topic(s)</p>	<p>Class: _____ Subject: _____ Topic: _____</p>

14. Listed below are different kinds of resources. Please indicate your preference with respect to each by placing a cross mark in the appropriate box:

	Most preferred	Preferred	Somewhat preferred	Least preferred	Not at all preferred
a. Books					
b. Newspapers					
c. Radio					
d. Television programmes					
e. Computer					
f. CD ROM's					
g. Internet					

15.

15.1 Please mention the problem you face in making use of the afore-mentioned resources in the classroom. Please be specific as to the nature of the problem.

15.2 Based on your experience, please provide solutions to the problems you have raised. These solutions may be the ones that you have already implemented in your classrooms, or those that you would like to do so in future.

Form 3: Guidelines for Observation of Computer class

1. Class _____ :

2. Subject :
3. No. of students :
4. No. of students per computer :
5. Seating arrangement of students :
6. How many students can operate the computer: : All/ Majority /Only a few/ None
7. Title(s) of CD(s) being viewed :
8. Stage at which CD is being used:
(before, during or after a topic has been taught)
9. Whether all students are viewing the same CD simultaneously :
If yes, whether they are doing so in a single group or in small groups :
If in a single group, how the other children are occupied :
10. Level of interaction between teacher and students :
11. Level of participation by students :
12. Intervention by teacher :
13. Confidence shown by students in handling the computer :
14. Interaction among students :
15. Motivation shown by students In using CD's :
16. Discipline maintained by students :
17. Whether the activities/concepts covered in the CD were reviewed and summarised by the teacher:

Form 4: Guidelines for Observation of Radio lesson

1. Class: _____
2. Subject: _____

3. No.of students: _____
4. Title of the radio lesson : _____
5. Stage at which radio lesson is being used: _____
6. Whether the lesson is being repeated: _____
(To ascertain from students)
7. Level of interest shown by children in the lesson: _____
8. Participation by students : _____
9. Interaction between teacher and students: _____
10. Activities carried out by the students during the session: _____
11. Seating arrangement of children during Activity _____
12. Whether the instructions provided during the lesson were followed exactly: _____
- 12.1 If not, nature of alternatives/adaptations: _____
- 12.2 If yes, whether there were problems in doing so: _____
13. Discipline maintained by students: _____
14. Whether the activities/concepts covered in the radio lesson were reviewed and summarized:
By the teacher: _____
15. Is the radio lesson aligned to the school subjects/ classroom transactions : Yes No
16. Participation by teachers: Active Passive
17. Whether time management of radio lesson is a problem Yes No :
17.1 If yes, How does the teacher address it : _____

Form 5: Guidelines for Observation of Edusat Programme

1. Class: _____

2. Subject: _____
3. No.of students: _____
4. Title of the programme : _____
5. Whether the programme was summarized/reviewed by the teacher: _____
6. Stage at which the programme is being used: _____
7. Whether the lesson is being repeated: _____
8. Whether the TV presentation were clearly visible to all students: _____
9. Level of interest shown by the students: _____
10. Whether students were taking notes during presentation: _____
11. Discipline maintained by students: _____
12. Involvement of teachers: _____

Form 6: Guidelines for Classroom Observation

1. Whether the classroom is : Multi grade Single grade

2. Subject taught during observation : Kan ☐ Maths ☐ Science ☐ Social Science ☐ Eng ☐

3. Class(es) handled by the teacher: ----- No. of students: -----

4. Gender of the teacher : Male ☐ Female ☐

5. Classroom Environment

5.1 Is the classroom clean?	Yes/No
5.2 Is there a seepage-free even flooring?	Yes/No
5.3 Is there a secure, leak-proof roof?	Yes/No
5.4 Is the classroom well ventilated?	Yes/No
5.5 Are there benches / desks for children?	Yes/No
5.6 If no, how are the children seated?	In rows / In groups
5.7 Did the children keep their bags stacked	Yes/No
5.8 Is there a table / chair for the teacher? If yes, how often did the teacher sit on the chair?	Yes / No Rarely / often / very often
5.9 Are there visuals displayed?	Yes/No
If yes, are they:	Student created/teacher created/purchased?

6. Classroom Management

6.1 Where was the class conducted?	Inside the classroom / outside the classroom
6.2 If inside the class, were the students seated in one place throughout the class?	Yes/No
6.3 Did the teacher attend to the seating arrangement of the children?	Yes/No
6.4 How frequently did children write?	Not all / once in a while / often
6.5 While the children wrote, did the teacher go around checking their work?	Yes/No
6.6 Did the teacher expect complete silence in the classroom?	Yes/No
6.7 Did the teacher spend extra time with slow learners?	Yes/No
6.8 How did the teacher engage students who finished their work ahead of others?	

1

7. Teaching (provide details for all items under this category)

7.1. Games played	
7.2 Activities given	
7.3 Use of :	
<ul style="list-style-type: none"> a. Models b. Charts c. Textbook d. Other books, e. Newspaper f. Magazines g. Computer / CD h. Any other teaching aid(please specify) 	
7.4. Stories / anecdotes / examples given	
7.5 Dramatization / Role play done	
7.6 Use of blackboard	
8. Integration with CD's / Radio/Edusat (Please provide the following details if this is being done)	
8.1 Link with previous CD's /Radio/Edusat viewed	
8.2 Instruction for viewing CD/Radio/Edusat relevant to the topic being taught	
8.3 Background information / Preparatory work for students before viewing CD /Radio/Edusat	
8.4 Suggestions/Ideas/Discussions based on CD's/Radio/Edusat	
8.5 Any Other	
9. Were these resources used for students project work	Yes/No
9.1 If yes, How was it used	Individual / Group
9.2 Please provide details:	_____ _____ _____

Form 7: Guidelines for Interaction with Students

1. Do they like coming to school? Why?

2. What do they enjoy most? Why?
 - Using CD's
 - Listening to radio lessons

3. Do they face difficulties in using computers? If yes, what?

4. What do they do using computers?

5. Do they play computer games? If yes, please provide details

6. What are their favourite CD titles?

7. What concepts have they learnt best using CDs?

8. Do they find radio lessons interesting? Why/Why not?

9. Do they face difficulties while listening to radio programmes? If yes, what?

10. What activities have they enjoyed most in the radio lessons?

11. What concepts have they learnt best through radio lessons?
12. Do they find TV lessons interesting? Why/Why not?
13. Do they face difficulties while viewing TV programmes? If yes, what?
14. What TV programme have they liked most?
15. What concepts have they learnt best through TV?
16. What do they find different while learning using computers/radio/TV and their regular classroom teaching?
17. Do they prefer technology to their teacher? Why?